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Betwixt and between.

Production and commodification of knowledge in a medical school pathological anatomy laboratory in Strasbourg (mid-19th century to 1939)

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Fig. C

Betwixt and between.

Production and commodification of knowledge
in a medical school pathological anatomy laboratory in Strasbourg,
(mid-19th century to 1939)

Entre science et service.

Production et commercialisation de la connaissance d'un laboratoire d'anatomie pathologique de la Faculté de Médecine de Strasbourg (mi-19e siècle - 1939)

Présentée par
Tricia CLOSE KOENIG

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Résumé de thèse.[1]

L'enjeu de cette thèse est de croiser l'histoire des sciences médicales et l'histoire économique pour saisir et comprendre la dynamique de production et la commercialisation de ce qu'on désigne en français comme l'activité « des analyses médicales » ; c'est-à-dire un service qui produit à partir de prélèvements corporels des informations bio-médicales utilisées à des fins de diagnostic médical. Elle s'appuie sur le cas spécifique de l'histoire d'un laboratoire d'anatomie pathologique de la Faculté de Médecine de Strasbourg. Le but poursuivi consiste à éclairer la naissance des analyses médicales en tant qu'entités médicales *et* économiques dans le cadre des théories récentes de l'émergence d'une économie basée sur la connaissance. La thèse croise une analyse de longue durée des circulations et des pratiques matérielles en anatomie pathologique et une micro-histoire d'un laboratoire universitaire d'anatomie pathologique dans l'entre-deux-guerres. Elle décrit et contextualise la diversification de l'activité de ce laboratoire entre 1919 et 1939, période à laquelle ses fonctions habituelles de recherche et d'enseignement se doublent de la naissance d'une proto-industrie produisant un service d'analyse médicale. Outre ses fonctions d'enseignement et de recherche, le laboratoire obtient ainsi une troisième identité, celle d'un laboratoire de diagnostic. Si le croisement entre longue durée et micro-histoire fait apparaître l'histoire de l'Institut d'Anatomie Pathologique de Strasbourg à bien des égards comme fragmentaire voire lacunaire, c'est précisément que le centre de notre intérêt n'est pas une histoire institutionnelle mais une histoire médicale et économique de la naissance d'un laboratoire d'analyses médicales au sein de cet Institut.

Quels sont les attendus de cette réflexion ? En milieu hospitalier comme en médecine de ville ou spécialisée, tests, analyses et autres examens médicaux sont monnaie courante. Les

[1] This extended thesis summary in French is inserted here as required at the *Université de Strasbourg* for dissertations written in English.

échantillons prélevés (sang, urine ou tissus) sont envoyés dans un laboratoire, intégré ou non au lieu de prélèvement, puis soumis à un ensemble de procédures impliquant des techniques chimiques, biochimiques, microbiologiques, cytologiques, histologiques ou bactériologiques. Aujourd'hui, on estime que les résultats de ces examens de laboratoire participent pour 60% à 80% des décisions médicales. Ceci n'a cependant pas toujours été le cas.

Les laboratoires d'analyses médicales ne sont pas uniquement des éléments de pratique médicale. Les moyens nécessaires à l'obtention d'un échantillon, à son conditionnement, à son transport, à sa préparation, à son examen et à son analyse forment la base d'une véritable industrie du service médical. En France, une étude économique récente a constaté l'existence de 4200 laboratoires, employant 46200 personnes dont l'activité relève des laboratoires d'analyses biologiques et médicales (LABM). Un rapport de la Cour des Comptes, datant de 2005, souligne l'augmentation des coûts relatifs à ces laboratoires au sein de l'économie générale des soins médicaux, coûts estimés à 46 euros par habitant en 2000. Les données BIOLAM concernant les analyses médicales effectuées par les laboratoires privés et remboursées par la Sécurité sociale montrent une augmentation de près de 50% des dépenses relatives aux analyses de laboratoire entre 2000 et 2008. Cette étude estime également les dépenses de laboratoire pour l'année 2003 à 2,4 milliards d'EUR pour le secteur public (les hôpitaux) et 3,66 milliards d'EUR pour le secteur privé (les LABM « en ville »). Comme le montrent ces chiffres, l'histoire du développement économique des laboratoires d'analyses médicales est un aspect au moins aussi fondamental que leur histoire scientifique. Pourtant, aujourd'hui, nous ne savons que peu de choses sur l'émergence et le développement de ce système laborantin. L'historiographie a généralement tenu cette question à distance. L'étude du cas des Hôpitaux Universitaires de Strasbourg et de la Faculté de Médecine de Strasbourg nous permettra de nous saisir de cette question.

En 1999, le directeur des hôpitaux universitaires et municipaux de Strasbourg (HUS) et le président de l'Université Louis Pasteur (ULP) demandèrent conjointement à l'État une évaluation et une expertise concernant l'état financier des laboratoires de la Faculté de Médecine et leurs relations avec l'hôpital municipal. Leur activité était considérable et dépassait largement ce que les universités étaient habituées à administrer. Par exemple, dans les années 1990, les revenus issus de l'activité de service des laboratoires médicaux représentaient approximativement 10% du budget universitaire. En 1992, les HUS dépensèrent 132,2 millions de FRF (ce qui équivaut à 20 millions d'EUR) pour les services de laboratoire, et, en 1995, 157,8 millions de FRF (24 millions d'EUR), ce qui représentait alors 6% du budget de l'hôpital. Cependant, la dynamique économique des laboratoires d'analyses n'est pas une préoccupation nouvelle et cette enquête de 1999 n'était pas la première à produire un tel état des lieux. La première datait de 1937.

Cette thèse s'inscrit à l'intersection d'une historiographie des laboratoires - et de ce qui fut décrit comme la révolution de laboratoire en médecine - et d'une approche programmatique liant histoire médicale et histoire économique.

Les historiens s'accordent à reconnaître que les laboratoires jouèrent un rôle indispensable en médecine au 20e siècle. Ainsi, dans le triptyque des cosmologies médicales développé par Edwin Ackernecht - médecine au chevet du malade, médecine d'hôpital et médecine de laboratoire[2] - la médecine de laboratoire est nettement caractérisée comme une médecine moderne qui débuterait aux alentours de 1848 et qui se prolongerait durant tout le 20e siècle. L'omniprésence des laboratoires médicaux a été mise en évidence par de nombreuses publications. Il en est ainsi, pour ne citer ici que quelques références, d'Olga Amsterdamska et Anja Hiddinga, dans leur contribution au volume de référence *Medicine in*

[2] Pour reprendre la terminologie anglo-saxonne : bedside medicine, hospital medicine, laboratory medicine.

the twentieth century, ou encore de l'introduction au volume *The Laboratory revolution in medicine*, dirigé par Andrew Cunningham et Perry Williams. Les laboratoires ont essentiellement retenu l'attention en tant que lieux de recherche et d'enseignement médical. En revanche, une troisième acception, celle du laboratoire en tant qu'institution de service élaborant des diagnostics médicaux et produisant des données médicales, a très peu été l'objet d'études en histoire de la médecine durant les deux dernières décennies. Cette troisième fonction relativement négligée est pourtant essentielle à la compréhension du rôle du laboratoire dans les pratiques médicales : elle est au centre de cette thèse.

Les publications du début du 20^{e} siècle envisagent les pratiques et les analyses de laboratoire comme une application de la « science » à « l'art » médical. Les historiens quant à eux ont souvent souscrit au récit selon lequel, de la fin du 19^{e} siècle au milieu du 20^{e} siècle, les chercheurs et les praticiens se situaient dans des mondes différents traversés par des tensions. Cependant, une littérature récente suppose que, depuis leur émergence, les sciences de laboratoire, et plus particulièrement la bactériologie, « parlent » aux praticiens, et sont devenues ainsi inévitables, fondamentales et routinières pour la pratique médicale. Actuellement, certaines études questionnent de plus en plus profondément ce dernier caractère désormais évident des laboratoires, selon lequel les programmes de recherche ont une pertinence quasi-inhérente ou quasi-évidente pour la pratique médicale. La manière dont les connaissances de laboratoire pouvaient « parler » aux praticiens est cependant une question qui reste entièrement ouverte. Si les données de laboratoire et les expertises étaient effectivement une confirmation ou une aide au jugement clinique, elles auraient menacé l'expertise et l'art clinique, d'autant plus lorsqu'elles les contredisaient ou les rejetaient. En confirmant le jugement clinique, elles n'étaient pas essentielles et pouvaient être considérées comme superfétatoires. Inversement, en contredisant l'expertise clinique, elles pouvaient être envisagées comme un discrédit de l'autorité des praticiens. Dans ce cas, pourquoi et comment les analyses médicales de laboratoire ont-elles fini par devenir une part intégrante de la pratique médicale ?

L'approche méthodologique STS des années 1980 et 1990, promouvant la considération des pratiques scientifiques, nous permet d'interroger cette rencontre et cette progressive coopération entre les laboratoires et les praticiens médicaux. En abordant les histoires de laboratoires comme autant d'histoires de pratiques et de matériaux, nous dépasserons alors le slogan, rhétoriquement séduisant, mais analytiquement décevant, selon lequel les laboratoires « parlent simplement au médecin ». Si, dans le champ STS, les études de laboratoire ont traité de leur construction par l'examen de leurs pratiques, ces dernières ont par ailleurs été analysées par les historiens des sciences. Ce fut le cas de Hans-Jorg Rheinberger dans ses recherches sur les objets épistémiques des laboratoires et John Pickstone dans sa caractérisation des pratiques de laboratoire en tant que « ways of knowing ». Quant à nous, nous soutiendrons que, si les services de laboratoire et les techniques de diagnostics sont enracinés dans les sciences médicales, les origines des pratiques de service (prélèvements, conditionnement, transport, préparations et examen) se trouvent dans des pratiques de production de savoirs scientifiques. Leur construction et leur formulation émergent des laboratoires de sciences médicales qui, les premiers, ont intégré des compétences de diagnostic. L'examen de ces pratiques éclaire cette transition d'une science à un service.

Les structures hospitalières illustrent bien cet état de fait. Pour la plupart d'entre elles, le nombre et la nature des examens augmentant, au point de requérir plusieurs heures de travail par jour et du personnel spécialisé, les administrations procédèrent à la création de services centraux. Cette rationalisation, dans le but d'effectuer des économies d'échelle, a permis d'en contrôler les coûts. Habituellement, dans le cadre français, où les hôpitaux sont pour la plupart publics, les laboratoires sont dirigés par leur administration centrale et leurs budgets intégrés au budget global de l'institution : ils servent à effectuer des analyses, des examens et des diagnostics pour les patients. À Strasbourg, ce service était localisé à la Faculté de Médecine. Lorsque la demande, les effectifs de personnels et la quantité de matériels s'accrurent, la construction de nouveaux bâtiments fut rendue nécessaire. Les services de laboratoire étaient alors établis comme des entités indépendantes au sein de chaque institut de la Faculté de Médecine et les activités s'étendirent et se virent attribuer des lieux bien identifiés.

Néanmoins, le cas de figure strasbourgeois possède quelques particularités. En 1918, la ville de Strasbourg, faisant retour à la législation française, disposait d'une faculté de médecine construite durant l'annexion allemande. La faculté entretenait ses propres cliniques et sa propre recherche médicale. En 1919, ces cliniques et instituts devinrent les propriétés de l'université. Plus tard, en 1935, les cliniques furent transférées à l'hôpital, via une convention entre la Faculté de Médecine et l'Hôpital civil. Cependant, les instituts scientifiques et les laboratoires des cliniques demeurèrent partie de la Faculté de Médecine et ainsi de l'université. L'hôpital municipal local ne possédait, quant à lui, aucun équipement de laboratoire et devait sous-traiter ces tâches aux laboratoires des cliniques et des instituts qui avaient le savoir-faire nécessaire pour effectuer des analyses médicales. Ces laboratoires appartenant à la Faculté de Médecine, les travaux d'analyses en appelèrent à des compensations ou des rétributions financières. Cette sous-traitance et les arrangements subséquents furent documentés et, en conséquence, sont aujourd'hui visibles pour l'historien, tandis qu'ailleurs en France, ils sont souvent difficilement perceptibles et demeurent invisibles.

Les services du laboratoire de la Faculté de Médecine de Strasbourg étaient proposés par les directeurs des cliniques et des instituts scientifiques, à destination de l'hôpital public mais aussi du secteur privé. A l'instar des professeurs de médecine qui soignaient des patients privés au sein des cliniques de la Faculté de Médecine à Strasbourg, d'autres proposèrent les services de laboratoire aux praticiens privés. Pour ces activités, les professeurs des cliniques étaient rémunérés par des honoraires privés et les services de laboratoire, lorsqu'ils apparurent, furent traités de la même manière. Ces services de laboratoire se situaient donc à mi-chemin de l'hôpital et de la pratique privée. Il existait cependant, dans certains laboratoires, une distinction subtile entre cette activité de diagnostic comme activité mineure qui ne requiert pas de personnel supplémentaire, et un service diagnostique établi, requérant du personnel, de l'équipement et du matériel supplémentaire.

Les honoraires représentaient le moyen de rémunérer une profession libérale qui supposément ne produit pas de plus value. L'adoption de tarifs fixes pour chaque acte médical coïncide avec le développement du mouvement syndical des médecins de la fin du 19e siècle. La tarification correspondait au tiers payant et réduisait la pratique médicale à des tâches spécifiques liées à un système de rémunération à l'acte. Les hôpitaux, autant que les hospices, n'étaient pas non plus soumis à une dynamique commerciale. Ils comptaient sur les donations charitables pour couvrir les frais de fonctionnement. En même temps, les hôpitaux n'avaient que peu de frais de fonctionnement. En France, les hôpitaux devinrent des centres de soin médicaux durant la période de l'entre-deux-guerres. Comme ils recevaient de plus en plus de patients et une clientèle payante privée, comme ils proposaient des diagnostics et des traitements médicaux et réunissaient des technologies médicales, les finances devinrent un véritable problème et des frais furent attribués aux actes et services médicaux.

L'histoire de la médecine n'a accordé que peu, si ce n'est aucune attention aux aspects économiques et financiers des activités scientifiques et médicales dans l'enseignement hospitalier et médical, les collections et les musées médicaux, et dans les laboratoires. Cette thèse rend les aspects monétaires et économiques visibles en tant que parties intégrantes de la recherche, de l'enseignement et des pratiques médicales et scientifiques. Elle entreprend et promeut une histoire économique de la médecine, celle d'un monde et d'une époque où les scientifiques et les médecins n'avaient pas nécessairement à gagner leur vie par leur profession, où l'argent n'était pas (tout du moins de façon manifeste) valorisé ou visible et où les arrangements financiers furent souvent intriqués à la charité et à la solidarité hospitalières, mais où les aspects économiques et financiers dépassèrent, et de loin, l'état des finances communément associé à l'enseignement et à la recherche.

Les laboratoires de la Faculté de Médecine de Strasbourg, et ceux ailleurs en France, étant au sein d'universités publiques, n'étaient pas prévus comme des structures devant générer des bénéfices. Ils furent l'objet d'une économie d'ordre académique, où ce sont des idées et des faits qui sont produits et où la valeur, le profit et les dépenses sont associés à un capital symbolique. Mais les pratiques concrètes sont bien plus ambivalentes. Lorsqu'une demande pour de telles idées se développa en dehors de la sphère académique, alors, en principe, elles purent être marchandées et échangées pour de l'argent, ce qui était connu dans les laboratoires universitaires d'ingénierie. L'argument de ce travail est de considérer la fin du 19^{e} siècle et le début du 20^{e} siècle comme le moment de naissance d'une proto-économie fondée sur la connaissance, dans laquelle le savoir put être transformé en avantages substantiels et en recettes financières. Ainsi, la rétribution cessa d'être uniquement symbolique et d'ordre scientifique, et les échanges et les gains devinrent tout à la fois scientifiques et monétaires.

Au sein de cette histoire des sciences médicales et dans le paysage des pratiques médicales (supposées) non-commerciales et des Facultés de médecine publique, il n'y a semble-t-il que peu de raison de susciter des questions d'ordre économique. Les résultats de cette thèse prouvent cependant le contraire. Il y a de bonnes raisons de faire intervenir les aspects commerciaux et économiques dans l'histoire des laboratoires médicaux. Non seulement pour comprendre la manière dont ils devinrent aussi lucratifs qu'ils le sont aujourd'hui, mais aussi parce que cette dimension économique encore non explorée révèle une autre face de la manière dont les premiers laboratoires fonctionnèrent. Qu'avaient donc à vendre les laboratoires ? Les échantillons de tissus et de fluides entraient au laboratoire, du papier en sortait. La transaction financière n'impliquait cependant pas d'échange matériel. Ce qui était vendu était immatériel : des mots ou des chiffres. Le savoir scientifique était codifié et transféré sur du papier. Le travail des laboratoires cliniques produisait des informations cliniquement pertinentes conduisant à la création d'une économie de la connaissance qui grandit en une industrie lucrative.

La préoccupation de l'Etat relative à l'augmentation des coûts du travail des LABM ne s'est pas limitée aux enquêtes nationales sur les coûts des analyses de laboratoire. En 1997, la Cour des comptes effectua une enquête concernant les comptes des HUS, pour la période de 1988 à 1993. Un des points centraux de cette enquête portait sur les laboratoires universitaires et sur les relations économiques et financières existant entre ces laboratoires et l'hôpital, une particularité locale attestant du passé complexe de la ville et de la région, entre la France et l'Allemagne. Cette étude soulignait le manque de clarté dans la distinction des propriétés et des dépenses respectives de l'hôpital et de l'université, et recommandait une révision de la convention qui structurait leur relation. Elle décrit les principes de cette convention : les remboursements réciproques des coûts réels engagés par chaque structure. Les relations de la faculté de médecine et de l'hôpital via une convention devaient aboutir à un accord de non-profit entre deux institutions publiques qui échangent des services réciproques.

Les laboratoires universitaires auxquels nous avons fait référence incluent : 3 laboratoires de biochimie (incluant l'Institut de Génétique et de Biologie Moléculaire et Cellulaire), 3 laboratoires de microbiologie (bactériologie, virologie, parasitologie), les laboratoires de l'Institut d'Hygiène, l'Institut Médico-légal, l'Institut de Biophysique, l'Institut d'Anatomie Pathologique et l'Institut de Pharmacologie, ainsi que la Clinique de Dermatologie et la Clinique d'Ophtalmologie. L'étendue restreinte d'une thèse requiert un choix méthodologique. Si nous voulons analyser l'histoire d'un laboratoire en profondeur, il faut se contenter de n'en choisir qu'un seul, en fonction de la pertinence du laboratoire, de l'accessibilité de ses rapports considérés comme des sources et de son intervention durable dans le monde de l'analyse médicale.

Les registres de laboratoire étaient localisés à l'Institut d'Anatomie Pathologique et à la Clinique de Dermatologie. Cette dernière comportait un service diagnostique qui ne concernait que les patients traités au sein de la clinique. Mais le premier présentait l'avantage de disposer de sources car, outre les registres de laboratoire, d'autres sources primaires étaient accessibles qui détaillent la dynamique économique du laboratoire. L'Institut d'Anatomie Pathologique présentait aussi la spécificité d'être passé du giron de la Faculté de Médecine allemande à celui de la Faculté de Médecine française en 1919. Il a été de plus l'objet d'une enquête financière commanditée par la Cour des comptes durant l'entre-deux-guerres. Pour ces raisons, il a semblé particulièrement opportun pour l'objectif de cette thèse de placer l'Institut d'Anatomie Pathologique au cœur de cette étude de cas.

Les sources mobilisées comprennent, tout d'abord, les sources historiques classiques de l'histoire institutionnelle. Des publications scientifiques et des articles biographiques décrivent les personnages, Friedrich von Recklinghausen et Pierre Masson, qui dirigèrent l'Institut et la manière dont ils le firent. Les catalogues du musée d'anatomie et les registres d'autopsies font apparaître l'émergence des traditions de l'anatomie et de l'anatomie pathologique qui forgèrent les pratiques de l'Institut. Les rapports de l'université et les archives administratives de l'hôpital et de l'université nous renseignent sur la place de l'Institut au sein des relations entre la Faculté de Médecine et l'Hôpital Civil. Deuxièmement, les registres de laboratoires ont été mobilisés pour des analyses quantitatives de l'activité du service entre 1919 et 1939. Ceci comprend le dénombrement, la compilation et l'analyse des inscriptions journalières aux registres, afin de donner une image statistique de ce que fut une activité émergente. Troisièmement, les tensions financières entre la Faculté de Médecine et l'Hôpital Civil, un complexe hybride particulier en France, conduisit la Cour des comptes à s'y intéresser entre 1937 et 1939 dans une enquête portant sur la période 1924-1934. Les rapports de cette enquête et l'attention qu'ils portent aux pratiques comptables de l'Institut d'Anatomie Pathologique ouvrent une fenêtre au sein des pratiques de gestion de ce laboratoire et en donnent le détail des comptes.

Le recoupement de ces trois approches - celle d'une histoire institutionnelle et biographique, celle de la pratique quotidienne et celle d'une histoire comptable - constitue l'un des caractères originaux de cette thèse. La confrontation de cette variété de sources a permis de dresser la carte de dynamiques scientifiques et économiques profondément intriquées au sein d'un institut de science médicale lorsque ce dernier développa une activité de service. L'approche méthodologique et les sources ont permis d'envisager, d'identifier et d'entrer dans le détail de la commercialisation des diagnostics anatomopathologiques durant l'entre-deux-guerres.

À la suite de l'annexion de Strasbourg par l'Allemagne en 1872, un institut allemand de pathologie fut créé. Les pratiques matérielles de cet *Pathologisches Institut* - collectionner, décrire, nommer, comparer et organiser - sont issues d'une tradition propre à l'histoire naturelle. Collecter et enregistrer s'intègrent dans une longue tradition en anatomie, qui date du 18^{e} et du 19^{e} siècle. Les pratiques de production du savoir d'anatomie pathologique durant la période de l'entre-deux-guerres peuvent être attribuées à cette tradition. La collection d'anatomie de Strasbourg du 19^{e} siècle reflète les intérêts des anatomistes, lesquels se portent non seulement en anatomie normale, mais aussi en anatomie pathologique. Les contenus propres aux musées médicaux furent organisés et réorganisés afin de présenter et de révéler les savoirs anatomiques et pathologiques. Mais la production de savoir ne fut pas limitée à ces procédures de mise en ordre. Les préparations du musée furent décrites et examinées dans des dissertations, des articles et des observations. Une fois accumulé, classifié et mis en ordre, le monde des préparations peut être mis en parallèle et rapproché d'autres mondes et d'autres formes d’apprentissage. De façon similaire, les pathologistes extrayaient les comptes-rendus des catalogues et les combinaient pour établir et documenter les maladies dans le sens d'une pratique épistémique propre à l'histoire naturelle. Ceci était le cas de la méthode anatomo-clinique qui mettait en relation les conclusions des pathologistes et les antécédents d'un cas médical. Les pages des catalogues purent être réarrangées et comparées avec des antécédents médicaux. Ces pratiques de comptes-rendus n'étaient donc pas seulement des pratiques administratives et d'inventaires. Elles furent des « technologies de papiers », que Volker Hess et Andrew Mendelsohn définissent comme ne relevant pas seulement de l'organisation et la mise en ordre du savoir, mais participant de sa production.

Au sein des écoles et facultés de médecine, les collections et les musées ont été des lieux de production du savoir médical, mais également des lieux où des matériaux étaient circulés, transformés, stockés et échangés. Cela était rendu possible par l'existence préalable de pratiques matérielles : réunir et préparer les spécimens. Le premier chapitre de la thèse décrit et analyse les traditions des pratiques anatomiques et pathologiques qui sollicitaient des corps humains. La donation (et la vente illégale) des corps de criminels exécutés constitua la principale source de corps en France. Les départements et les instituts d'anatomie des facultés de médecine donnaient accès à des matériaux qui dans d'autres circonstances ne pouvaient circuler. Au 19^{e} siècle, la presque totalité des corps des personnes qui mouraient à l'hôpital de Strasbourg étaient autopsiés au sein du l'Institut d'Anatomie. À la fin du 19^{e} siècle, une partie de cette activité fut transmise aux pathologistes allemands du *Pathologisches Institut.*

L'examen des pièces d'autopsie devait confirmer les causes du décès, et étaient utilisées pour l'enseignement et la recherche. L'examen des pièces chirurgicales conduisit à un élargissement de la perception de la maladie et des lésions. Ainsi, les pathologistes examinèrent les lésions à un stade potentiellement plus précoce de l'évolution de la maladie. Pour l'étude des modes d'évolution d'une maladie, l'identification de cette dernière à différentes étapes de son évolution fut crucial.

La construction du bâtiment du *Pathologisches Institut*, inauguré en 1878 à Strasbourg, apparut comme l'édification d'une « fortification scientifique. Ceci était notamment lié au fait que cet institut bénéficiait d'un laboratoire de pointe, à l'instar des autres instituts de l'université allemande conçus pour illustrer la puissance de la recherche et de l'enseignement allemands. Ces laboratoires de pathologie côtoyaient la morgue, les salles d'autopsie, et les amphithéâtres. Les examens furent dès lors interprétés et traduits plus seulement à l'amphithéatre de dissection, mais aussi au sein des laboratoires et sur leur paillasses. Ceci impliquait l'usage de microscopes, ainsi que les pratiques d'anatomie pathologique qui englobaient la microscopie et l'histologie. Le matériau au cœur du travail de ces laboratoires était d'un nouveau format : les préparations microscopiques. Elles impliquaient diverses techniques de préparation, mais aussi de visualisation, les unes et les autres dérivant du laboratoire. Malgré les transformations des pratiques et des lieux de travail, les pratiques de laboratoire de pathologie partageaient de nombreux traits communs avec les pratiques muséales précédentes : la collecte, la préparation et la préservation, la collection de spécimens, la description et la publication. L'approche anatomo-clinique de comparaison *post-mortem* des lésions et des symptômes fut alors étendue de l'examen macroscopique à l'examen microscopique. Avec l'accumulation des observations histopathologique, il devint possible d'identifier des structures morphologiques ou cellulaires, conduisant à redéfinir les catégories des maladies. De la recherche à la pratique médicale, le deuxième chapitre de la thèse enquête sur la manière dont les lames histopathologiques devinrent des matériaux à partir desquels on put connaître une maladie, dans un processus circulaire de production et d'application du savoir médical.

À la fin du 19e siècle, avec la révolution microscopique, les pathologistes ajoutèrent une nouvelle dimension à leur savoir. Ils devinrent histopathologistes, dotés d'une expertise dans l'identification des maladies, identification qui dès lors n'était plus exclusivement *post-mortem*. Ceci implique qu'ils ont conçu et produit de nouvelles sources d'offre de connaissance. Mais comment et quand les praticiens commencèrent-ils à vouloir confronter leurs diagnostics cliniques aux examens du laboratoire histopathologique pour confirmer ou infirmer leurs observations ? Ou, pour le dire en des termes économiques, quand et comment une demande émanant des médecins, pour des examens histopathologiques, apparut-elle ? C'est en ce point que l'histoire des laboratoires d'analyses médicales chevauche ou croise l'histoire d'une préoccupation majeure de la santé publique du début du 20e siècle : la lutte contre le cancer. La reconfiguration des approches et des enjeux thérapeutiques relatifs à la santé du collectif national après la Première Guerre mondiale aboutit à l'instauration d'une réforme majeure concernant le traitement du cancer, impliquant l'établissement du modèle des « centres régionaux de lutte contre le cancer ». L'une des premières institutions de ce genre, le Centre Paul Strauss, fut inauguré à Strasbourg en 1924. Les centres firent la promotion d'une approche de travail en équipe comprenant des anatomopathologistes, des chirurgiens, des radiothérapeutes et des physiciens, travaillant sur un pied d'égalité. Les recommandations émises impliquaient la détermination par le diagnostic histopathologique du traitement du patient. Ce traitement pouvait alors être jugé inutile ou alors impliquer les techniques chirurgicales ou radiothérapiques. Ceci suscita une demande d'expertise histopathologique et, par conséquent, un laboratoire d'histopathologie uniquement destiné aux diagnostics. L'Institut d'Anatomie Pathologique mit ces services à disposition du centre. Cependant l'examen histopathologique d'échantillons de tissus de patients fut étendu à la région entière. Les praticiens et les hôpitaux s'intéressèrent à ce laboratoire dans le but d'obtenir des rapports d'examen, lesquels pouvaient constituer un ticket d'entrée permettant de bénéficier des équipements nécessaires au traitement du cancer, ailleurs inexistants. L'information était codifiée avec des mots et des termes définis lors de la production des connaissances. La classification et la codification n'étaient pas seulement des outils de communication professionnelle, elles participèrent de la coordination des thérapies contre le cancer. L'information, en tant que mots, devint la clé. Non seulement des clés « lexicales », mais littéralement, elles ouvrirent des portes à des patients atteints du cancer, notamment les portes des centres de traitement. Le cancer, au premier plan des agendas politiques et médicaux, fut à l'arrière-plan de la création d'activités de laboratoire distinctes au sein de l'Institut d'Anatomie Pathologique. La manière dont le laboratoire en vint à revêtir une double identité – celle d'un laboratoire de la Faculté de Médecine pour l'enseignement et la recherche et celle d'un laboratoire de services pour le diagnostic – est l'objet du chapitre trois.

La demande de diagnostics histopathologiques apparut donc avec les changements affectant les modalités de traitements thérapeutiques et le développement de la radiothérapie. La demande d'information histopathologique fut ainsi co-construite sur la base de savoirs élaborés par les pathologistes et sur la demande utilitaire des professionnels du cancer de disposer d'une information essentielles à leur diagnostic. Elle nécessitait la création et l'adaptation d'un service standardisé par la codification de connaissances scientifiques qui puissent s'échanger et circuler en tant qu'information. Dotés d'un lexique ou d'une nomenclature adaptés et partagés, les pathologistes traduisaient leurs observations en catégories médicales. Le rapport d'examen était effectivement traduit dans un format papier qui pouvait facilement être envoyé aux praticiens.

Au-delà de la production intellectuelle du savoir et de son utilité clinique, le chapitre quatre pose la question de savoir comment la connaissance et la demande furent transformées en un marché, à part entière, des analyses histopathologiques. La réalité économique a été reconstruite à partir de la pratique médicale, les pratiques de laboratoire et d'autres traces d'archives. Les registres des laboratoires de l'Institut d'Anatomie Pathologique enregistrèrent les détails des échantillons envoyés au laboratoire, aussi bien que les observations de leur examen histopathologique. Ces registres étaient un moyen de tenir à jour les comptes du laboratoire, et offrent également une vue à l'échelle de l'activité du laboratoire. Des analyses quantitatives en série des entrées de ces livres de compte entre 1919 et 1938 révèlent une multiplication par 5 du nombre d'examens histopathologiques effectués au laboratoire. En 1919, 571 examens ont été enregistrés. Ceci correspond à 11 échantillons examinés par semaine ou à 2 par jour. Au début, l'activité de service diagnostique du laboratoire restait un travail gérable, à la charge du directeur de laboratoire, aidé d'un assistant ou d'un étudiant. Cependant en 1938, les examens atteignirent le au nombre de 2832, soit 55 analyses par semaine ou encore 8 par jour. Cette augmentation du volume impliquait une augmentation des besoins et des coûts en heures de travail et du matériel nécessaire pour le travail de laboratoire. Ceci engendra un tournant dans la gestion des pratiques et inévitablement posa la question de savoir qui allait payer cette augmentation des coûts.

Les accords initiaux furent modelés sur les traditions pré-existantes à l'institut. Depuis l'annexion allemande, c'était l'hôpital qui remboursait l'Institut d'Anatomie Pathologique pour le coût matériel des autopsies. Ceci perdura durant l'entre-deux-guerres, avec le versement d'une somme annuelle fixe de 3000 FRF. Selon ce modèle fondé sur une convention antérieure liant l'hôpital et la faculté de médecine, le centre de traitement du cancer - le Centre Paul Strauss - commença, en 1924, à payer l'institut à hauteur de 2000 FRF par an pour le travail fourni en laboratoire. Ceci n'impliquait pas le paiement de tous les coûts des examens, mais la couverture de tous les impayés des patients. En continuité de l'assurance de santé bismarckienne instaurée en 1883 et maintenue par les autorités françaises après 1919 en Alsace, de nombreux frais médicaux hospitaliers des patients, incluant les examens de laboratoire, étaient payés par des caisses ou des organisations mutualistes. Les patients de classes aisés, également traités à l'hôpital dans des chambres de première classe par des professeurs de la Faculté de Médecine, payaient pour ce service privé, qui incluait les examens de laboratoire. Les recettes issues des examens d'histopathologie pour des patients privés firent plus que doubler entre 1929 et 1934. Les profits de cette activité concernant des patients privés étaient distribués aux techniciens de laboratoire, qui effectuaient des heures supplémentaires pour préparer des lames, et participèrent au triplement du salaire du directeur de l'institut dans les années 1930.

Selon les théories économiques, l'évolution d'un nouveau marché d’examens médicaux peut-être envisagée selon les termes d'une courbe en S, telle que la définit Paul Geroski. Elle est caractérisée par un moment initial impliquant la disponibilité de certaines réserves, ce moment est suivi d'un saut de la demande, puis par une période de stabilisation. Une fois qu'une demande médicale d’examens histopathologique fut créée, la question de la rétribution des médecins devient primordiale. Dans cette mesure, les honoraires des pathologistes et le coût des services proposés durent être établis. Cependant, cela n'impliquait pas d'emblée la fixation d’un tarif et ce, bien qu'ils fussent rémunérés par des honoraires. En 1935, ces examens de laboratoire furent définis comme un acte, quelque chose qui pouvait être évalué par unité de temps, d'expertise et d'argent, non seulement pour les rémunérations privées, mais également pour l'hôpital. La tarification et le comptage par l'intermédiaire de ces unités furent, dans ce contexte, une manière de gérer l'augmentation des coûts de l'hôpital et de régler les disputes financières récurrentes entre l'Hôpital Civil et les laboratoires de la Faculté de Médecine, les cliniques universitaires et les consultations de patients externes. En même temps, ce fut l'ouverture d'une vanne autorisant la commercialisation d'une activité médicale. Si les examens de laboratoire quantifiés comme des actes augmentèrent, cela signifie que l'activité de service des laboratoires pouvait et allait devenir très profitable pour ceux qui se chargeaient de la rendre disponible.

À la marge et en complément du service d'autopsie et de diagnostic, l'analyse des comptes du laboratoire de l'Institut d'Anatomie Pathologique indique que l'Institut généra une autre activité commerciale : la vente de lames histopathologiques comme matériel pour l'enseignement. Bien que ces recettes n'atteignent pas l'échelle des diagnostics privés, cette activité n'en est pas pour autant anecdotique.

En résumé, l'enquête économique du chapitre quatre démontre que l'Institut d'Anatomie Pathologique fut impliqué dans de nombreux échanges et généra des recettes pour ses services depuis la fin du 19^{e} siècle. À la fin des années 1920, les sommes fixées pour la prosecture et pour l'expertise diagnostique à l'égard du centre du cancer n'étaient que deux éléments d'une équation bien plus large. Le laboratoire recevait des recettes pour des examens individuels qui prirent rapidement de l'ampleur au point que l'échelle des services privés multiplia par dix la totalité des indemnisations hospitalières.

Le terme français « acte » est utilisé pour définir un segment d'activité ou une série de gestes, ainsi des actes de laboratoire ou des actes médicaux. Un « acte » est cependant davantage une unité de négociation engageant des frais médicaux. L'adoption du terme « acte médical » ou « acte le laboratoire » transforme le calcul des coûts ou la fixation des prix en un élément organisable et gérable. Le savoir, les compétences et l'expertise préalable, nécessaires au processus d'examen en laboratoire, se situaient sur un continuum. Le terme « acte » associait ce processus à une unité. Et en tant qu'unité finie, il devint échangeable, avec un coût fixe de production, suivant des procédures économiques, comme une transaction. Le savoir histopathologique a été produit et commercialisé au laboratoire de l'Institut d'Anatomie Pathologique de Strasbourg. L'acte de laboratoire résultant est devenu une unité économique.

L'Institut d'Anatomie Pathologique fonde l'étude de cas d'un laboratoire clinique qui, comme nous l'avons soutenu précédemment, révèle un versant économique très important de l'activité médicale. Il faut cependant garder à l'esprit qu'il existe différents types de laboratoires d'analyses médicales et que cette étude de cas rencontre ici ses limites. Si les raisons de ce choix spécifique de laboratoire résident dans la disponibilité des sources, lesquelles offrent différentes vues à l'analyse historique, il est évident que l'étude d'un cas individuel est limitée lorsque l'on tente une généralisation du laboratoire d'anatomie pathologique aux analyses médicales en général. De nombreuses analyses médicales sont quantitatives et ont été progressivement automatisées. L'histopathologie, qui repose sur la reconnaissance visuelle de structures morphologiques, est restée, au long du 20^{e} siècle, un examen qualitatif où les pathologistes sont essentiels, et qui ne pouvait dès lors pas être automatisé. Cela a certainement contribué au maintien de l'attachement d'une expertise à une spécialisation médicale, laquelle n'existait qu'à la Faculté de Médecine durant l'entre-deux-guerres. C'est là un point qui participe probablement aussi à la détermination du système de rémunération de ces examens de laboratoire et qui n'est certainement que peu propice à une généralisation. Ceci nécessite cependant d'être clarifié à travers d'autres études d'analyses médicales, au-delà de la perspective de cette thèse. Paradoxalement, l'automatisation restreinte du travail de laboratoire pathologique peut être considérée comme une stratégie professionnelle, avec d'un côté des machines qui ne peuvent remplacer l'œil expert d'un médecin et, d'un autre côté, le travail de laboratoire qualitatif, non reproductible mécaniquement et qui donc limite la représentativité de cette étude de cas dans l'ordre des laboratoires d'analyses en général.

Afin d'examiner l'émergence de la dimension économique de cette activité médicale et scientifique, il était nécessaire de cerner l'origine des deux éléments principaux d'un marché : l'offre et la demande. Dans notre cas, l'offre émanait de la production, par des anatomopathologistes et des histopathologistes, d'une expertise et de connaissances scientifiques liées à des pratiques d'anatomie et d'anatomie pathologique. Ces pratiques apparaissent pour la plupart aux 18^{e} et au 19^{e} siècles et celles d'histologie à la fin du 19^{e} et au début du 20^{e} siècle. Quant à la demande, il convient, pour la comprendre, de prendre en considération la création, en France, dans les années 1920 et 1930, des centres de lutte contre le cancer. Ces centres sollicitèrent de nombreuses examens histopathologiques, car le diagnostic histopathologique était devenu un préalable nécessaire à l'orientation du traitement. La thèse est alors construite autour de deux moments : celui de la production de connaissances anatomiques et histopathologiques d'une part ; celui de la marchandisation et de la commercialisation de ces connaissances d'autre part. En étudiant un laboratoire d'analyse médicale spécifique, la thèse apporte ainsi une contribution pionnière à l'histoire des laboratoires d'analyses médicales, encore peu étudiée à ce jour. Ce faisant, elle contribue à ouvrir un pan négligé en histoire de la médecine, mais cherche aussi à faire œuvre en histoire économique. Notre travail prend en effet en considération non seulement les processus de production des connaissances scientifiques, mais aussi ceux de la production d'un service commercial et à but lucratif.

Les laboratoires en médecine ont de multiples identités. Ils peuvent être un lieu de recherche fondamentale ou de recherche appliquée, scientifique ou clinique, et comme nous l'avons démontré à travers cette thèse, universitaire ou hospitalier. De telles catégorisations soulignent le fait que si les laboratoires furent des lieux de production de savoir et si le savoir fut la base pour des applications et des usages médicaux plus larges, alors les laboratoires doivent être considérés comme hybrides. L'usage clinique de routine se situait entre recherche, production de savoir, pratique médicale et industrie. Une industrie médicale basée sur la connaissance, comprenant ses innovations, sa distribution et son économie.

Les laboratoires d'analyses médicales ont été examinés comme des lieux qui participent aux pratiques médicales, mais qui de plus contrôlent ces pratiques. Ils ont été considérés comme des opérateurs critiques dans la discussion opposant l'art médical et la science médicale. Ils ont été dépeints comme des technologies médicales qui transformèrent l'hôpital et l'organisation collective de la médecine. Ils furent envisagés comme des lieux où se forgèrent de nouvelles identités professionnelles. Les laboratoires médicaux et cliniques se situent effectivement entre les praticiens médicaux et la science médicale. Cependant, il y a un véritable fossé entre cette représentation historique des laboratoires et l'orientation ouvertement commerciale des laboratoires cliniques contemporains. En fait, les laboratoires cliniques se situent à la charnière entre pratique médicale et production de biens. Cependant, aucun d'eux ne suivaient l'économie habituelle des marchandises. La pratique médicale n'est pas une entreprise commerciale. Comme pour la production de biens, la nature de la demande pour des services de laboratoires médicaux, surtout en ce qui concerne les demandes individuelles, est irrégulière et non prévisible. De plus, il convient de préciser que l'offre, qui est habituellement gouvernée par le retour net de sa production comparé au bénéfice dérivable de l'usage de cette même ressource ailleurs est, dans ce cas, limitée par la réglementation des laboratoires.

Le marché du laboratoire d'analyses médicales n'est pas un marché comme un autre. Il est scientifique. Il est médical. Il est commercial. Il vend des mots ou des chiffres. Il est toutes ces choses à la fois et en même temps, aucunes d'entre-elles. Il ne revêt pas entièrement ni les habits (classiques) des entreprises scientifiques, ni ceux des entreprises médicales ou commerciales. Dans cette thèse, le laboratoire de l'Institut d'Anatomie Pathologique se situe entre science et service, les cadres institutionnels entre la Faculté de Médecine et l'Hôpital

Civil, les pratiques entre la production et la commercialisation des connaissances, les échanges entre l'économie morale académique et une économie commerciale, les produits entre le matériel et l'intellectuel, les recettes, enfin, entre honoraires et tarifs.

Le point d'orgue de ce statut ambigu, fut atteint en France en 1946 lorsque la législation apporta une définition aux « laboratoires d'analyses médicales » et organisa la publication des tables des tarifs à l'échelle nationale. À sa suite, des laboratoires commerciaux privés furent créés en ville et participèrent de la généralisation très large des analyses médicales, non seulement à l'hôpital, mais aussi dans la pratique médicale de tous les jours et ce durant toute la seconde partie du 20^{e} siècle. Souvenons-nous des chiffres cités en introduction. Aujourd'hui, le travail de laboratoire clinique est notamment effectué par 4200 laboratoires privés, lesquels emploient 46200 personnes. Une nouvelle législation prévoyant l'ouverture du marché des laboratoires médicaux aux industries multinationales en 2016, ces entreprises médico-commerciales, relativement nombreuses et de petite échelle, sont menacées. Cette législation réclame un niveau de qualité standard (ISO 15189) que la plupart des petits laboratoires seront incapables de suivre. La dynamique de cette économie basée sur la connaissance définie législativement en 1946, mais dont l'origine se situe durant l'entre-deux-guerres, a atteint une échelle pour laquelle la rationalisation économique est portée à un nouveau stade. Les réflexions sur l'avenir des laboratoires d'analyses médicales en France peuvent se référer à l'histoire des officines de pharmacie. En France, ces dernières furent en effet transformées en industries pharmaceutiques à la sortie de la Seconde Guerre mondiale et selon une trajectoire similaire. L'imposition de nouveaux standards techniques, prônés notamment au nom d'une rationalisation de leur économie, a participé à la concentration industrielle. Si l'histoire n'a aucune leçon à donner, il y a cependant de bonnes raisons aujourd'hui de considérer qu'une histoire économique de la médecine a quelque chose a apporté dans le débat actuel.

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Chapter 1
Introduction

A day in the *Institut d'Anatomie Pathologique* Laboratory, c 1925.

***The usual account* or *Taking it at face value*[1]**

By nine o'clock in the morning, the laboratory assistants and other workers were busy at work.[2] Paraffin embedded tissue pieces had to be mounted on slides and stained. Stains had to be mixed and prepared from their chemical constituents. Glassware had to be washed, rasors and blades sharpened, saffron distilled. A number of incoming surgical pieces were delivered and had to be prepared for examination. Equally any hospitalized patients that had passed away the previous day were delivered to the morgue in the basement. The chair of pathological anatomy and director of the *Institut d'Anatomie Pathologique* of the *Faculté de Médecine de Strasbourg*, Pierre Masson, then arrived, greeted everyone and shook their hand. Louis Géry (*chargé de cours*), Charles Oberling (*chef de travaux*), and M. Schmittbiel (*garçon de laboratoire delegué à la prosecture par l'hôpital*) had prepared the cadavers and were ready to perform the day's autopsies. On an average day there were 5 autopsies. The *chefs de clinique* of medicine, surgery and pediatrics, with their assistants, interns and students hovering around them, surrounded the autopsy table. The intern, holding the patient file, briefly presented the evolution of the illness/pathology/patient history and the *chef de*

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[1] These two accounts of a day in the *Institut d'Anatomie Pathologique* are speculative. They are based on secondary sources as well as the activities that I have traced in the institute. Sources for this include: J. Edouard Morin, "In memorium professeur Pierre Masson 1880-1959," *Montréal Médical* (October 1, 1959): 14-15; Muriel Philippe, "Louis Frühling (1916-1962) et la méthode anatomo-clinique" (Thèse de médecine, Strasbourg: Université Louis Pasteur, 2001), 638-679.

[2] When Louis Fruhling was Chair and Director, Marguerite Staub-Holweg, secretary (also managed the accounts) and lab worker, arrived at 8am. Fruhling arrived shortly after and would work until 8pm. In the 1950s, the day's work began with *extemporanés*. Staub prepared the slides. In the 1930s, when Masson was in Montreal, Géry typed his own texts. Fruhling hired Marcellin to do his typing. Logbooks were kept for every examination and diagnosis. Entries were made by hand, by the lab workers (*laborantins*). A *fiche* was kept for every patient. Philippe, "Louis Frühling," 643.

service pronounced the clinical diagnosis. The prosector, holding the material, explained the pathological lesions in detail and in relation to the clinical symptoms. Throughout the autopsy, numerous fragments were taken for histological examination, which would complete the file a few days later. The autopsy protocole would be written up the same day. The histological examinations were recorded in another laboratory logbook. Great attention was given to the contents of the protocol, as it could be a case study for a publication.

At the beginning of the afternoon, Masson and Gery would walk up to the large amphitheatre uptairs where they taught theoretical pathology. Masson presented the study of tumours, using concepts and ideas from embryology and histology concerning origin, and elaborated on the nature and the evolution of tumours. Some days, all 110 seats of the amphitheatre were filled with medical professors, the institute personnel, the *chefs de clinique*, a number of foreign medical students and scientists, and a number of upper level medical students.

In the mid-afternoon, the activity would move downstairs to a long room on the main floor. Oberling would project slides and expose their preparation and their interpretation. All pathology - tissue degeneration, inflammation, and tumours - of all organs were explained deeply. Laboratory exercises were then conducted to explore histopathology slides and pieces. Meanwhile, assistants, visiting researchers, and advanced students would prepare slides and conduct examinations on their own in another laboratory. The pathologists would pass occasionally to see how and what they were working on.

At about five o'clock, Masson would bring the day's surgical pathology slides. Everyone present had to give their opinion on the diagnoses and particulars of the cases. The assistants and upper level students would open the discussion with their conjectures. Masson would state his diagnosis, firmly and surely. On Fridays, a group meeting with all the personnel would discuss a series of interesting and special cases presented by Masson, Géry and Oberling.

At quarter-to-seven, Masson would make the rounds of the laboratories to say good-bye. After his departure, the personnel, often exhausted, were free to go.

The day's activities - autopsies, slide preparations, and histo-diagnosis discussions - served both teaching and research; transmitting, communicating and producing knowledge. In knowledge transmission, pieces were examined and slides prepared, while students observed and tried histology techniques. In knowledge communication, some cases and the corresponding slides were kept and used to present theoretical and practical pathology. In knowledge production, some cases and the corresponding slides were kept and used in research projects and appeared in publications.

The other side of the coin

By nine o'clock in the morning, the laboratory workers were busy at work. A number of incoming surgical pieces had arrived. They each had to be entered into the laboratory registries before being prepared for examination. Orders had to be made for chemical reactants, gloves, and laboratory equipment. Equally any hospitalized patients that had passed away the previous day were delivered to the morgue in the basement. A nominal fee was paid to the person who transported the corpses from the hospital and medical school clinics. When the chair of pathological anatomy and director of the *Institut d'Anatomie Pathologique* of the *Faculté de Médecine de Strasbourg*, Pierre Masson arrived, he greeted everyone and shook their hand. Any incoming payments from the sales of teaching slides or for diagnosis work had to be deposited in the black box or in the institute bank account. Any incoming invoices had to be paid.

Louis Géry (*chargé de cours*), Charles Oberling (*chef de travaux*), and M. Schmittbiel (*garçon de laboratoire delegué à la prosecture par l'hôpital*) had prepared the cadavers and were ready to perform the day's autopsies. On an average day there were 5 autopsies. The *chefs de clinique* of medicine, surgery and pediatry, with their assistants, interns and students hovering around them, surrounded the autopsy table. The intern, holding the patient file, briefly presented the evolution of the illness/pathology/patient history and the *chef de service* pronounced the clinical diagnosis. A lab assistant filled in the autopsy protocol as the autopsy progressed. The prosector, holding the material, explained the pathological lesions in detail and in relation to the clinical symptoms. Throughout the autopsy, numerous fragments were taken for histological examination, which would complete the file a few days later. The histological examinations were recorded in another laboratory logbook. Great attention was given to the contents of the protocol, as it could be a case study for a publication.

At the beginning of the afternoon, Masson and Gery would walk up to the large amphitheatre upstairs where they taught theoretical pathology. Masson presented the study of tumours, using concepts and ideas from embryology and histology concerning the origin and elaborated on the nature and the evolution of tumours. He used slides and tissue samples that had been prepared from autopsy pieces or from histo-diagnosis samples. Some days, all 110 seats of the amphitheatre were filled with medical professors, the institute personnel, the *chefs de clinique*, a number of foreign medical students and scientists, and a number of upper level medical students.

Meanwhile, orders for purchases of histopathology teaching slides had be organised and any prepared orders had to be shipped. For this, a technician might look through registers, pull embedded pieces from boxes, then isolated off in the corner of the laboratory prepare the slides and corresponding invoices, wrap and ship them.

In the mid-afternoon, the activity would move downstairs to a long room on the main floor. Oberling would project slides and expose their preparation and their interpretation. All pathology - tissue degeneration, inflammation, and tumours - of all organs were explained deeply. Laboratory exercises were then conducted to explore histopathology slides and pieces. The students used the slides stored in a cabinet against the wall of the laboratory. Some students might have their own set of slides, which they had purchased from the insitute. Meanwhile, assistants, visiting researchers, and advanced students would prepare slides and conduct examinations on their own in another laboratory. The pathologists would pass occasionally to see how and what they were working on.

At about five o'clock, Masson would bring the day's histopathology slides for diagnosis. Everyone present had to give their opinion on the diagnoses and particulars of the cases. The assistants and upper level students would open the discussion with their conjectures. Masson would state his diagnosis, firmly and surely. A lab worker would record the diagnosis dictated by Masson. This would then be re-copied on an A5 letter head slip of paper and mailed to the practitioner or institution that had sent the sample. On Fridays, a group meeting with all the personnel would discuss a series of interesting and special cases presented by Masson, Géry and Oberling.

At quarter-to-seven, Masson would make the rounds of the laboratories to say good-bye. After his departure, the personnel, often exhausted, were free to go.

The day's activities - autopsies, slide preparations, histo-diagnosis discussions, and administrative bookkeeping - served teaching, research, medical practice and business management; producing, communicating, and commercialising knowledge. In knowledge production, some cases and the corresponding slides were kept and used in research projects and appeared in publications. In knowledge communication, some cases and the corresponding slides were kept and used to present theoretical and practical pathology. Some were catalogued and reproduced for commercial histopathology slides. In information communication, some examinations were sent to medical practitioners. They would in turn send an honorary sum. Bookkeeping and recordkeeping were meticulous in order to keep track of the diverse activities efficiently. The income generated by this, and by the sale of prepared slides, would enhance Masson's and his assistants' salaries. It would further allow investment in research with the purchase of instruments or literature.

Medical history has paid little, if any, attention to the economic and financial side of scientific and medical practices in medical school and hospital teaching, in medical collections and museums, or in laboratories. If recent trends over the last thirty years have given heightened attention to practice and material conditions of scientific and medical teaching and research, most of these accounts have stopped short of engaging with overtly financial and economic aspects included in practice and materiality. This thesis makes, as hinted in the second account of a typical day in the pathological anatomy laboratory, monetary and economic aspects visible as integral parts of medical and scientific research, teaching, and practice. In short, this engages with and promotes an economic medical history of a discipline in which money was not (at least openly) valued or visible and where financial arrangements were often intertwined with hospital charity and solidarity. At the same time, the argument will be that this was the birth of a proto-knowledge based economy, in which knowledge could be transformed into substantial financial incentive and return. Remuneration ceased to be exclusively symbolic and exchanges and gains became both scientific and monetary.

1.1 Historiographical context

In the interwar period, in a Strasbourg pathological anatomy laboratory at the medical school, money circulated. The above caricatural day in the laboratory illustrates this. Corpses, surgical pieces and tissue samples, laboratory notebooks and academic publications are the usual circulating materials in pathological anatomy laboratories. Less visible, if not invisible, are money, invoices, and laboratory registries. If scientists have been portrayed within recent history of science and medicine as scientific entrepreneurs,[3] entreprise has most frequently referred to either organizational schemes ressembling factory organization[4] or official financing for research.[5] The present thesis, a study of a clinical laboratory, lends to history of science and history of medicine, but equally to economic history. It can be situated as clinical laboratory history, but also crosses university laboratory history and edges on economies of medical practice and technologies. Restricting such a study to traditional or uni-lateral approaches would reveal the laboratory described in the first caricature above. By innovating a pluri-disciplinary methodology, the latter caricature described above is revealed, detailed and characterized.

1.1.1 Laboratories in medical history.

In the rhetoric of early twentieth century articles, it appears that the use of the laboratory in medical practice in the first half of the twentieth century was essentially endorsed as an application of science to the art of medicine.[6] On one hand, historians have more or less subscribed to the narrative that from the latter half of the nineteenth century and into the mid-twentieth century, medical scientists and medical practitioners inhabited different worlds and

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[3] For example, Simon Schaffer, "A science whose business is bursting: Soap bubbles as commodities in classical physics," in *Things that talk: Object lessons from art and science*, ed. Lorraine Daston (New York: Zone Books, 2004), 147-192; Aileen Fyfe and Bernard Lightman, eds., *Science in the marketplace: Nineteenth-century sites and experiences* (Chicago: The University of Chicago Press, 2007).

[4] For example, Daniel P. Todes, *Pavlov's physiology factory: Experiment, interpretation, laboratory enterprise* (Baltimore: Johns Hopkins University Press, 2002); Bruno Latour, "The costly ghastly kitchen," in *The laboratory revolution in medicine*, ed. Andrew Cunningham and Perry Williams (Cambridge and New York: Cambridge University Press, 1992), 295-303.

[5] For example, Robert E. Kohler, *Partners in science: Foundations and natural scientists, 1900-1945* (Chicago: University of Chicago Press, 1991); Christopher Lawrence, *Rockefeller money, the laboratory, and medicine in Edinburgh 1919-1930. New science in an old country* (New York: University of Rochester Press, 2005).

[6] M. H Fussell, "Blood examination. Its value to the general practitioner," *Journal of the American Medical Association* (July 28, 1900): 228-230; Victor A Robertson, "Laboratory aids to diagnosis for the general practitioner," *Medical News* 84 (1904): 259-263; James B Herrick, "The relation of the clinical laboratory to the practitioner of medicine," *Boston Medical and Surgical Journal* 156, no. 24 (1907): 763-768.

there was some degree of tension between them.[7] Recent studies are increasingly illustrating that this situation has been significantly over-stated. The ways in which science and medicine have interacted with one another is a theme that resurfaces in medical history.[8] But, as Steve Sturdy describes, "the kinds of collaborations that historians of medicine usually bracket as exceptional were probably much more usual than has been supposed."[9] Effectively, a number of emerging case studies of medical laboratories do not witness such tensions.[10]

On the other hand, it has been assumed that from the mid-nineteenth century laboratory sciences and especially bacteriology simply "spoke to the clinician."[11] Recent studies have increasingly questioned the self-evident and self-explanatory character of research and laboratory investigations that are simply assigned practical relevance in medical practice.[12] Christoph Gradmann has recently shown for the emblematic case of Robert Koch that how, why, and when lab inquiries could "speak" to clinicians need to be investigated and demonstrated even for pivotal figures.[13]

Tension and/or coalition not withstanding, what is clear is that laboratories in medicine had multiple identities. They could be fundamental or applied, research or service oriented, scientific or clinic. Such categorizations underscore the fact that if laboratories were knowledge producing places and if knowledge was the basis for wide clinical application and

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[7] Gerald L. Geison, "Divided we stand: Physiologists and clinicians in the American context," in *The therapeutic revolution. Essays in the social history of American medicine*, ed. Morris J. Vogel and Charles E. Rosenberg (Philadelphia: University of Pennsylvania Press, 1979), 67-90; Russell C. Maulitz, "'Physician versus bacteriologist': The ideology of science in clinical medicine," in *The therapeutic revolution. Essays in the social history of American medicine*, ed. Morris J. Vogel and Charles E. Rosenberg (Philadelphia: University of Pennsylvania Press, 1979), 91-107.
[8] For an overview of this literature, John Harley Warner, "The history of science and the sciences of medicine," *Osiris* 10 (1995): 164-193. See also W. F. Bynum, *Science and the practice of medicine in the nineteenth century* (New York and Cambridge, UK: Cambridge University Press, 1994).
[9] Steve Sturdy, "Looking for trouble: Medical science and clinical practice in the historiography of modern medicine," *Social History of Medicine* Forthcoming (2011).
[10] Rosemary Wall, "Using bacteriology in elite hospital practice: London and Cambridge, 1880-1920," *Social History of Medicine* Forthcoming (2011); Morten Hammerborg, "The laboratory and the clinic revisited: The introduction of laboratory medicine at the Bergen General Hospital, Norway," *Social History of Medicine* Forthcoming (2011).
[11] Maulitz, "Physician versus bacteriologist."
[12] Olga Amsterdamska, "Medical and biological constraints: Early research on variation in bacteriology," *Social Studies of Science* 17 (1987): 657-687; Christoph Gradmann, "Isolation, contamination, and pure culture. Monomorphism and polymorphism of pathogenic micro-organisms as research problem 1860-1880," *Perspectives on Science* 9 (2000): 147-172; Pauline Mazumdar, *Species and specificity: An interpretation of the history of immunology* (Cambridge: Cambridge University Press, 1995). For a discussion of this point, see also the program and presentations of the Summer school - Workshop commemorating the 100th anniversary of the Nobel Prize Award to Robert Koch "Rethinking Koch's Postulates" 14-16 October 2005 at the Ev. Akademie Berlin-Bradenburg, Schwanenwerder.
[13] Christoph Gradmann, *Laboratory disease: Robert Koch's medical bacteriology*, trans. Elborg Forster (Baltimore: The Johns Hopkins University Press, 2009).

use, then laboratories could be considered hybrids where routine clinical use concluded a knowledge based medical innovation, distribution and economy.

From such multiple faceted labororatories, the emergence of clinical laboratories[14] as localized spaces where tests, analyses and examinations were done on patient fluids and tissue samples in order to get information pertaining to the diagnosis and treatment of disease has received growing attention by historians of medicine since Robert Kohler described the situation in 1981:

> "We know that many more physicians were relying on laboratory methods around 1900. We know that improved and new analytical methods began to appear, and a casual inspection of hospital reports reveals that the number of analyses done each year began to soar after 1900. At the same time, modern clinical laboratories became a regular feature of hospital design. But the details of when and by whom new methods were actually introduced into practice are a story still to be told."[15]

The variety of locations of early laboratory services has not only reflected multiple and shared identities of laboratories within medical institutions, as explored in numerous case studies, but it has also contributed to understanding what Kohler points to, how these new methods were introduced into practice. Clinical laboratories have been traced as features of new and modern American,[16] Scottish,[17] and German[18] hospitals. Peter Twohig has highlighted the collaboration of the hospital, the medical school, and the provincial government in the founding of the first laboratory in Halifax, Canada.[19] In France, pharmacists in the hospital performed a portion of laboratory testing for physicians.[20] What can be deduced from the

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[14] I maintain this definion of clinical laboratories in my use of the term throughout the thesis.
[15] Robert E Kohler, *From medical chemistry to biochemistry: The making of a biomedical discipline* (Cambridge, UK: Cambridge University Press, 1981), 228.
[16] Ibid., 233-237; Allan M. Brandt and David C. Sloane, "Of beds and benches: Building the modern American hospital," in *The architecture of science*, ed. Peter Galison and Emily Thompson (Cambridge, Mass/London, UK: The MIT Press, 1999), 281-305; Annemarie Adams and Thomas Schlich, "Design for control: Surgery, science, and space at the Royal Victoria Hospital, Montreal 1893-1956," *Medical History* 50, no. 3 (2006): 303-324.
[17] L. Stephen Jacyna, "The laboratory and the clinic: The impact of pathology on surgical diagnosis in the Glasgow Western Infirmary, 1875-1910," *Bulletin of the History of Medicine* 62 (1988): 384-406; Lawrence, *Rockefeller money, the laboratory, and medicine in Edinburgh 1919-1930*; Steve Sturdy, "Knowing cases: Biomedicine in Edinburgh, 1887-1920," *Social Studies of Science* 37, no. 5 (2007): 659-689.
[18] Johannes Büttner, "The origin of clinical laboratories," *European Journal of Clinical Chemistry and Biochemistry* 30, no. 10 (1992): 585-593; Johannes Büttner, "Die Herausbildung des Normalwert-Konzeptes im Zusammenhang mit quantitativen diagnostischen Untersuchungen in der Medizin," in *Normierung der Gesundheit*, ed. Volker Hess (Husum: Matthiesen Verlag, 1997), 17-32; Johannes Büttner, "Impacts of laboratory methodology on medical thinking in the 19th Century," *Medical Sciences History* 17 (2001): 19-25.
[19] Peter L. Twohig, *Labour in the laboratory. Medical laboratory workers in the maritimes* (Montreal and Kingston: McGill-Queens University Press, 2005).
[20] Delphine Ranslant, "The clinical laboratory: A central point of medical practice hidden in the basement. Case study on the convention bound laboratories of Strasbourg" (Mémoire de DEA, Strasbourg: Université Louis

variety is that in different institutional contexts, available facilities were lent to the needs at hand: hospital diagnosis labs being used for research, pharmacists performing routine blood and urine tests, research and teaching labs being used for diagnoses. As such, the adoption of lab techniques for diagnosis did not immediately result in a physical segregation of a laboratory for diagnosis.[21]

Identifying the location of clinical laboratories allows the importance attributed to the activity to be judged; notably, by characterizing the activity as central or as peripheral. That laboratory facilities were multi-functional lends to an ambiguity in tracing the early history of the use of laboratories for diagnosis. In case studies, this can be revealing. Firstly, when lab tests were first requested, the scale was such that it was conceivable to tack the activity onto an existing service, especially if it had proper instrumentation and necessary know-how. The side-activity status allowed two activities to inhabit one bench. Secondly, a distinction between the relatively simple blood and urine analyses and the specialist examinations of surgical pieces can be made. Whereas they both required technical know-how and hands-on experience, the former could be performed in a side room, but the latter required a larger organizational structure. It was only when the scale of the activity exceeded the threshold of a side activity that a distinct laboratory for diagnosis was established.

The laboratory as a specialized place for science has equally been explored in recent historical studies.[22] In addition to enriching the picture of what scientists do, field studies of laboratory practices have addressed the question of the construction of the laboratory.[23]

The laboratory in medicine takes a multitude of forms and serves a multitude of purposes, i.e. pharmaceutical research and medication production, physician education, medical research, and patient monitoring.[24] An omnipresence of medical laboratories inn medical practice, which stems largely from this multiplicity, has been highlighted in a number of publications; perhaps most overtly by Olga Amsterdamska and Anja Hiddinga in their

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Pasteur, 2004); Büttner, "The origin of clinical laboratories," 590; See also J. Desbordes and G. Strauss, *La Législation du laboratoire d'analyses médicales, 2e éd* (Paris: Editions du Creuset, 1956); M. Goddard, "Pharmacie et biologie," *Bulletin de l'ordre des pharmaciens* 49 (1958): 7-51.

[21] Kohler, *From medical chemistry to biochemistry: The making of a biomedical discipline*, 233.

[22] For example, Thomas F. Gieryn, "City as truth-spot: Laboratories and field-sites in urban studies," *Social Studies of Science* 36 (2006): 5-38; Robert E Kohler, *Landscapes and labscapes. Exploring the lab-field border in biology* (Chicago: University of Chicago Press, 2002).

[23] Bruno Latour and Steve Woolgar, *Laboratory life: The construction of scientific facts* (Princeton: Princeton University Press, 1986); Karin Knorr-Cetina, *The manufacture of knowledge* (Oxford: Pergamon Press, 1981); Sharon Traweek, *Beamtimes and lifetimes: The world of high energy physicists* (Cambridge, MA: Harvard University Press, 1988).

[24] Multiple facets of laboratories and biomedicine in the latter half of the twentieth century are portrayed in: Jean-Paul Gaudillière, *Inventer la biomédecine. La France, l'Amérique et la production des savoirs du vivant (1945-1965)* (Paris: Editions la Découverte, 2002).

contribution to the reference volume *Companion to Medicine in the Twentieth Century* or Andrew Cunningham and Perry Williams' introduction of their edited volume *The Laboratory Revolution in Medicine*.[25] As the latter states:

> "If you feel unwell and go to see a doctor or are admitted to hospital, the chances are that the physicians will take a sample of your body – generally blood, tissue or urine – and send it away to another place for testing; in such cases the decision as to whether you are ill or not, and if you are, what disease you have, will be primarily taken not by you and not by your doctor but by a laboratory test. If you require treatment, this will probably involve the administration of medicinal substances prepared not by you nor by your doctor but in a highly specialised factory-like laboratory. If you decide to become a doctor yourself, your formal professional training will begin not with general practice, nor with hospital work, but with study of the medical sciences, in lecture rooms, libraries and laboratories."[26]

This edited volume aimed to widen discussion of the laboratory revolution in medicine by assembling a number of papers that covered issues of general importance, power and practices of the laboratory in medicine.[27] In order to do so, the volume brings together a number of articles on the nature and genesis of laboratory medicine. Together, they provide an account of how medicine in Western industrial societies acquired its distinctive power and authority through association with the laboratory.

Bruno Latour has equally identified the power of laboratories, which like levers can compound strength and modify state of affairs outside laboratories; a parody of Archimedes' "give me a place to stand and a lever, and I will move the earth."[28] Latour's publications on Pasteur's laboratories provide a biomedical example which lends a starting point for exploring the question of how clinical laboratories emerged or bissected from medical science research laboratories.

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[25] Olga Amsterdamska and Anja Hiddinga, "The analyzed body," in *Companion to medicine in the twentieth century*, ed. Roger Cooter and John Pickstone (Amsterdam: Harwood Academic Publishers, 2000), 417-733; Andrew Cunningham and Perry Williams, "Introduction," in *The laboratory revolution in medicine*, ed. A. Cunningham and P. Williams (Cambridge: Cambridge University Press, 1992), 1-13.
[26] Cunningham and Williams, "Introduction," 1.
[27] Cunningham and Williams, "Introduction." In their introduction, they emphasize that in the era of hospital medicine, the hospital is the arbiter of medical knowledge and the rise of the laboratory implied demoting the importance of the hospital (p.3). However, what they call a 'staggering' transition to laboratory medicine was actually parallelled in other sciences as European universities invested in laboratory facilities.
[28] Bruno Latour, "Give me a laboratory and I will raise the world," in *Science observed. Perspectives on the social study of science*, ed. Karin Knorr-Cetina and Michael Mulkay (London: Sage Publications, 1983), 141-170.

Questions of power have equally been addressed by framing clinical laboratories as medical technologies that changed hospital and collective medical configurations.[29] Steve Sturdy and Roger Cooter address the rise of corporatism and management in medicine, stating: "that doctors and medical policy makers… saw medical laboratories as embodying a way of knowing – characterized by a logic of diagnostic categorization and therapeutic standardization – that was particularly suited to the administrative requirements."[30] Questions of configuration are also central when considering laboratories as places of professional identities, work, and licensing.[31] These perspectives broach questions of financial management, but except for the study of laboratory technologist licensure by economist William H. White, they do not address it. Medical and clinical laboratories effectively sit between medical practitioners and medical science. But they are equally adjacent to medical service industries. There is a gap between these historically portrayed labs and present overtly commercially oriented clinical laboratories.

Clinical laboratories are places where body materials are transformed to reveal diagnostic (as well as prognostic and monitoring) information. Ilana Löwy situates diagnosis:

> "Diagnosis, the art or act of identifying and classifying diseases from their signs and symptoms, is a key organizing principle of modern medicine. ... Diagnostic categories give meaning to signs sent by the body, differentiate the normal from the pathological, and define what a given complaint is, what its prognosis is, and how it should be treated. In these ways, these categories structure clinical, administrative, and patient practices."[32]

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[29] Stanley Joel Reiser, *Medicine and the reign of technology* (Cambridge, UK: Cambridge University Press, 1978); Joel D. Howell, *Technology in the hospital. Transforming patient care in the early twentieth century* (Baltimore and London: The Johns Hopkins University Press, 1995); Keith Wailoo, *Drawing blood. Technology and disease identity in twentieth-century America* (Baltimore and London: The Johns Hopkins University Press, 1997); Volker Hess, "Standardizing body temperature: Quantification in hospitals and daily life, 1850-1900," in *Body Counts. Medical Quantification in Historical and Sociological Perspective/La quantification médicale, perspectives historiques et sociologiques*, ed. Gérard Jorland, Annick Opinel, and George Weisz (Montreal and Kingston: McGill-Queen's University Press, 2005), 109-126; Klasien Horstman, "Chemical analysis of urine for life insurance: The construction of reliability," *Science, Technology, and Human Values* 22, no. 1 (1997): 57-78; Klasien Horstman, "Technology and the management of trust in insurance medicine," *Theoretical Medicine and Bioethics* 21 (2000): 39-61.

[30] S. Sturdy and R. Cooter, "Science, scientific management, and the transformation of medicine in Britain c. 1870-1950," *History of Science* 36, no. 4 (1998): 423.

[31] Twohig, *Labour in the laboratory*; William D. White, *Public health and private gain. The economics of licensing clinical personnel.* (Chicago: Maaroufa Press, Inc., 1979).

[32] Ilana Löwy, *Preventive strikes: Women, precancer, and prophylactic surgery* (Baltimore: Johns Hopkins University Press, 2009), 5. This follows rational management of diseases as stable entities. Löwy cites Charles Rosenberg on this point. Charles Rosenberg, "Managed fear: Contemplating sickness in an era of bureaucracy and chronic disease," American Osler Society, 2008.

Effectively, my study reverses this by considering the structure of clinical, administrative, and to a lesser degree patient practices as giving meaning to diagnosis categories and a means of tracing them historically. These categories are constructed as practical knowlege that stems from clinical, administrative, and patient practices.[33] I argue further that these categories are, in fact, co-constructed with scientific knowledge production. With this in mind, I present laboratory history with an original approach in regards to existing historiography of biomedical laboratories. The thesis proposes intersecting economic history of medicine with history of medical science.

1.1.2 Economics in medical history

Contrary to the historiography of clinical laboratories, the recent historiography of therapeutic agents has directly addressed the question of economics, money, and academic-industry collaboration.[34] This is not surprising since these agents lay at the boundary between medical and scientific service, on one side, and pharmacy and pharmaceutical industry with production and distribution of traditional and modern treatments and medications, on the other. Pharmaceutical history is evidently one of economics and commerce. This is because pharmaceutical production and pharmaceutical industries were (and are) undeniably commercial.[35] This can be traced to the identification of pharmacies with epiceries in eighteenth century France. Commercial profit and the notion of liberal profession were reconciled by the assimilation of the pharmacy professional with that of grocer in France in 1777.[36] Herein the pharmacist was recognized as a learned and liberal professional, but equally a privileged vender. As such, pharmacy attracted those of modest backgrounds that

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[33] Peter Keating and Alberto Cambrosio, *Biomedical platforms. Realigning the normal and the pathological in late-twentieth century medicine* (Cambridge, MA: The MIT Press, 2003); Peter Keating and Alberto Cambrosio, "The production of biomedical measures: Three platforms for quantifying cancer pathology," in *Body counts. medical quantification in historical and sociological perspective*, ed. Gérard Jorland, Annick Opinel, and George Weisz (Montreal and Kingston: McGill-Queen's University Press, 2005), 173-202.

[34] For example, recent edited volumes: Christian Bonah et al., eds., *Harmonizing drugs. Standards in 20th century pharmaceutical history*, Standard drugs, Drug standards Series (Paris: Editions Glyphe, 2009); Christoph Gradmann and Volker Hess, eds., *Vaccines as medical, industrial, and administrative objects*, vol. 21(2), Science in Context, 2008; Viviane Quirke and Slinn, eds., *Perspectives on twentieth century pharmaceuticals* (Oxford: Peter Lang, 2010).

[35] For example, Jordan Goodman and Vivien Walsh, *The tree, the molecule and cancer: The story of Taxol* (Cambridge: Cambridge University Press, 2001); Jordan Goodman, "Pharmaceutical industry," in *Companion to medicine in the twentieth century*, ed. Roger Cooter and John Pickstone (London and New York: Routledge, 2003), 141-154; Sophie Chauveau, *L'invention pharmaceutique* (Paris: Editions Sanofi-Synthélabo, 1999); Jeremy A. Greene, *Prescribing by numbers: Drugs and the definition of disease* (Baltimore: Johns Hopkins University Press, 2006).

[36] Jean-Pierre Baud, *L'affaire de la main volée. Une histoire juridique du corps* (Paris: Editions du Seuil, 1993), 200. Olivier Faure, "Les pharmaciens et le médicament en France au XIXe siècle," in *Histoire et médicament aux XIXe et XXe siècles*, ed. Christian Bonah and Anne Rasmussen (Paris: Editions Glyphe, 2005), 77.

relied on their professional activity financially. Olivier Faure speaks of this opposition as morally uncomfortable for pharmacists, who earned a more or less comfortable living but belonged to an honourable profession.[37] Charlatans, quacks and peddlers also attempted to reconcile medical service with commercial ends.[38] Albeit they neither had the support of the medical profession, nor were they recognized professionals, placing them on medical sidelines.

Being reliant on the practitioner's prescription, pharmacy was in fact subordinate to the medical profession.[39] The services and structures adjacent to the medical profession were numerous.[40] These structures required materials and human capital; they required financial input and were effectively run as businesses.

The entry of pharmaceutical entreprises into the domaine of industrial firms corresponded to the second industrial revolution, with the transformation of pharmaceutical dispensaries into factory-like companies and with major chemical industries entering the medication market.[41] With this transformation, pharmaceutical products and medication became articulated as economic goods that followed the laws and logic of economic markets. Albeit, not just any market.[42] Pharmaceutical production and pharmaceutical products concern and link industrial logic and medical practice. Production processes, as well as the ingredients and the final products were highly standardized and regulated.[43] Overseeing such standardization processes required shared definitions and means of communication between different spheres, i.e. industrialists, researchers, pharmacists, physicians, patients, etc. Each new product, medication or medication format, has further been shown to involve changes in therapeutic practices.[44]

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[37] Ibid., 66.
[38] James Harvey Young, *Toadstool millionaires: A social history of patent medicines in America before federal regulation* (Princeton, NJ: Princeton University Press, 1972).
[39] The subordination of the pharmacist in France was first introduced by legislation. Faure, "Les pharmaciens et le médicament en France au XIXe siècle," 66-68.
[40] Most para-medical professions described date to the early 20th century: Gerald Larkin, "The emergence of para-medical professions," in *Companion encyclopedia of the history of medicine*, ed. W. F. Bynum and Roy Porter, vol. 2 (London and New York: Routledge, 1993), 1329-1349.
[41] Cf. Jean-Paul Gaudillière, "Médecine, marchés et santé publique : de la préparation pharmaceutique au biocapital," in *Médecine, santé et sciences humaines*, ed. Jean Marc Mouille et al. (Paris: Belles Lettres, 2011), 649-655.
[42] Jean-Paul Gaudillière, "Une marchandise pas comme les autres. Historiographie du médicament et de l'industrie pharmaceutique en France au XXe siècle," in *Histoire et médicament aux XIXe et XXe siècles*, ed. Christian Bonah and Anne Rasmussen (Paris: Editions Glyphe, 2005), 115-158.
[43] Cf. Bonah et al., *Harmonizing drugs. Standards in 20th century pharmaceutical history*.
[44] Anne Rasmussen, "La résistible ascension du comprimé. Pharmaciens, médecins et publics face aux nouvelles formes pharmaceutiques," in *La diffusion de nouvelles pratiques de santé. Acteurs, enjeux, dynamique (XVIIIe-XXe siècles)*, ed. Patrice Bourdelais and Olivier Faure (Paris: Belin, 2005).

In addition to their place on industrial fronts and medical practices, pharmaceuticals were places of scientific research and scientific production.[45] This herein sets them as "archetypical example of science-based industry."[46] And of interest to economists.[47] The entrepreneurial endeavours of scientists commercialising their know-how and knowledge in the late nineteenth century and early twentieth century, such as Paul Ehrlich, Louis Pasteur, or Frederick Best and Charles Banting, were additionally working in pharmaceutical related contexts.[48]

However, whereas medical practice and medical sciences were not easily perceptibly commercial, it may not seem natural to argue for economic considerations in historical narratives. Laboratories made this juxtaposition with the sale of non-material and non-ethically problematic laboratory diagnosis. Compared to pharmaceuticals, clinical laboratories did not sell goods. The clinical laboratory products were not produced and stocked on shelves. Clinical laboratories analyzed and examined human fluids and tissue samples. When adhering to this service, biomedical scientific knowledge and know-how was paid for. When adhering to this service, clients got, although not immediately, a piece of paper to put in their medical file. They got words or numbers. Medical consultations did not involve producing goods either. They involved patients meeting physicians, followed by some degree of question and answer discussion and some degree of physical examination. Patients did not meet or interact directly with laboratory scientists in order for them to produce laboratory results. Clinical laboratory examinations had (and have) an ambiguous status and are situated economically between medication and medical consultations.

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45 John P. Swann, *Academic scientists and the pharmaceutical industry: Cooperative research in twentieth-century America* (Baltimore: The Johns Hopkins University Press, 1988); Nicolas Rasmussen, "The moral economy of the drug company-medical scientist collaboration in interwar America," *Social Studies of Science* 34, no. 2 (2004): 161-185.

46 Giulio Bottazzi et al., "Innovation and corporate growth in the evolution of the drug industry," *International Journal of Industrial Organization* 19 (2001): 1162.

47 Alfred D. Chandler, *Shaping the industrial century: The remarkable story of the evolution of the modern chemical and pharmaceutical industries* (Cambridge, MA: Harvard University Press, 2005).

48 Jonathan Liebenau, "Paul Ehrlich as a commercial scientist and research administrator," *Medical History* 34 (1990): 65-78; Maurice Cassier, "Appropriation and commercialization of the Pasteur anthrax vaccine," *Studies in History and Philosophy of Biological and Biomedical Sciences* 36, no. 4 (2005): 722-742; Jonathan Simon, "The origin of the production of diphtheria antitoxin in France, between philanthropy and commerce," *Dynamis* 27 (2007): 63-82; Maurice Cassier and Christiane Sinding, "'Patenting in the public interest': Administration of insulin patents by the University of Toronto," *History and Technology* 24, no. 2 (2008): 153-171.

1.2 An intersection of economics and history of science and medicine

1.2.1 Universities, research laboratories and budgets

The laboratory of the *Institut d'Anatomie Pathologique* was a university institute laboratory. There were numerous social and economical influences on the objectives and financial management of university institutes. In considering the status of universities, a strong divide is made between universities of North America and those of Europe. On the whole, North American universities are private, whereas most European universities are public. In France, and for the case at hand, universities were public.[49] As non-for-profit and public institutions, universities received funds from a variety of sources, which include private donations and federal, state or local government funding. Becauses they were not-for-profit, universities were not organized with the explicit goal of maximizing profits. As such, the neoclassical model of value and of markets can only be applied in a restricted manner. Usually in history of science, university institutions, scientific institutes and laboratories are considered as receiving a budget corresponding to what they spent and which might have beeen justified with account records. They were not generally expected to generate income. Yet concrete practices were more entangled. In the twentieth century, in these not-for-profit institutions the principle of raising money to fund research, and vice versa did become current. In Europe, public higher education and research institutions did, at times, generate income. The vested interest in the products of scientific research has been documented in the history of science. The emblematic story of Louis Pasteur is but one example that illustrates this.

Louis Pasteur supplemented his income, principally from revenues from patents and licenses (many in wine, vinegar and beer industries), with monetary awards from scientific societies (1500 FRF in 1853 from the *Société de pharmacie de Paris* for his work on racemic acid; 5000 Florins (apx 8500 FRF) in 1871 from the Austrian government for his efforts against the silkworm blight; 625 000 FRF in 1887 from the government of South Wales for measures to reduce its rabbit population.[50] His studies on beer were supported by brewers

[49] A. Geuna, *The economics of knowledge production: Funding and the structure of university research* (Cheltenham, UK: Edward Elgar Publishing, 1999), 13; Estelle James and Egon Neuberger, "The university department as a non-profit labor cooperative," *Public Choice* 36, no. 3 (1981): 36; with exception of for-profit American universities: Richard S. Ruch, *Higher Ed, inc* (Baltimore: The Johns Hopkins University Press, 2003).
[50] Gerald L. Geison, *The private science of Louis Pasteur* (Princeton, NJ: Princeton University Press, 1996), 41.

(100000 FRF). He also commercialized the anthrax vaccine and diphtheria sera.[51] Much of this revenue is expected to have gone to the French state or to the budget of the *Institut Pasteur*.[52]

Like the laboratories of Louis Pasteur, the instances in which science laboratories were becoming places of goods production on a large-scale were on the rise in the latter nineteenth century. The chemistry labs of Justus von Liebig and Felix Hoppe-Seyler, the physiology labs of Carl Ludwig, Michael Foster, and Ivan Pavlov (gastric juices), the bacteriology labs of Robert Koch, or the immunology lab of Paul Ehrlich or (sera and vaccines), are amongst the most familiar examples.[53]

There are numerous case studies of industries and universities cooperating on one level or another.[54] The source of funding for the maintenance and the expansion of laboratories has been addressed in tracing the founding of labs; from service or consultancy to philanthropy to governmental support.[55] In France, Harry Paul highlights this as characteristic of provincial universities, where "there had always been a strong emphasis on local industry and agriculture."[56] In fact, Harry Paul and Mary-Jo Nye argue that French provincial universities depended financially on connections to and subventions from industry, in exchange for training applied scientists.[57] Subsequently, wÒhen the 1885 law allowed faculties to accept private and municipal gifts, courses in applied science were turned into professorial chairs.[58]

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[51] Ilana Löwy, "On hybridizations, networks and new disciplines: the Pasteur Institute and the development of microbiology in France," *Studies in History and Philosophy of Science* 25, no. 5 (October 1994): 655-688; Cassier, "Appropriation and commercialization of the Pasteur anthrax vaccine"; Simon, "The origin of the production of diphtheria."
[52] Geison, *The private science of Louis Pasteur*, 42.
[53] Timothy Lenoir, "A magic bullet: Research for profit and the growth of knowledge in Germany around 1900," *Minerva* 26, no. 1 (1988): 66-88; William H. Brock, *Justus von Liebig. The chemical gatekeeper* (Cambridge: Cambridge University Press, 1997), esp Chapter 5; Todes, *Pavlov's physiology factory*; Liebenau, "Paul Ehrlich as a commercial scientist and research administrator."
[54] An turn of the century example could be that of Marie Curie, see Soraya Boudia, *Marie Curie et son laboratoire* (Paris: Editions des archives contemporaines, 2001).
[55] See for example, the case studies in Frank A. J. L. James, *The development of the laboratory: Essays on the place of experiment in industrial civilisation* (Basingstoke and London: MacMillan Press, 1989).
[56] Harry W. Paul, *The sorcerer's apprentice: The French scientist's image of German science, 1840-1919* (Gainesville: University of Florida Press, 1972), 85.
[57] Harry W. Paul, "Apollo courts the Vulcans: The applied science institutes in nineteenth-century French science faculties," in *The organization of science and technology in France 1808-1914*, ed. Robert Fox and George Weisz (Cambridge: Cambridge University Press, 1980), 155-181; Mary Jo Nye, *Science in the provinces. Scientific communities and provincial leadership in France, 1860-1930* (Berkeley: University of California Press, 1986).
[58] Nye, *Science in the provinces*, 25.

From the early nineteenth century, the financial needs of the universities tended to be covered largely by the state, in addition to the fees paid by the students.[59] Things started to change after the second economical revolution, during the second half of the nineteenth century and the concurrent "great transition" of universities, notably in Germany.[60] Science and research became more practical, material and hands-on. At this time, relations developed and strengthened between universities and industries.[61]

Jean François Auger has pointed out the frequency with which university engineering departments were contracted to provide services for industries in Montreal and Toronto.[62] In the first decades of the twentieth century, these services included routine tests of mechanical resistance and elasticity of cement, wood and other construction materials, as well as measurement of motor performance and equipment normalization or standardization for companies in the railway and mining industries. The funds raised in selling services at McGill University were commonly reinvested in laboratory material and equipment. That is, the economic gain remained in the laboratory that offered the service and was managed internally. However, the *Ecole Polytechnique de Montréal* claimed 20% of their laboratories' revenue and the faculty member that performed the tests 80%.[63] It is interesting that the university labs did not aim to compete with commercial testing firms, but rather sought to perform the tests that such firms were not equipped to carry out. Auger identifies a number of similarities between the five laboratories he examined, including a routine nature of the service such that it did not require long winded research and a scale of revenue that was not significant for the university.[64]

But outside of these Canadian cases, university professors could top up their salaries on an individual basis: "In several countries ordinary salaries paid from the university budgets

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[59] Paul Gorbod, "Resources and management," in *A history of the university in Europe. Volume 3: Universities in the nineteenth and early twentieth centuries (1800-1945)*, ed. Walter Rüegg (Cambridge: Cambridge University Press, 2004), 111-112.
[60] Steven R. Turner, "The great transition and the social patterns of German science," *Minerva* 25 (1987): 56-76.
[61] Gorbod, "Resources and management," 113.
[62] Jean-François Auger, "L'université au service de l'industrie : la vente des services de laboratoire en génie au Canada, 1895-1939," in *Les transformations et mutations de l'université depuis du XIIIe au XXIe siècle*, ed. Yves Gingras and Lyse Roy (Montreal: Presses de l'Université du Québec à Montréal, 2006), 113-132; Jean-François Auger, "La commercialisation des produits de recherche en génie au laboratoire d'électronique appliquées de l'Ecole Polytechnique de Montréal, 1937-1975," *Histoire, Economie et Société* 20 (2001): 105-122.
[63] Auger, "L'université au service de l'industrie," 126.
[64] He examined 5 laboratories: Mechanical Laboratory Engineering in the Faculty of Engineering at McGill University; Laboratory of the Dept of Electrical Engineering at McGill University; Mining Laboratory of the Chemical and Metallurgical Dept at McGill University; *Laboratoire de génie minier* at *L'école polytechnique de Montréal*; Aerodynamic Laboratory of the Faculty of Applied Science and Engineering at the University of Toronto.

or by the state were supplemented by fees for lectures and examinations, by allowances for holding an office, etc., all of which made up a sort of variable 'bonus'."[65] The marketing of a university laboratory expertise was common in, but not limited to, engineering, biomedical and chemistry labs.[66] The costs of medical education rose from 1870 onwards as investments had to be made in laboratory and hospital equipment.[67] In the period of reconstruction, for example, renovation and amelioration of existing facilities, a department could potentially look to raise its own funds to supplement needed equipment and internal expenses.[68]

Strasbourg's university laboratories were autorized by the *Ministre de l'Intérieur publique* to perform operations for industry.[69] This was acknowledged by Jean Essig, *Inspecteur des finances*, in 1928.[70] He observed that these resources were nearly nul at the Strasbourg university. On the contrary, at the university in Nancy, they were quite important. This, he claimed, was due to the numerous technical institutes within the university in Nancy, including chemistry, electrical engineering, metallurgy and mining, agricultural, dairy, brewery.[71] At this point in any case, medical school laboratories were not prone to rendering such commercial services.

1.2.2 Physician remunerations

Prior to the mid-twentieth century, the medical profession was not a financial enterprise in that notably, monetary exchange was invisible when it was present. Practicing medicine, like other learned professions, was not a commercial entreprise.[72] Practitioners set their own fees, with a sliding scale adjustable to the social or financial situations of patients. Until the

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[65] Gorbod, "Resources and management," 108.
[66] Robert Fox and Anna Guagnini, "Laboratories, workshops, and sites. Concepts and practices of research in industrial Europe, 1800-1914. Part two.," *Historical Studies in the Physical and Biological Sciences* 29, no. 2 (1999): 193-294; Robert Fox and Anna Guagnini, "Laboratories, workshops, and sites. Concepts and practices of research in industrial Europe, 1800-1914. Part one.," *Historical Studies in the Physical and Biological Sciences* 29, no. 1 (1998): 55-139; As well as, James P. Hull, "From the FPL to PAPRICAN: Science and the pulp and paper industry," *History of Science and Technology in Canada Bulletin* 7, no. 3 (1983): 3-13; Pierrick Malissard, "Les 'Start Up' de jadis: La production des vaccins au Canada," *Sociologie et Société* 32, no. 1 (2000): 193-206.
[67] Antoine M. Luyendijk-Elshout, "Medicine," in *A history of the university in Europe. Volume 3: Universities in the nineteenth and early twentieth centuries (1800-1945)*, ed. Walter Rüegg (Cambridge University Press, 2004), 544.
[68] Such reconstructions were need in Strasbourg – archives etc. – but this was also the case for most European universities, see: Gorbod, "Resources and management," 102-107.
[69] This may be related to the 1885 law cited by Paul and Nye above.
[70] Rapport de M. Jean Essig, Inspecteur des Finances, sur l'Université de Strasbourg, 19 mars 1928. 58. 103AL 1074. ADBR.
[71] In Nancy there were important applied science institutes, common to French provinces, which had been open in collaboration with regional industrial entreprises, such as the *Institut de Chimie*, *Institut Electrotechnique et de Mécanique Appliquée, Ecole de Brasserie, Institut Aérodynamique.* Paul, "Apollo courts the Vulcans," 162.
[72] Ffrangcon Roberts, *The cost of health* (London: Turnstile Press, 1952).

implementation of third-party payment (i.e., private or public health insurance), patients paid physicians entirely out of their pocket; many could only pay modest fees and sometimes physicians did not charge the poor or could not collect fees owed. In the case of the country doctor, the payment was not always monetary, but farm produce.[73] Country doctors in eighteenth and early nineteenth century, sometimes farmers themselves, were also rewarded with farm labour or services.[74] At this time and in this context, healthcare could not be described with commercial economics.

The adoption of fixed fees paid per medical act corresponded with the union and association of medical professionals [*mouvement syndicale des médecins*] in the early twentieth century.[75] Tarification was not immediate or unproblematic and was debated from the late nineteenth century. Some practitioners, having difficulty reducing their practice to specific tasks, found the fee-for-service idea unsettling.[76] It was argued, for example,

> "That visits cannot be in ratio with the gravity of the disease or the danger to the doctor; that such a custom would neutralise all progress and emulation; that a fixed rate of fees would be contrary to the interests both of the patient and the doctor; that, in the judicial evidence of experts, a tariff is not more admissible, because the physician ought never to accept the part of a witness, but only that of expert; while physicians, in their relations with their patients, have a varied basis for establishing their honorarium – viz., the nature and importance of the service rendered, and the social position and fortune of him who receives it; the scientific and honourable position of him that renders the service; and, finally, local custom. The doctor should avoid presenting a detailed account of his visits, but should fix the total sum. Some of these objections, however, obviously apply rather to a fixed and inflexible tariff of fees, which we presume that nobody ever thought of suggesting or applying, than to a minimum standard serving as an useful basis for common understanding of the remuneration which practitioners ought to require for their medical services."[77]

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[73] Jacques Léonard, "La pensée médicale au XIXe siècle," *Revue de Synthèse* IIIe série., no. 109 (1983): 29-52; Jacques Léonard, *La vie quotidienne du médecin de province au XIXe siècle* (Paris: Hachette, 1977); Jacques Léonard, "Les médecins de l'Ouest qu XIXe siècles, Tomes 1, 2 & 3." (Paris: Université de Paris IV, 1976).

[74] Evelyn Bernette Ackerman, "The activities of a country doctor in New York State: Dr. Elias Cornelius of Somers, 1794-1803.," *Historical Reflections* 9 (1982): 191; Léonard, "Les médecins de l'Ouest qu XIXe siècles, Tomes 1, 2 & 3.," 1499; Edna Hindie Lemay, "Thomas Hérier, A country surgeon outside Augoulême at the end of the 18th century: A contribution to social history.," *Journal of Social History* 10, no. 4 (1977): 542.

[75] Christian Bonah, "La profession médicale à travers l'histoire," in *Médecine, santé et sciences humaines*, ed. Jean Marc Mouille et al. (Paris: Belles Lettres, 2011), 79-91.

[76] As argued by Dr. Caffe in "Medical fees," *The British Medical Journal* 2 (August 10, 1872): 169-170.

[77] The discussion arose at "the Congress" in Rome, but was negated. Ibid., 170.

This discussion coincided with emergence of private and/or employer health insurance with whom practitioners were contractualized and paid set rates. It was over the next few decades and with establishment of public health care that rates were fixed for medical practice. The role that social security [*Sécurité sociale*] and professionalisation through the *Ordre des médecins*, play in this are considerable.[78] Unions [*syndicalisme*] were initially against fixed fees set by the first mutual companies, i.e. for miners. The publication of a "*tarif Jeanne*" in 1897 was a first step in authorizing the "*paiement à l'acte*."[79] In 1897, Dr. Jeanne published medical fees in the *Concours médical*. These suggested fees for medical honoraries took into account four parameters: the financial situation of the client; the importance of the service rendered; the reputation or scientific value of the physician; the material circumstances of the treatment.[80] The medical associations [*syndicats médicales*] pushed the initiative; for example the *Societé des médecins de Besançon et de la Franche-Comté* published a fee schedule in 1901 with rates ranging from 2 to 20 FRF depending on the class of the patient, whether they were a regular or new patient, and whether it was a home visit. The question of tarification of medical acts has been explored up to the turn of the century, but has not been followed for the first half of the twentieth century when the debate was most tense.[81] When it was articulated, tarification of medical consultations was determined as issue of corporate or collective bodies and not between physician and patient.

More generally, it might be considered that medical professionals were not reputable if they expressed commercial or mercenary goals. Economist Hermann Levy stated, "economy in medical treatment contradicts the very foundation of medical science."[82] If mid-twentieth century sociologists also maintained that medical treatment was above economic considerations, the first half of the twentieth century witnessed a progressive transformation of medical economics and payment of medical practice with the establishment and codification of acts and fees.[83] This new economic structure of practitioners' remuneration

[78] Patrick Hassenteufel, *Les médecins face à l'état : une comparaison européenne* (Paris: Presses de Sciences Po, 1997); Pierre Guillaume, *Le rôle social du médecin depuis deux siècles (1800-1945)* (Paris: Association pour l'étude de l'histoire de la sécurité sociale, 1996); Pierre Guillaume, *Mutualistes et médecins : conflits et convergences (XIXe-XXe siècles)* (Paris: Editions de l'Atelier, 2000).
[79] Bénédicte Vergez, *Le monde des médecins au XXe siècle* (Bruxelles: Editions Complexe, 1996), 191.
[80] These are listed by Jean-Jacques Laboutière, "La convention médicale: historique, état des lieux par rapport à la psychiatrie libérale," *Les Psychiatres de Vaucluse*, décembre 2002, http://www.psy84.org/p84/p843015.htm. although he does not cite any primary sources for his historical narrative.
[81] Micheline Louis-Courvoisier, "Le médecin et les honoraires," in *Médecine, santé et sciences humaines*, ed. Jean Marc Mouille et al. (Paris: Belles Lettres, 2011), 91-97; Vergez, *Le monde des médecins au XXe siècle*.
[82] Hermann Levy, *National health insurance. A critical study* (Cambridge: Cambridge University Press, 1944).
[83] Ffrangcon Roberts, *The cost of health*; Ffrangcon Roberts, "The cost of the National Health Service," *The British Medical Journal* 1, no. 4598 (1949): 296.

opened a gap within which health services could be established. Health services, such as clinical laboratories, herein sat midway between pharmacists selling products commercially and physicians performing medical acts honourably.

1.2.3 Economic importance of clinical laboratories

Be it in early standards measurements in engineering and physics labs or details of patient tissue in histopathology labs, laboratory services did not produce "goods," per se, rather they offered expertise and produced measurements, words, numbers, and invisible information. Clinical laboratories sat on the fence between medical practice and goods production. However, neither of these follows usual commodity economics. Medical practice was not a commercial enterprise. As for goods production, the nature of demand for medical laboratory services, especially on an individual level, was irregular and unpredictable.[84] In addition, supply, which is usually "governed by the net return from its production compared with the return derivable from the use of the same resources elsewhere,"[85] was restricted by licensing.

In the landscape of, at least supposedly, non-commercial medical practices and non-commercial medical schools, the grounds for drawing economic questions into this history of medical science may not be obvious. The results of this thesis, however, prove otherwise. There is due reason to consider commerciality and economics in historical study of clinical laboratories. Not only to understand how they became as lucrative as they are today, but because this is an unexplored dimension that reveals another side of how early laboratories functioned. For example, medical laboratories, ridden with apparatus, machines, technicians and routine-driven procedures, are ripe with medical technology history, as many studies of laboratories have shown. Economic and financial questions are inherent in the management of (laboratory) technologies, the commercialization (and maintenance) of apparatus and machines, the employment and administration of (laboratory) personnel, and the provision of medical laboratory services. Beyond a history of medical service, this can (and should) be explored as a fabric or complex system of exchanges.

In fact, clinical laboratory services are a full-blown industry. Jane Levitt identifies the field of clinical laboratory testing with that of the health services industry in the United States,

> "Since the turn of the century, the health services industry has changed from what was essentially a small-scale cottage industry, based on fee-for-service private-practice

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[84] Kenneth Arrow, "Uncertainty and the welfare economics of medical care," *The American Economic Review* 53, no. 5 (1963): 948.
[85] Ibid., 952.

physicians, to a large-scale business, typically centered in a medical school/hospital complex, dominated by third-party payment, and characterized by high technology. The health service industry is indeed a "big business" controlled by major corporations, as is the automobile industry or the food industry."[86]

The use of laboratory services and the ensuing expenditures have been commonly cited as important in the overall growth of health care expenses and this from the mid 1970s.[87]

The request for medical tests, analyses, examinations and scans as enquiry in medical consultation today is a given. When consulting a medical doctor or specialist or when admitted to hospital, it is common and even expected to be asked for blood, urine and/or tissue sample. The sample is then sent to a laboratory, which may or may not be on site, for examination with chemistry, biochemistry, microbiology, cytology, histology, or bacteriology techniques. It has been estimated that lab results are influential in 60 to 80% of medical decisions.[88] Medical or clinical laboratories are not only fundamental in medical practice, taking a sample, packaging it, transporting it, preparing it, examining it, and reporting on it form the basis of a medical service industry. Each step in the process engages costs.

Indeed, medical services represent more than a hefty percentage of medical and hospital budgets. In recent decades, the cost of medical care has risen drastically and has been largely attributed to developments in medical technology; for example, capital-intensive instruments and procedures.[89] On the American front, Levitt has highlighted the increase in expenditures for diagnostic laboratory procedures that contribute to the overall rise in the cost of medical care. She directs her inquiry to the expansion of private industry into the health services field and traces the development of laboratories from small-scale, manually-operated hospital-based centres to large-scale automated laboratories located primarily in major medical centres and in large, privately-owned, independent laboratories. This is equally visible on the Canadian front.[90] Soon, it will be the case for France as well. A legislation has

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[86] Jane Levitt, "The growth of technology and corporate profit-making in the clinical laboratories," *Journal of Health Politics, Policy and Law* 8, no. 4 (1984): 733.
[87] Arnold M. Epstein, Susan J. Krock, and Barbara J. McNeil, "Office laboratory tests. Perceptions of profitability.," *Medical Care* 22, no. 2 (1984): 160-166; Levitt, "The growth of technology and corporate profit-making in the clinical laboratories"; Ross Sutherland, *False postive. Private profit in Canada's medical laboratories* (Halifax and Winnipeg: Fernwood, 2011).
[88] "Biologie Médicale Libérale. Etat des lieux d'une profession en mutation." (Syndicat des biologistes, Mai 2006), 4 cites "The Value of Diagnostics: Innovation, Adoption and Diffusion into Health Care." Lewin Group, 2005.
[89] Levitt, "The growth of technology and corporate profit-making in the clinical laboratories." cites "National Health Expenditures and Average Annual Percent Change," *Health United States, 1978.* US Department of Health, Education and Welfare, DHEW Publication No. (PHS) 78-7232.
[90] Notably in the province of Ontario. Sutherland, *False positive*.

been passed that will open the clinical laboratory market to industries in 2016 and simultaneously require a level of quality standard (ISO 15189) that most small laboratories will not be able to meet.[91]

In France, a 2005 *Cour des Comptes* report underlined the rising costs of medical laboratories and the "obsolete and fastidious" regulations that inhibit instilling important economies of scale in this sector. The regulation prohibits consolidation of medical laboratories; there are 4200 laboratories in France, which may be compared to ten times fewer in Germany.[92] These laboratories employ 46200 people (41000 full time positions), of which 40% are dedicated to administrative questions (such as managing third-party payment system (*tiers payant)*, health insurance coverage (*CMU*), etc.).[93] The 2005 report focused notably on radiology and medical laboratory expenses, emphasizing a parallel between the two types of technological care services and the possibility of implementing economies of scale without sacrificing care quality.[94] The medical laboratory biologists union (*Syndicat des biologists*) argues against the "industrialization" of laboratory work, opposing health practice and industrial approach.[95] They state in a report for the ministry of health that "medical deontology" opposes "commercial logic" underlining the political consequence of opening the market to outside investors rather than maintaining capital in the hands of medical laboratory biologists.[96]

Another recent economics study established that in 2000 annual spending for clinical lab work equaled 46 EUR/inhabitant in France, 43 EUR/inhabitant in Germany, 56 EUR/inhabitant in Italy, 150 EUR/inhabitant in the USA and 182 EUR/inhabitant in Switzerland.[97] In France, laboratory examinations represent nearly 3% of healthcare expenses reimbursed by social security.

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[91] Ordonnance n° 2010-49 du 13 janvier 2010 relative à la biologie médicale. JORF n°0012 du 15 janvier 2010.
[92] Philippe Séguin, "Cour des comptes. Intervention du Premier Président. Conférence de presse.", September 14, 2005, AHUS; "Biologie Médicale Libérale," 8 The latter states there were 4237 in 2006 and note that Assurance Maladie recognized 3913 in metropolitain France in 2004.
[93] "Biologie Médicale Libérale," 8.
[94] "Chapître 1. Les dépenses de la Sécurité Sociale.," in *Cour des Comptes. La Sécurité Sociale.* (Paris: Les Editions des Journaux Officiels, 2005), 53-54.
[95] "Biologie Médicale Libérale," 10.
[96] Ibid. cites Elisabeth Lion, "Les biologistes, les laboratoires privés d'analyses médicales et le marché intérieur de 1993." 15 mars 1990.
[97] Ibid. cites "Les laboratoires d'analyses médicales en France." Burlington consultants, Juillet 2002. On comparison of lab costs between European countries see Jean-Pierre Molgatini, "Confédération des biologistes européens (CBE)" (Syndicat des biologistes, Mai 2006).

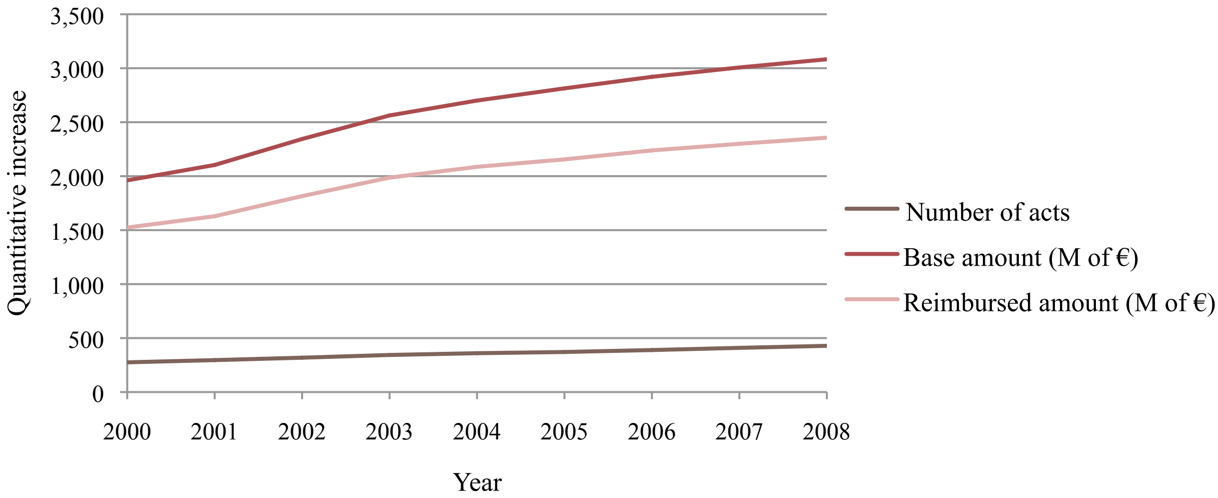

Figure 1.1 Medical laboratory analyses performed by private laboratories and amounts reimbursed by *Sécurité Sociale* in France, 2000-2008[98]

A study of medical laboratory analyses performed by private laboratories and reimbursed by *Sécurité Sociale* in France between 2000 and 2008 using data published by *Sécurité Sociale* indicates roughly 50% increase in laboratory analysis expenses over 8 years. Or in other words, medical service industries of laboratory analysis had an average growth of 6.25% over this period, one that witnessed major economic crisis elsewhere. The data set includes laboratory work [*des actes de biologie médicale*] billed by liberal or private laboratories. The data includes the number of acts performed annually from 2000 to 2008, the base amount (the amount billed by the laboratory), and the reimbursed amount by the *régime general*. The *régime general* accounts for approximately 71 to 73% of all *régimes* of *Sécurité Sociale*. But this does not include laboratory acts performed by public hospitals or other public health institutions. It is further estimated that laboratory expenses in 2003 were divided between 2.4 billion EUR for public sector and 3.66 billion EUR for the private ("en ville") sector; a 40:60 ratio. Note also that the fee per laboratory act is less in the public sector than in the private: the B index unit is 0.18€ (or 0.23€ if administrative costs are included) in public and 0.27€ in "soins de ville" private sector.[99] A more detailed analysis shows that both the number of laboratory examinations and the costs of these examinations have both increased between 2000 and 2008. The increase, represented in the above figure, oscillated between 3% in and

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[98] This graph was generated with data from a series of tables (BIOLAM 2000-2001, BIOLAM 2002-2003, BIOLAM 2004-2005-2006, BIOLAM 2006-2007-2008) of statistiques published online by *Sécurité* Sociale: http*://www.ameli.fr/l-assurance-maladie/statistiques-et-publications/donnees-statistiques/biologie/biolam-2008-2010.php*

[99] "Chapître 1. Les dépenses de la Sécurité Sociale.," 56.

11%. Yet, despite these figures, we hardly know anything about how this system of lab work came into being. These figures indicate that, in addition to history of science or medicine, clinical lab histories need to be framed in economic terms.

1.2.4 National inquiries about a local peculiarity

The French state's concern of the rising costs of clinical laboratory work has not been limited to overall national inquiries of consumption and lab analysis costs. In 1997, the *Cour des Comptes* also performed a study of the 1988 to 1993 accounts of the *Hôpitaux Universitaires de Strasbourg* (HUS).[100] The university laboratories and the important economic and financial relations between these laboratories and the hospital, a local peculiarity testifying to the city's and region's complicated past between France and Germany, were one focus. The study further underlined the lack of clarity in distinguishing between hospital and university property and expenses and, as such, recommended revision of the convention that structured their relationship. It described the principal underlining the convention: reciprocal reimbursement of real costs engaged by each structure. For the suite of this analysis, it is important to underline here that the hospital-medical faculty relationship via convention aimed at a non-profit agreement between two publically run institutions that relied on services provided mutually to each other.

Laboratory analyses and examinations were reimbursed based on a fixed transactional index unit B. The invoicing modalities adopted the *Cour des Comptes* claimed, had become more and more "unrealistic" with the rapid and uncontrollable rise of the prescription of laboratory acts.[101] Notably, the volume of medical analyses being prescribed was largely superior to that in other *Centre Hospitalier Universitaire* (CHU) and the unitary rate of the B unit was higher than that for most laboratories within other CHUs.[102]

Two years later, in 1999, the director of the HUS and the president of the *Université Louis Pasteur* (ULP)[103] jointly requested state evaluation and counsel on the university

[100] Gabriel Minout, Le Président de la Chambre régionale des Comptes d'Alsace à M. Edouard Couty, Directeur Général des Hopitaux Universitaires de Strasbourg., "Observations définitives suite à l'examen des comptes des Höpitaux Universitaires de Strasbourg (1988-1993)", avril 1997, 26-28, AHUS.

[101] Ibid., 28.

[102] Françoise Lalande and Georges Dallemagne, "Rapport sur les Hôpitaux Universitaires de Strasbourg: Le devenir des laboratoires hospitaliers et universitaires. Rapport Initial." (Inspection Générale de l'Administration de l'Education Nationale et de la Recherche/Inspection Générale des Affaires Sociales, Aout 2000), Résume du rapport 2-3, AIAPS.

[103] *Université Louis Pasteur* was the name of Strasbourg's science university between 1970 and 2008. It merged/reunited with the *Université Marc Bloch* and the *Université Robert Schuman* to form the *Université de Strasbourg* on 1 January 2009.

medical laboratory situation.[104] In particular, the study concerned: a) the relevancy of distribution of medical analysis activities developed by the hospital and university laboratories in the context of restructuring hospitals in the region; b) the appropriate adaption to the situation, in terms of university laboratory administration and human resources; c) the analysis of financial aspects (operating costs and prices, investment modalities for the hospital and the university) in consolidating laboratories.[105] The laboratory activities were significant and beyond what universities were accustomed to managing. In the 1990s, the income for the medical laboratory service activity represented approximately 10% of the university budget. In 1992, the *Hôpitaux Universitaires de Strasbourg* spent 132.2 million FRF (equivalent to 20 million EUR) on laboratory services and in 1995, 157.8 million FRF (24 million EUR). This represents 6% of the hospital budget of 2.58 billion FRF in 1993.[106] This sum was paid to the *Faculté de Médecine de Strasbourg*.[107]

What was the HUS getting for this huge sum? In 1998, the HUS ordered 186 million B units.[108] Of these 98 million or 53% were performed by medical school laboratories, 66 million or 35% by hospital laboratories, and the remaining 21 million or 11% by other laboratories.[109] In the same year, the HUS paid ULP 151 million FRF for their services, which accounts for 82% of the university laboratories revenue of 185 million FRF. The university laboratories referred to here include: 3 biochemistry laboratories (including *Institut de Génétique et de Biologie Moléculaire et Cellulaire*), 3 microbiology (bacteriology, virology, parasitology) laboratories, the laboratories of the *Institut d'Hygiène*, the *Institut Médico-légal*, the *Institut de Biophysique*, the *Institut d'Anatomie Pathologique*, and the pharmacology laboratory, as well as the *Clinique de Dermatologie* and the *Clinique d'Ophtalmologie.* Their management and financial productivity was under considerable examination from 1997 and into the 2000s. The outcome of the examination was the transfer, to the HUS, of the medical

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[104] Lalande and Dallemagne, "Rapport sur les Hôpitaux Universitaires de Strasbourg."
[105] *"L'ordre de la mission reçu le 13 mars 2000 a prescrit une mission d'expertise et de conseil qui portera plus particulièrement sur: la pertinence de la répartition des activités de biologie développées par les laboratoires du CHU et les laboratoires universitaires, dans le contexte général de restructuration des hôpitaux de la région; la bonne adaptation à la situation des modalités de gstion de laboratoires universitaires et leurs conséquences en terme de gestion de personnels; l'analyse des aspects financiers (coûts d'exploitation et prix de revient, modalités d'investissements à envisager pour l'hôpital et l'université) dans la perspective des regroupements à réaliser."* Ibid., 4.
[106] Gabriel Minout, Le Président de la Chambre régionale des Comptes d'Alsace à M. Edouard Couty, Directeur Général des Hopitaux Universitaires de Strasbourg., "Observations définitives suite à l'examen des comptes des Höpitaux Universitaires de Strasbourg (1988-1993)," 5. By comparison, personnel expenses represent about 60%.
[107] Ibid., 26.
[108] This is not the number of analyses or tests, but the number of index units that served to calculate costs.
[109] Ibid., 1 of Résumé.

faculty laboratories that had been known as *laboratoires conventionnés* and had been performing lab work for the Strasbourg hospitals since the interwar period.[110]

In light of budgets and incomes of millions and billions of French Francs or Euros, the question is not only how laboratories took on such a vital role in medical practice, but also how did their instauration and their management lead to such a costly/profitable enterprise?

1.2.5 Defining an intersection of economics and history of science

The laboratory of the *Institut d'Anatomie Pathologique* was a science institute laboratory in a medical school and it was anchored in research and teaching. This was simultaneously a medical school laboratory with a clinical laboratory side activity. Clinical laboratory analysis appeared as accessory investigations, chemical or microscopic examinations on body fluids or tissues for diagnostic purposes, conducted by an examining physician or a nurse in a ward side room. This laboratory performed histopathology and cytology examinations. These are qualitative examinations and different in nature from much quantitative clinical lab work. However, they lend to and are issue from similar structures. Once number and nature of examinations, as well as numbers of ward side rooms in every hospital service had increased to the point that they required several hours of work a day and specialized personnel to do it, hospital administrations proceeded to reorganize this activity in centralized special services looking for rationalization, specialization and economies of scale in order to provide hospital services internally and control costs. Usually, in the French landscape, where hospitals were predominantly public state institutions, laboratories were run by the hospital and served patient specimen analysis, examination, diagnosis and assessment and were integrated into the global budget of the institution. In Strasbourg, they were located within the medical school and as they grew in terms of demand, personnel, organization, building additions were necessited, as pictured below.

[110] On their history see Ranslant, "The clinical laboratory: A central point of medical practice hidden in the basement. Case study on the convention bound laboratories of Strasbourg."

Figure 1.2 *Clinical médicale B* laboratories at the medical school in Strasbourg, 2011[111]
From left to right: the further extensions, the first extension, the original clinic.

The significant pecularity of the situation in Strasbourg is that during the German reign between 1871 and 1918, the German medical faculty proceeded to establish its own (teaching) hospitals. These were called "medical university clinics" and were administratively and financially separate and independent from the public, muncipal hospital, the *Bürgerspital*. Erected alongside the old muncipal hospital, medical and surgical "university clinics" were property of Strasbourg's medical faculty. University clinics created their own analayis laboratories. Since they were directed by professors and assistant professors of the medical faculty, they were at the forefront of innovating laboratory examinations, which would become routine diagnostic tools. In 1935, when the university clinics were transferred to the municipal hospital, the laboratories remained property of and managed by the medical faculty. Hospital-medical school conventions which regulated financial matters between the two institutions came to also regulate these laboratories.[112] What started as a reimbursement scheme for material expenses between two public institutions looked different by the time these reimbursements concerned the above stated 98 million examinations a year. Quarrels about reimbursement, fees, and terms of the conventions, etc. did not begin in the 1990s. They started as early as the 1930s, before and with the inception of the system. Expectedly, tensions arose as administration managed tight (public) institution budgets while profits were being made within those institutions

Financially, the situation allowed medical school institute directors to practice medicine privately, e.g. have side earnings and receive monetary compensation in exchange for their expertise. Profits could increase institute budgets and especially grant their directors

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[111] Photo: T. Close-Koenig
[112] For more details, see Chapter 4.

the entrepreneurial freedom to reinvest money where they wished, i.e research, renovations, or salaries.

This thesis takes advantage of this local pecularity. This situation generated administrative paperwork, which translates to historical sources. Negotiations about conventions, disputes over reimbursement of costs and financial investigations render visible in Strasbourg what usually remains difficult to glimpse and study elsewhere: the economic and financial side of clinical laboratory analysis activity and services.

The pathological anatomy institute was involved in the above described economic transactions. These were transactions with the hospital, with medical practitioners and with medical clinics for the provision of, what can be called, medical services. As such, the medical school institute and laboratory should be viewed, not only as a research and teaching institution, but also as a service provider. Imposing an economic lens on a service provider is unproblematic. However, imposing an economic lens on a research institute does not go without justification.[113]

Michel Callon has listed the resources or factors of production needed by a research laboratory as: work force (know-how and competences), instruments, documents (academic literature) and credits (finances).[114] From this a research laboratory produces articles and patents, comptences, new techniques and instruments.[115] Reducing research to productivity in terms of inputs and outputs, however, is an oversimplied metaphor. These analogies are in reality more dangerous than useful, Callon warns. They do not explain the circulation of scientific facts. Or how research simultaneous creates new products and a demand associated with them.[116] Starting from this observation, the present thesis attempts to go beyond the economic metaphor, by analysing a specific case of clinical laboratory and its institutional setting.

But do economics have a role to play in history of science? The thesis has had inspiration from four ways in which economics can and has intersected with history of science, technology, and medicine.

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[113] "The temptation for sociology of science to resort to an economic metaphor to avoid idealism is great. From Hagström to Bordieu as well as Merton and Mulkay, a parallel has often been established between economic market and scientific institution or field. ... " Michel Callon, "Introduction," in *La science et ses réseaux. Genèse et circulation des faits scientifiques* (Paris: Editions la Découverte, 1989), 14, note 2. (My translation.)
[114] Ibid., 12.
[115] Ibid.
[116] Ibid., 14.

First. Economics can be considered on a par with social or political influences.

In 1936 Henry Sigerist, director of the a new history of medicine institute at Johns Hopkins, responded to George Sarton's critic of the discipline stating medical history was "political history, social history, economic history, history of religion ..." every bit as much as it was history of science.[117] Sigerist opened the multiple facets of history that can and should be considered in history of medicine. Similarly, the medical history presented in this thesis is hopefully economic history every bit as much as it is history of science.

Second. Scientific institutions can be economic institutions with inputs, outputs, and production dynamics.

Analogy between production and research has been repeatedly presented in science and technology studies (STS) by Hagström, Bourdieu, Merton, Mulkay.[118] Michel Callon, in 1989, warned against reducing research to inputs and outputs.[119] Because, he argues, this would imply that in research, the creation of supply, demand, and market would be simultaneous and inexplicable. With his study of scallop fishing in Brittany, he explores forms of investments and concludes that networks need be added to the equation.[120]

Bruno Latour, on the other hand, makes a parallel between scientists and capitalists.[121] He compares factories and laboratories: factories for production of machines, laboratories for production of facts.

> "It is striking that the whole century is also creating these specialized places called factories, which include specific places to make new machines. Laboratories are becoming special places to make specific goods – in this case, facts – for a new emerging market, the scientific market. In this view, the laboratory does not exist just to train students, but it is producing the means to deeply modify the practice of medicine."[122]

Although Latour acknowledges this in his contribution to the collective volume on the laboratory revolution in medicine, he does not apply extensive economic analysis in his work

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117 Henry E. Sigerist, "The history of medicine and the history of science," *Bulletin of the Institute of the History of Medicine* 4 (1936): 6.
118 Callon, "Introduction," 14. (Note 2)
119 Callon, "Introduction."
120 Michel Callon, "La protohistoire d'un laboratoire," in *La science et ses réseaux. Genèse et circulation des faits scientifiques* (Paris: Editions la Découverte, 1989), 66-116.
121 Bruno Latour, "Portrait d'un biologiste en capitaliste sauvage," in *Petites leçons de sociologie des sciences* (Paris: La Découverte, 1993), 100-129.
122 Latour, "The costly ghastly kitchen," 299.

on Louis Pasteur.[123] Latour neglects economic stakes in his analysis of power relationships in Pasteur's work on anthrax. It was in fact the diptheria serum that turned things around for Pasteur, and not anthrax vaccine.[124] Thus while repeatedly calling for economic theory and analysis in STS studies and all the while warning about purely metaphorical and thus superficial use of such analytical and interpretive framework, even main stream figures of STS studies like Callon and Latour do not step very far beyond an analogy of the scientific market, where products are ideas and facts, where value, profit, expenses are associated with symbolic capital.

Serious engagement with science and knowledge as a basis for concrete economic and industrial development and distribution has been broached in studies of medical technologies that considered production and industrialization.[125] Like these, the present study wishes to take analysis beyond the vaguely designed scientific market.

Third. The use of economies in discussing relations and exchanges.

The definition and common use of the word "economies" in the eighteenth century as a way of doing and exchanging. This usage predated economic theory and articulation of production and maximization. This notion of economies has been used in history of science by Emma Spary, in her book on the *Jardin du Roi*.[126] She presents a wide number of economies in social, financial, and natural history exchanges. Through this historical lens, the organizational foundation and dynamics of the *Jardin* are revealed. In this thesis, the eighteenth century is discussed only very briefly in the Chapter 2, however, throughout the thesis exchanges of all natures are described. These economies are revealing.

Fourth. The borrowing and application of economic models (theories) to a historical case study.

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[123] Bruno Latour, *Les microbes : guerre et paix* (Paris: A. M. Métailié, 1984); Latour, "Give me a laboratory and I will raise the world."
[124] Simon, "The origin of the production of diphtheria."
[125] Most particularly like, Jean-Paul Gaudillière and Ilana Löwy, eds., *The invisible industrialist. Manufactures and the production of scientific knowledge* (Basingstoke and London: MacMillan Press, 1998); But also Stuart Blume, *Insight and industry. On the dynamics of technological change in medicine* (Cambridge, MA: The MIT Press, 1992).
This has also been explored in STS and innovation studies of contemporary science, such as Michael Gibbons et al., *The new production of knowledge: The dynamics of science and research in contemporary societies* (London: Sage Publications, 1994).
[126] Emma C. Spary, *Utopia's garden. French natural history from old regime to revolution* (Chicago: University of Chicago Press, 2000).

Thus far I have mentioned economic considerations in history of science and medicine and in STS. But from the other side of the fence, what economic approaches or studies should be considered? Economists study health, medicine, and science. Economists also study history, economic history, in the field of economies or economic phenomena in the past. Analysis in economic history is undertaken using a combination of historical methods, statistical methods and by applying (commonly contemporary) economic theory to historical situations and institutions. Such studies include business histories, financial histories, and labor histories. These can be qualitative or quantitative, might apply econometrics (cliometrics), and might involve economic modelling.

The approach that inspired this thesis were concerned with industrial organization, the field of economics that studies the strategic behaviour of firms, the structure of markets and their interactions. For example, Alfred Chandler's histories that detail of organizational structure to characterize industrialization.[127] Similarly and more recently, Markus Becker has borrowed historical methods, using primary archive sources, in his study of industrial orgranization for a case study of Carl Zeiss.[128]

Discussion of monetary factors in medicine and health care may be, and has been, studied by economists, and as such the creation of the discipline of health economics. Health economists study the functioning of the health care system and the private and social causes of health-affecting behaviors. Kenneth Arrow's paper on considering health in economic terms is considered seminal in the discipline of health economics.[129] Effectively, there was an explosion in publications (articles and books) on the topic from the 1960s. However, the creation of a number journals dedicated to the discipline has been more recent.[130]

The means of using economic history in this thesis is by looking at the laboratory activity through a lense of economic dynamics, notably one of supply and demand. Albeit

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[127] Chandler, *Shaping the industrial century*; Alfred D. Chandler, *Strategy and structure: Chapters in the history of the American industrial enterprise* (Washington, D.C: Beard Books, 1969); Alfred D. Chandler, *Inventing the electronic century: The epic story of the consumer electronics and computer industrie* (Cambridge, MA: Harvard University Press, 2005).

[128] Markus Becker, "From entrepreneur to organization: The case of Carl Zeiss," Manuscript, 2010.

[129] Arrow, "Uncertainty and the welfare economics of medical care."

[130] Other more recent academic journals focusing on health and medical economics (in chronological order of their creation) are: 1967 Social Science and Medicine. Part C: Medical economics (Netherlands); 1971 Excerpta medica. Health policy, economics and management (Japan/USA/Netherlands); 1972 Economie et santé (Switzerland);1979 Research in Health economics (USA); 1981 Advances in health economics and health services research (USA); 1982 Journal of Health economics (Netherlands); 1983 Journal d'économie médicale (France); 1991 British Journal of Medical Economics (UK); 1992 Health economics (USA); 1998 Journal of Medical economics (UK); 2000 Health economics in prevention and care (Germany); 2001 International Journal of health care finance and economics (Netherlands); 2001 The European Journal of Health economics (Germany); 2002 Forum for Health economics & policy (USA); 2004 Applied Health economics and health policy (UK); 2006 Health Economics, Policy, and Law (UK).

without neglecting details of organizational nature, like tacit or recordkeeping practices and routines. This is complemented by an analysis of financial accounts of the laboratory, the creation of value, profit and expenses.

1.3 A case study

1.3.1 Strasbourg's medical school laboratories

Medical research and teaching labs spread in Germany universities, including Strasbourg, at the close of the nineteenth century.[131] The investment in medical laboratories in late-nineteenth century Germany has been thoroughly demonstrated. The German university in Strasbourg rose as a number of majestic buildings housing top laboratory facilities were built in the 1870s. The medical school, in particular, served as a window [*Schaufenster*] onto the administrative, scientific and technological strengths of Germany and as an affirmation of their prestige and power.[132] These laboratories for research and teaching were exceptional for French universities, but also for those in Germany.

In the inter-war period there were eight or nine medical school laboratories in Strasbourg that performed diagnosis services (not including the bacteriology lab run by the regional government) each housed within a different building or service.[133] The medical school performed laboratory analyses for the hospital within laboratories that were first and foremost destined for research and for training medical students. These laboratories hovered

[131] Christian Bonah, *Instruire, guerir, servir. Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXe siècle* (Strasbourg: Presses Universitaires de Strasbourg, 2000); George Weisz, *The emergence of modern universities in France, 1863-1914* (Princeton, NJ: Princeton University Press, 1983); Walter Rüegg, ed., *A history of the university in Europe. Volume 3: Universities in the nineteenth and early twentieth centuries (1800-1945)* (Cambridge, UK: Cambridge University Press, 2004); Luyendijk-Elshout, "Medicine."

[132] On the history of the university during the German annexion see: Christian Bonah, "Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXeme siècle. Comparaisons, transferts et contre-transferts. Etude de cas de deux universités en province." (Strasbourg: Université Louis Pasteur, 1996); Bonah, *Instruire, guerir, servir. Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXe siècle*; John Craig, *Scholarship and nation building. The Universities of Strasbourg and Alsatian society, 1870-1939* (Chicago: University of Chicago Press, 1984); Elisabeth Crawford and Josiane Olff-Nathan, eds., *La science sous influence. L'université de Strasbourg enjeu des conflits franco-allemands 1872-1945* (Strasbourg: La Nuée Bleue, 2005).

[133] The grounds shared by the medical school and the municipal hospital are quite expansive and have been referred to as "the city within the city." Denis Durand de Bousingen, *L' hôpital de Strasbourg : une ville dans la ville* (Strasbourg: Hôpitaux universitaires de Strasbourg, 2003).

between patient service and fundamental research. The organization of these labs may be, in part, traced to the historical origins of medical specialization in these two countries; whereas Paris hospitals developed specialties within their midst, in Germany specialization developed in science-based institutions or as university clinics.[134]

Returning under French rule in 1918, designated commissaires for the reorganization and reestablishment of a French medical faculty and a municipal hospital found themselves faced with a situation hitherto unknown in France: a medical faculty owning and running its own teaching and research hospital, a local hospital that had no laboratory facilities, and a system of social and health insurance financing parts of this. In 1919, the medical school institutes and medical school clinics were university owned. In 1935, clinics were transferred to the hospital via a medical school-hospital convention, albeit maintaining teaching rights. Scientific institutes and clinic laboratories remained part of the medical faculty and thus of the university. The hospital used the medical school laboratories because they were established and held the know-how to perform laboratory work. This was issue of an expertise established in and for teaching and research that could be applied to routine diagnosis, as well as the availability of material and apparatus needed for this. There was a fine line, however, in some laboratories between this diagnosis activity as a minor side activity that did not require additional personnel or expenditure and an established diagnostic service activity that required additional personnel, equipment and product purchases.

The widespread use, and therein ambiguity, of the term laboratory, especially in medical and health institutions contrasts with the simultaneous invisibility of the type of laboratory and laboratory activity that the present thesis considers: laboratories that examine fluids or tissue for treatment and diagnosis. Clinical laboratory work is particularly visible in medical practice in the latter half of the century. Post 1945, the lab is perceptible through mobilization of medical administration, lab workers, factory-like procedures, and automated analyzers or kits.[135] But this does not mean that the clinical laboratory dates to mid-century; rather at this time, specimen analysis for medical practice was on a scale that pushed these structures to the forefront of medicine. Scale is an important consideration. If the medical practitioner performed a few simple analyses in a backroom while the patient waited (or after

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[134] George Weisz, *Divide and conquer. A comparative history of medical specialization* (Oxford: Oxford University Press, 2006); George Weisz, "Naissance de la spécialisation médicale dans le monde germanophone," *Actes de la recherche en sciences sociales* 156-157 (2005): 37-51; George Weisz, "The emergence of medical specialization in the nineteenth century," *Bulletin of the History of Medicine* 77 (2003): 536-575.

[135] Harry Marks, "The social context of automation," Unpublished manuscript, 1981; Keating and Cambrosio, *Biomedical platforms*.

the patient left), then an individual laboratory would not fill any purpose. However, if there were too many analyses to perform in the practitioners spare time or if they were too complex in technique or instrumentation for the backroom, then an individual laboratory with expertise and instrumentation dedicated to this activity would be purposeful.[136] Similarly if someone working at a laboratory at a medical school, for example, was asked by a colleague to perform a few specimen analyses and these could be performed in a few minutes or in one's spare time, then an individual clinical laboratory might not be needed. If, on the other hand, the number of requests being sent to the lab were such that time and costs were infringing on the laboratory's primary purpose and budget, an individual clinical laboratory would again be purposeful. As such, pinpointing the origin of this activity is complex. This is in part due to the fact that specimen analysis in a backroom or a side activity in an existing lab, it is invisible. Albeit, there are means to render this invisible status visible; for example via practitioner patient records and notes from this era, as is the case for Christopher Crenner's thesis work and book or via hospital patient records and notes as used by Rosemary Wall in her thesis work.[137] Such documents are not often existent or available. Tracing the history of the clinical laboratories begins, as such, with visible benchmarks of their emergence in Strasbourg and in France. The strength of these laboratories for research and teaching authenticates, in part, a historical study of medical laboratories in Strasbourg. Furthermore, following the political transfer of the region, the medical school and hospital were reorganised. This has left an administrative trail that is useful for identifying where the laboratories stood and what importance they held for teaching, for research, for the hospital and for medical practice.

1.3.2 Sources

Twentieth century medicine is characterized by the omnipresence of medical laboratories. The all-pervasiveness of laboratories is one that stems from and lends to ambiguity of the word "laboratory." This explains why the archive documents mentioning laboratories were

[136] Christopher Crenner, "Private laboratories and medical expertise in Boston circa 1900," in *Devices and designs. Medical technologies in historical perspective*, ed. Carsten Timmermann and Julie Anderson (Basingstoke and New York: Palgrave Macmillan, 2006), 61-73.

[137] Christopher Crenner, "Professional measurement: Quantification of health and disease in American medical practice, 1880-1920" (PhD, Cambridge, MA: Harvard University, 1993); Christopher Crenner, *Private practice in the early twentieth-century medical office of Dr. Richard Cabot* (Baltimore: Johns Hopkins Unversity Press, 2005); Crenner, "Private laboratories and medical expertise in Boston circa 1900"; Rosemary Wall, "Self-representation and practice: Diagnosing and treating diphtheria at Bart's, 1890-1920" (presented at the SSHM Annual Conference, University of Warwick, 2006).

unexpectedly numerous in the Administrative archives of the *Hôpital civil de Strasbourg* (AHUS) and Administrative archives of the *Faculté de Médecine de Strasbourg* (AFMS). Their large number did not lighten the task at hand of tracing their history, rather it muddied the waters: laboratories were everywhere and many of those in the documents did not seem relevant to my quest. Christian Pfister, in his 1917 history of the University of Strasbourg, even considered the university library to be a "vast laboratory."[138] That is to say that by the early decades of the twentieth centuries, laboratories were everywhere and were not limited to medical practice, research, or science. However, I was aiming to uncover traces of the early lending of science and teaching laboratories to diagnosis and medical practice. In order to situate this, numerous archival sources were used. These included primarily the Archives of the *Institut d'Anatomie Pathologique de Strasbourg* (AIAPS) and the Archives of the *Université de Montréal* (AUM), but also Archives of the *Clinique de Dermatologie* (ACD), Archives of the *Département du Bas-Rhin* (ADBR), Archives of the *Centre Anti-cancéreux - Centre Paul Strauss* (ACPS), Archives of the *Direction Départementale des Affaires Sanitaires et Sociales* (ADDASS), and Archives of the city of Strasbourg (ACUS). I was very fortunate to have the occasion to equally consult the Rockefeller Institute Archives (RAC).

Of the archival documents that explained and situated medical school laboratories, their activities and their relations with the hospital there are two sets that stand out. The *Cour des Comptes* led investigations into the management of the *Laboratoire d'Anatomie Pathologique* accounts between 1924 and 1934. The investigations concentrated on the financial management of the laboratory income. I came across the records of these inquiries in the Strasbourg medical school archives. Whereas I had knowledge that the labs provided some service to the hospital, there was little documentation of how this was actually managed. These labs were research and teaching laboratories and the archival matter showed as much. It would be easy to conclude that without documentation stating otherwise, the service activity was non-subsequential or on a gift-exchange basis. The *Cour des Comptes* inquiry into the accounting procedures of the laboratory of the *Institut d'Anatomie Pathologique* from 1924 to 1934, the laboratory of the *Clinique médicale B* from 1930 to 1934, and the *Chaire d'Hydrologie thérapeutique et de Climatologie* from 1924 to 1934 tells us otherwise and effectively has been eye-opening to medical service laboratory activity in the interwar era. If such medical labs were not commercial institutions, how did income management come to be investigated? The dossier of this inquiry and numerous other reports prepared by Parisian

[138] Christian Pfister, *Rapport sur l'Université de Strasbourg* (Paris: Maréchal, 1918), 27.

officials investigating medical school finances have been the principal sources for grasping pecuniary importance of these medical laboratories. These documents and this inquiry form the core of Chapter 5.

Another particularly rich set of documents were the laboratory registers or logbooks [*régistres de laboratoire*] of the *Institut d'Anatomie Pathologique*. About 300 black volumes were uncovered as renovations were taking place in the institute building shortly after I began this project. The renovations were destined to re-assign the offices of the pathologists that worked in the institute as their activities were increasingly grouped at the Hautepierre hospital. These volumes provided a large set of data concerning the laboratory activity and the histopathology examinations, including who sent tissue samples, what they were, when, how long it took for histology preparations and examination, what examinations revealed. This data set was the basis of a quantitative study. There have been bits of quantitative data given by Stephen Jacyna, Christopher Crenner, and Rosemary Wall in recent studies of clinical laboratories and Ilana Löwy has performed a study of surgical pathology lab reports.[139] But no previous study of clinical or medical laboratories has fully accessed or analysed qualitatively and quantitatively such a primary source. For this case study of the laboratory of the *Institut d'Anatomie Pathologique* in Strasbourg, the laboratory logbooks provide data for quantitative treatment and analysis of the laboratory activity, these are the focus of Chapter 4. This quantitative study give statistics that, crossed with financial data, from a bridge between historical and economic methodologies.

In this work, the archival sources and paper relics of the pathological anatomy institute are sources, but are also a product or instrument of the institution and are treated as such. I embrace them and have allowed them to direct me through my research. On paper and their use in knowledge compilation and organization, Delphine Gardey has written a rich historical account.[140] She calls the transformation of society a paper revolution. Bruno Latour also venerates study of paperwork. He states:

> "the most powerful explanations, that is those that generate the most out of the least, are the ones that take writing and imaging craftmanship into account. They are both material and mundane, since they are so practical, so modest, so pervasive, so close to

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[139] Löwy, *Preventive strikes*; Crenner, *Private practice in the early twentieth-century medical office of Dr. Richard Cabot*; Crenner, "Professional measurement"; Wall, "Using bacteriology in elite hospital practice"; Jacyna, "The laboratory and the clinic: The impact of pathology on surgical diagnosis in the Glasgow Western Infirmary, 1875-1910."

[140] Delphine Gardey, *Écrire, calculer, classer : comment une révolution de papier a transformé les sociétés contemporaines (1800-1940)* (Paris: Éd. La Découverte, 2008).

the hands and the eyes that they escape attention. Each of them deflates grandiose schemes and conceptual dichotomies and replaces them by simple modifications in the way in which groups of people argue with one another using paper, signs, prints and diagrams."[141]

The archival sources of the *Institut d'Anatomie Pathologique* are herein more than just sources, rather they are material productions and pivotal in knowledge production. I have identified four levels of these paper testimonies as 1) materiality & paper as material; 2) administrative technology & paper as inventory; 3) knowledge production & paper as technology; 4) money & paper as invoice trails. These four levels are present and discussed throughout the thesis. It is even around the rich and textual nature of these paper testimonies that the dissertation is organized. Each chapter begins with an anecdote or story related to a document. This sets the theme of that chapter. Chapter 2 focuses on catalogues, inventory and observations, as well as tying these to materials in pathological anatomy and corpses as raw material for research. An administrative technology appears in the catalogues and inventories of this chapter, but also in the laboratory logbooks and autopsy registries in Chapter 4. Paper technologies are outlined in Chapter 2, but they equally re-appear with the laboratory logbooks and with the *Atlas du Cancer*. And lastly, the invoice trail is seen (indirectly) in the account records recounted in Chapter 5.

1.4 Thesis outline

In the course of a laboratory analysis, patient specimen (urine, blood, organ, tissue, etc.) was examined and became a source of information (i.e., diagnosis). When medical practitioners could not perform the analysis themselves, they solicited the expertise of a competent institution (i.e., a laboratory). In this case, the laboratory analysis was a service and the laboratory a service provider. The status of what was initially a medical act shifted to that of a service from which it became a commercial or industrial act and an economic unit.

This thesis focuses on an exploration of this shift with a case study of an anatomical pathology laboratory. In the case study, the analyses being performed were histopathology examinations notably for cancer diagnosis and, as such, the creation of cancer treatment

[141] Bruno Latour, "Visualisation and cognition: Drawing things together," in *Knowledge and society* 6 (1986): 1-40.

facilities instituted a demand for the laboratory service. This demand, as will be shown, was primordial in bequeathing value to laboratory acts. This situation, along with particularities of Strasbourg institutions, stemming from political history, edifies transparency of a period of transition that has largely remained invisible.

The thesis examines the emergence of medical laboratory services and inquires into the origin of clinical laboratory services and how they became commercially oriented. The goal is to define a laboratory examination as en economic entity, and as currency in a transaction. But in order to do so, what clinical laboratories were supplying must be defined. They sent slips of paper with information to medical practitioners. This information was obtained through examination and analysis of bodily fluid and tissue samples. The said information was a codified form of scientific laboratory knowledge.

The thesis is divided into two parts: firstly exploring knowlegdge production in pathological anatomy and histopathology and secondly exploring the commodification and commercialization of that knowledge in a communicable form.

The first chapter focuses on anatomy collections, how they are accumulated and how they are used, but it is also on recollections and the role of catalogues in pathological anatomy. Not only is the topic the collections themselves, but the active role of the pathological anatomists in bringing the pieces and preparations together and inscribing them in catalogues, the title is thereby collecting and recollecting. The second chapter shifts from anatomy amphitheatres and musuems to laboratories and histology and histopathology transformation of biological samples. It is also on the scientists' actively informing those samples as histopathological slides. Eminent histologist Pierre Masson was a pivotal figure in the field, and in Strasbourg. The third chapter turns from research to diagnosis: inscribing and proscribing via knowlege and acknowledging or cognition and recognition. Again, Masson was an active figure, not only in developing laboratory techniques, but in the social and political mobility for cancer treatment. The opening of a regional cancer centre in Strasbourg brought change to the pathological anatomy institute's activity as demand and market for their services emerged. The last chapter ties this emergence to financial questions. The institutional setting and the administration of the financial entanglement of Strasbourg's hospital and medical school are traced. This brings to light accounting practices and internal management.

To sum up, this thesis attempts to pursue the lead made by major STS scholars that economic considerations should, and could, be more present in history of science and medicine. In fact, this requires combining two more traditional approaches of economics/economic history and history/sociology of science and medicine. This means suggesting that economical considerations have a significant role in scientific and medical practice and co-condition political and social aspects highlighted by classic STS. On the flipside, for economics and economic history, this approach implies that theories and analytical frameworks in economics might still underestimate recent results of STS, namely considering that facts are given naturally and are not historically, socially, and economically generated and developed. This may be key to defining an intersection between economics and history of science. Such is the challenge proposed by this thesis.

A terminology parentheses: Anatomical pathology or pathological anatomy?

The term pathological anatomy, rather than anatomical pathology, will be employed. Anatomical pathology is generally the favoured of the two terms in English.[142] Institutions, museums, and professorships in France use the title the *Anatomie Pathologique*. In Strasbourg, the label was clearly intended to differentiate from *Anatomie Normale* and *Anatomie Physiologique* first in classifying the anatomy collection in the early nineteenth century, then in creating a distinct chair in 1819 and again in 1919. Between 1872 and 1918, the German institution, museum and chair fell under the title *Pathologisches Institut.* The terms have historical overtones. "Pathological anatomy" implies a sub-discipline of or origin in anatomy, which in nineteenth century France was the case historically and it was alongside physiology and embryology under anatomy's roof.[143] "Anatomical pathology" implies a sub-discipline of or origin in pathology, and presently it is considered distinct from clinical pathology. "Pathology" stands on its own, rebuffing alliance or historicity and indeed, it was

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[142] However, they are often identified as synonymous. For example, anatomic pathology, anatomical pathology, anatomopathology, pathological anatomy, pathologic anatomy, pathoanatomy, and morbid anatomy are all translations of *anatomie pathologique* on the online Grand Dictionnaire Terminologique, (http://www.granddictionnaire.com/btml/fra/r_motclef/index1024_1.asp consulted 31 January 2009.) Russell Maulitz uses the term pathological anatomy. The articles in Cay-Rudiger Prüll's edited volumes favor pathology or anatomical pathology. Charles-Henri Ehrmann, *Compte rendu à la Faculté de médecine de Strasbourg des travaux anatomiques exécutés à l'Amphithéatre de cette Faculté pendant les années 1824 et 1825* (Strasbourg: Levrault, 1827).; Cay-Rüdiger Prüll, ed., *Traditions of pathology in Western Europe: Theories, institutions and their cultural setting* (Herbolzheim [Germany]: Centaurus, 2003).; Cay-Rüdiger Prüll, ed., *Pathology in the 19th and 20th centuries: The relationship between theory and practice* (Sheffield: European Association for the History of Medicine and Health publications, 1998).

[143] The definition of "pathological anatomy" in the Merriam-Webster dictionary on MedlinePlus identifies it as a subdiscipline of anatomy. (www2.merriam-webster.com/cgi-bin/mwmednlm?book=Medical&va=pathological anatomy Consulted 31 January 2009). The same dictionary provides 3 definitions for "pathology" (roughly corresponding to those of Maulitz) and does not contain an entry for "anatomical pathology."

an individual discipline in Germany from the mid-nineteenth century.[144] Here I will use "pathological anatomy" because the historical documents, notably those relating to the collections, indicate such historicity. Further to this clarification of terms is the definition of pathology itself. The definition of the term pathology has been described as problematic by Russell C. Maulitz and Cay-Rüdiger Prüll, who agree that the word is used in history of medicine for three different notions: 1) Pathology as a biological notion or as the science of disease; 2) Pathology as a cognitive notion or analysis of the change in ideas about illness; 3) Pathology as a professional notion or as a specific discipline.[145] William D. White, on the other hand, identifies the term pathology as the aggregate of anatomical pathology and clinical pathology; the former with emphasis on visual anatomical examinations and the latter on laboratory examinations including histology, microbiology, haematology, and chemical pathology.[146] As such, histopathology is the precise term for the laboratory service under consideration in this case study. Here, (if) I use the term pathology it is to speak of the profession or discipline that addresses post-mortem study, as well as post-excision (or biopsy) study, of cells, tissues and organs on the macroscopic and microscopic level; that is, to refer to anatomopathology and histopathology. Otherwise, the term pathological anatomy is used to refer to the French discipline.

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[144] See Prüll, *Traditions of pathology in Western Europe*.; Prüll, *Pathology in the 19th and 20th centuries* . Note that pathology in the UK, such as that defined by The Royal College of Pathologists refers to laboratory diagnosis in broad terms and encompassing haematology, microbiology, immunology, in addition to histopathology and chemical pathology, e.g., Prüll, *Pathology in the 19th and 20th centuries* .

[145] Ibid.; Ehrmann, *Compte rendu à la Faculté de médecine de Strasbourg des travaux anatomiques exécutés à l'Amphithéatre de cette Faculté pendant les années 1824 et 1825*.

[146] White, *Public health and private gain*, 48.

PART I. ON KNOWLEDGE PRODUCTION. PRODUCING EXPERTISE & SUPPLY.

Chapter 2

Dissecting cadavers & cataloguing preparations

The extended history of anatomy and pathological anatomy in Strasbourg

Introductory material. Hommel's catalogue.

The numerous catalogues of Strasbourg's medical school anatomy collection were issue of anatomy collecting and adjacent recordkeeping processes. Collecting and recording was a long tradition in anatomy.[1] The first anatomy catalogue in Strasbourg dates to 1737. The pathological anatomy knowledge production practices of the early twentieth century can be traced to this long tradition.

Figure 2.1 Title page of the first anatomy catalogue of Strasbourg's collection, 1737.

[1] I do not wish to confound the terms *anatomy* and *pathological anatomy.* I use the word *anatomy* to speak of what is known normal anatomy. I use the word *pathological anatomy* to speak of pathological anatomy or anatomical pathology, as opposed to normal or comparative anatomy.

This paper document is an entry into anatomy via a glimpse of the anatomy cabinet contents in the early eighteenth century. Prosectors and anatomists wrote this and other such books. They were issue of practices and a place. They recorded products. The 1737 catalogue was handwritten. It enumerated 65 anatomy preparations that Johann Ludwig Hommel (1706-1743) had prepared. It was not printed and distributed like other medical school documents such as dissertations or articles, but served internal inventory purposes. Hommel was prosector for the municipality of Strasbourg from 1736; a municipal post created in 1733 for an activity that took place in the medical school adjoining the municipal hospital. The first human anatomy demonstration in Strasbourg, however, can be traced to about two centuries earlier.

The first section of this chapter describes the rising frequency of human dissections and the creation of an anatomy theatre in Strasbourg. This historical setting, notably as it traces the circulation and acquisition of human corpses, prepares the terrain for the latter sections of the chapter concerned with anatomy collections and catalogues. It is a longue durée narrative based essentially on secondary sources. Key dates in Strasbourg's history are set up against other French and European developments to historicize and contextualize the local history. The chapter follows a roughly chronological plot, but is organized on a series of themes that are focused around materials. Firstly, dissection materials, corpses and cadavers, are outlined in a historical account of the beginning to the implementation of human dissection in medical studies and as a source of knowledge. Secondly, museum materials that figure in the showcases of anatomy museums illustrate a natural history way of knowing. In dissecting corpses and in preparing pieces, accessing and collecting as many preparations as possible was advantageous. The large numbers of preparations, however, required an administrative framework in order to be manageable. The last section describes and discusses paper materials and the anatomy museum catalogues. These catalogues were a means of re-collecting, physically and intellectually, collected materials.

Anatomopathology is a discipline founded on and defined by post-mortem study. It essentially emerged as a morphological science, branching from and alongside anatomy. The medical morphological sciences include: anatomy, histology, embryology, and pathological anatomy. The creation of the individual chairs is indicative of the individualization of the disciplines. Pathology or pathological anatomy, as a discipline in the field of medicine, has been traced to Germanic countries and to the establishment of six chairs (i.e., professorships) of pathological anatomy between 1844 and 1859.[2] The pathological anatomy tradition in Strasbourg crossed and actually predated this history as a chair for pathological anatomy was attributed to Jean-Frédéric Lobstein in 1819. This chair was transitory and re-merged with the anatomy chair.

What pathologists were doing in the late nineteenth century and even in the interwar period can be identified with these earlier practices. What they were doing was not new and there is a continuum that can be traced. The long durée history is necessary to understand this. But, what this chapter further argues and reframes is the material conditions of pathological anatomy and collecting body parts. In a certain sense it can be argued that the thesis adheres to the anatomo-pathological logic and logistics of procuring, recording, and inventorying "materials" from corpses. Katja Sabisch addresses a similar question in the context of materials for human experimentation.[3] In a similar direction, but from a Foucauldian perspective, Grégoire Chamayou has investigated power dispositifs in procuring corpses for dissections.[4] What both of these studies share is the attempt to trace a genealogy of logistics in devaluation strategies establishing corpses as "corpus vili" or bodies of lesser value and thereby opening the possibility of their use as "materials." In both of these studies devaluation is framed purely in a political, ideological or ethical perspective, but not in an economic one. The following thesis argues that part of the devaluation strategies and logistics is the fact that corpse logistics had a material economic side that was a significant and powerful part of the objectifying practices of bodies and body parts. In this sense, the concept of commodification, and not that of objectification, is mobilized.

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[2] On the history of pathology: Esmond Ray Long, *A history of American pathology* (Springfield: Thomas, 1962); Prüll, *Pathology in the 19th and 20th centuries*; Prüll, *Traditions of pathology in Western Europe*; Russell C. Maulitz, *Morbid appearances: The anatomy of pathology in the early nineteenth century* (Cambridge: Cambridge University Press, 1987); Juan Rosai, ed., *Guiding the surgeon's hand. The history of Americal surgical pathology* (American Registry of Pathology, Armed Forces Institute of Pathology, 1997).

[3] On the use of logic and logistics as concept in history of experimentation, see Katja Sabisch, "Das Weib als Versuchsperson. Medizinische Menschenexperimente im 19. Jahrhundert am Beispiel der Syphilisforschung," Manuscript (Bielefeld, 2007).

[4] Grégoire Chamayou, *Les corps vils. Expérimenter sur les êtres humains aux XVIIIe et XIXe siècles* (Paris: Editions la Découverte, 2008).

2.1 Dissection material. Anatomy and Aquisition.

2.1.1 Dissecting human cadavers

Medical teaching and anatomy theatres

Dissections performed in the Middle Ages, overseen by the magister, executed by the demonstrator and directed by the ostentor, were performed as affirmation of the Greek master's, Galen, anatomy and physiology.[5] That is, as a confirmation of anatomy portrayed in the surviving works and compendia of Galen, Greek physician, surgeon and philosopher. Human dissections were first performed in a number of Italian universities and medical colleges, and in France at the university in Montpellier.[6] In the late fifteenth century, the practice spread to medical faculties in European countries. Galen's theories were based on dissections of pigs and primates, but they dominated Western anatomy until the mid-sixteenth century. Anatomy professors trusted Galenic texts more than their own eyes; observation subordinated to description.[7] The 1543 publication of Andreas Vesalius' *De humani corporis fabrica* is considered a defining moment in attaining scientific knowledge from observation.[8] Vesalius demanded that "people stop looking at the text of Galen (or Mondino), and instead look at the text of the body, 'the non-lying book of the body' as he called it."[9] Until about the mid-sixteenth century, books were the ultimate source of knowledge. From the Renaissance, i.e., with Vesalius' work, cadavers and dissection progressively became the ultimate source of knowledge.

The first human anatomy demonstration organized in Strasbourg dates to 1517.[10] This pre-dated Vesalius' publication and it was one of the very first dissections performed in

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[5] For example, Andrew Cunningham, *The anatomical renaissance: The resurrection of the anatomical projects of the ancients* (Aldershot: Scolar Press, 1997).

[6] Firsts include: Montpellier 1340, Padua 1341, Venice 1368, Florence 1388, Vienna 1404, Prague 1460, Paris 1478, etc. Cf. David Le Breton, *La chair à vif : de la leçon d'anatomie aux greffes d'organes*, Edition revue et complétée. (Paris: Métailié, 2008), 56.

[7] Andrea Carlino, *Books of the body: Anatomical ritual and renaissance learning* (Chicago: University of Chicago Press, 1999).

[8] Steven Shapin, *The scientific revolution* (Chicago: University of Chicago Press, 1996); Elizabeth L. Eisenstein, *The printing press as an agent of change: Communications and cultural transformations in early-modern Europe* (Cambridge, MA: Cambridge University Press, 1980).

[9] Andrew Cunningham cites Vesalius and discusses this phrase: Cunningham, *The anatomical renaissance*, 121; 136.

[10] Jean-Marie Le Minor et al., *Anatomie(s) & pathologies. Les collections morphologiques de la Faculté de Médecine de Strasbourg* (Strasbourg: I.D. l'Edition, 2009), 9; Jean-Marie Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles* (Strasbourg: Presses Universitaires de Strasbourg, 2002), 15-17; Jacques Héran, *L'histoire de la médecine à Strasbourg* (Strasbourg: La Nuée Bleue, 1997), 70.

Germanic territory.[11] It was an exceptional event, under the direction of Wendelin Hock van Brackenaw, who had studied medicine in Bologna. Thereafter public dissections were somewhat regular events in Strasbourg. A barber or prosector performed the dissection under the direction of a medical doctor and organs were pointed out by a demonstrator. In the sixteenth century, dissections were being increasingly performed in academic contexts.[12] In Strasbourg, it was in 1585, with the creation of an academy for medical studies and two chairs, for *Medicina theorica* and *Medicina practica*, that practical demonstrations were included in the study of anatomy and botany.[13]

In the fourteenth and fifteenth centuries, professional training of physicians was established independent of religious orders. Secularization involved entering nascent economic systems with remuneration and fees for education; an emerging medical education market.[14] The rising frequency of anatomy demonstrations, notably in progressively organizing medical schools and other locals of medical teaching (ex. in Paris *Jardin royal, Collège royal, Académie royale des sciences,* etc.), required larger and more permanent spaces in order for those attending the dissection to be able to gather.[15] Like a theatre, they all needed to see the performance on the stage.[16] Having a theatre increased the competitive edge in attracting students and scholars. Small dissection rooms gave way to anatomy theatres in the sixteenth century; anatomy theatres were built in Padua in 1594, Leiden in 1596, London in 1557, Basel in 1589.[17] In Montpellier, the *arrêt des Grands Jours de Beziers* stated that from 1550, the medical curriculum was to include observing four autopsies per year. These were initially performed in a room for receiving bodies and performing dissections.[18]

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[11] Strasbourg was an imperial free city of the Holy Roman Empire.
[12] Katharine Park, "Myth 5. That the medieval church prohibited dissection," in *Galileo goes to jail and other myths about science and religion*, ed. Ronald L. Numbers (Cambridge, MA: Harvard University Press, 2010), 46; Roger French, "The anatomical tradition," in *Companion encyclopedia of the history of medicine*, ed. W. F. Bynum and Roy Porter, vol. 1 (London and New York: Routledge, 1993), 81-102; R. W. French, *Dissection and vivisection in the European renaissance* (Aldershot: Ashgate, 1999).
[13] Anatomy and botany were commonly joined in one professorship. The movement of the renaissance concerned observation of both botany and anatomy. Equally botany was *materia medica*.
[14] The nature of this market and the context would be interesting to explore, albeit beyond the scope of this thesis.
[15] Andrew Cunningham, *The anatomist anatomis'd: An experimental discipline in Enlightenment Europe* (Farnham: Ashgate, 2010), 30. recounts the experience of a medical student at Cambridge University who, in 1627/8 complained of not being about to see the dissection being performed. The anatomy theatre was only built at Cambridge in 1716.
[16] On early anatomy theatre architecture see Christian Billing, "Modelling the anatomy theatre and the indoor hall theatre: Dissection on the stages of early modern London," *Early Modern Literary Studies*, no. 13 (2004): 1-17.
[17] Giovanna Ferrari, "Public anatomy lessons and the carnival: The anatomy theatre of Bologna," *Past & Present*, no. 117 (November 1987): 72.
[18] François Bonnel has traced the history of dissections at the Montpellier medical school; one anatomy dissection was performed in 1526, two in 1527, three in 1528, four in 1529, two in 1530, three in 1531, six in

Subsequently, the first anatomy theatre in France was built in Montpellier in 1556. Theatres integrated most medical schools in France and Europe over the seventeenth and eighteenth century: in Paris in 1608, Copenhagen 1643, Altdorf 1650, Uppsala 1663, Madrid around 1689, Amsterdam 1691, Berlin 1720, Halle 1727.[19]

In Strasbourg, temporary settings were installed for public demonstrations. Johann Rudolph Salzmann, professor of practical medicine from 1611 to 1652, organized numerous public dissections. But he also performed anatomies in a number of other places: at the Saint Gall cemetery, at the hospital, in private houses, and in the academy's anatomy premises.

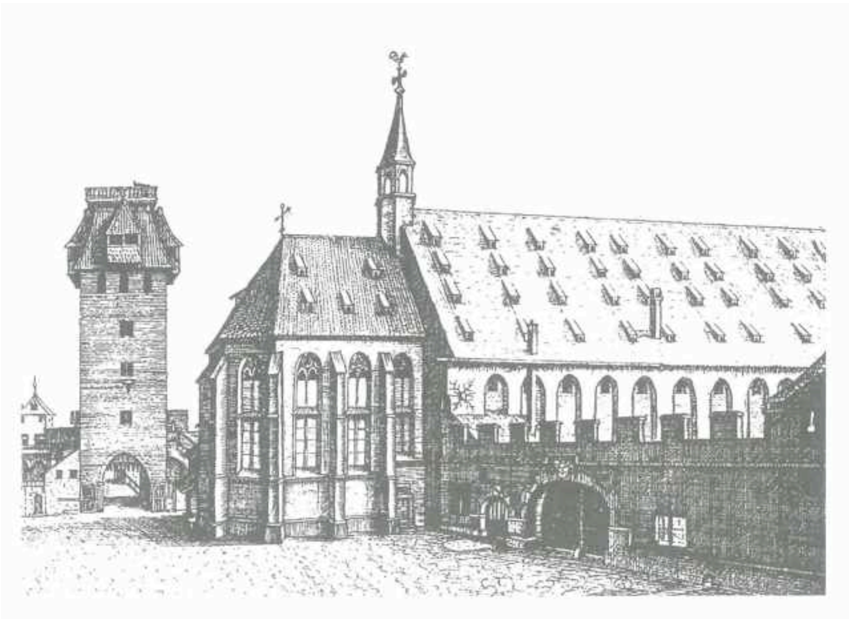

Figure 2.2a The Strasbourg Theatrum Anatomicum, 1670
The Saint Erhardt chapel and the *Hôpital civil*. Drawn by J. J. Arhardt in 1633.[20]

1532, three in 1533, five in 1534, two in 1535. François Bonnel, "Le musée d'anatomie : un patrimoine vivant," in *Médecine, Art et Histoire à Montpellier*, ed. E. Cuénant (Montpellier: Sauramps médical, 2002), 78-91; François Bonnel and Christophe Bonnel, "L'anatomie à Montpellier un enseignement prestigieux. De la dissection à l'anatomie virtuelle.," *Musée d'anatomie de Montpellier*, n.d., http://www.tomolis.com/anatomie/anatomie_dissection.htm.

[19] These are described by Cunningham, *The anatomist anatomis'd*, 29-44.

[20] Reproduced from Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 369 (Source: Cabinet des Estampes de Strasbourg).

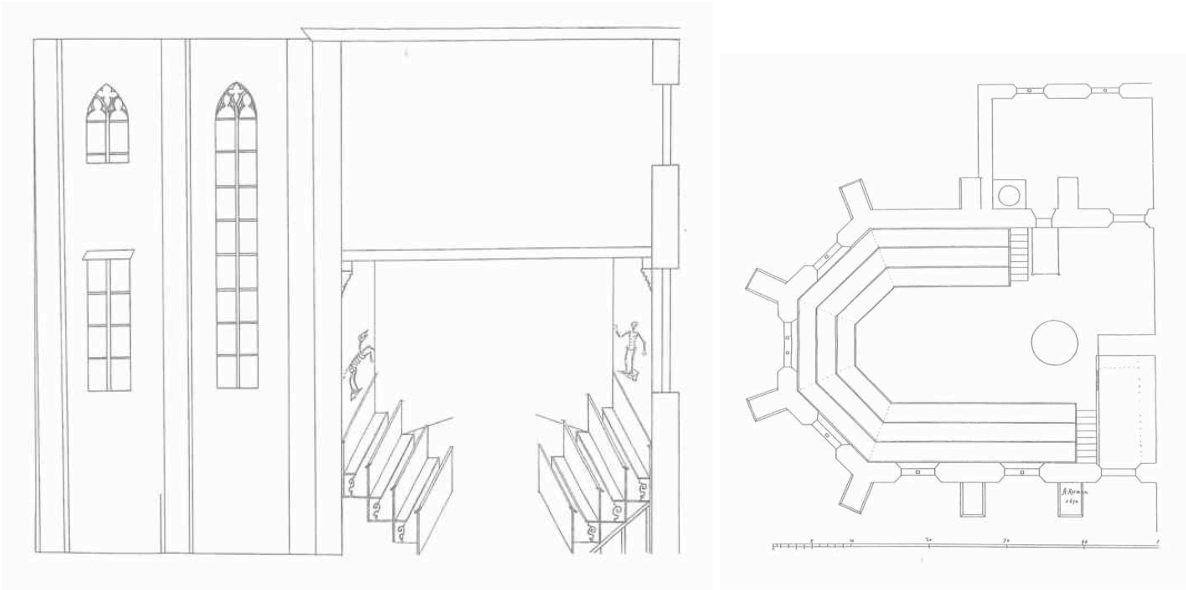

Figure 2.2b The Strasbourg Theatrum Anatomicum, 1670
Floor plan and elevation of the anatomy theatre, *Theatrum Anatomicum*, in the Saint Erhardt chapel. Drawn by A. Kerman in 1670. [21]

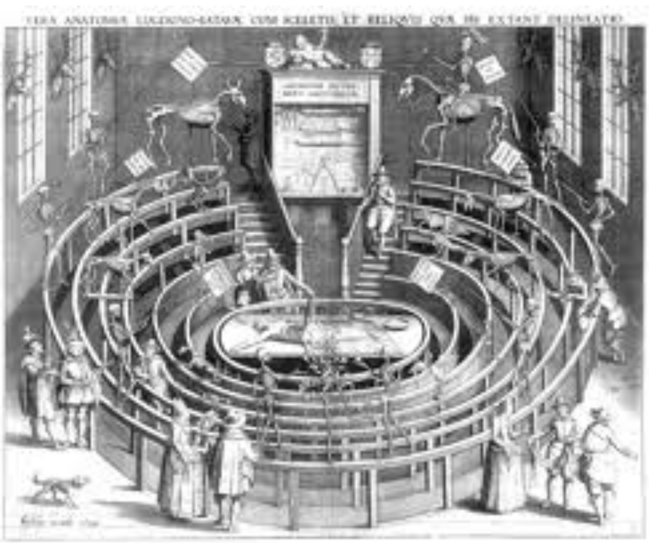

Figure 2.3 The Leiden Anatomy Theatre, c. 1610
One of the first anatomy theatre built in Europe was that of Leiden, Netherlands. Here is a view of that theatre as it was in 1610. Note the skeletons on display.[22]

[21] Reproduced from Ibid., 370 (Source: Archives de Saint-Thomas, Université 11 n° 150. ACUS).
[22] Reproduced from Billing, “Modelling the anatomy theatre and the indoor hall theatre: Dissection on the stages of early modern London,” http://extra.shu.ac.uk/emls/si-13/billing/index.htm.


Theatrum Annatomicum
Summa 319

Figure 2.4 The Strasbourg anatomy theatre costs, 1670
This list constitutes the costs of intalling the *Theatrum anatomicum* in 1670 by Andrea Kerman, head of public works.[23]

In 1670, the chair of anatomy and botany, Johann Albrecht Sebiz, had an anatomy theatre installed in Strasbourg in an abandoned chapel adjoining the hospital.[24]

Although there were many theatres built, to situate that of Strasbourg a very brief comparative note to that of Leiden, which had also been built in a church after the Reformation, can be made. There is a resemblance between the theatre built in Strasbourg and that built at the University of Leiden in 1593, one of the first anatomical theatres, and pictured here in about 1610. In the drawing by A. Kerman pictured here, the elevation, the tall

[23] Reproduced from Le Minor et al., *Anatomie(s) & pathologies. Les collections morphologiques de la Faculté de Médecine de Strasbourg*, 12. (Source: Archives de Saint-Thomas, Université 11 n° 150 ACUS)
[24] Le Minor states that this cost 319 *livres*. However, it is uncertain that the currency used in Strasbourg was not *Thalers*. The letters at the heading of the columns are not clear. Strasboug was a free Imperial city until 1681. The *Thaler* (along with the rare *Demi-Thaler* and the rarer *Quart-de-Thaler*) had been the currency from 1548 until about 1670. The *livre* would have been adopted in 1681. The currency of 1670 is undefined. http://www.cgb.fr/monnaies/vso/v09/gb/monnaiesgb9d36.html (consulted 28 June 2011).

windows for natural light, and the suspended skeletons are similar to those in the etching of the Leiden theatre. There was a common idea of what an anatomy theatre should be and Strasbourg adhered to it.

In the winter the professor of anatomy conducted public dissections of corpses. During the summer months there was no teaching and the theatre was turned into a kind of museum containing human and animal skeletons.

Creating or building a place for anatomy dissections witnesses the anchoring of the activity in medical schools and academic practices and the establishing of a business of medical education; a business with costs and prices. In addition to an appropriate lieu, preparing a public anatomy demonstration further required knowledgeable personnel to prepare and perform the dissection, and materials. The early anatomy demonstrations in Montpellier are exemplary of this.[25] An entrance fee of 12 *deniers* for medical students and 15 *deniers* for other spectators served not only to cover these costs, this was logistics and economy in anatomy.[26] Supplies were not on hand and were purchased as needed. A professor was hired to interpret the dissection and was given 1 *écu* for expenses. In 1527, such costs totalled just over 5 and a half *livres* and included: professor remuneration, prosector remuneration, a glass jar for placing intestines, incense to clean the room, hiring of hospital guard (*surveillant*) who helped transport the body and his wife who supplied the shroud for the body, hiring of two men to transport the body (from the hospital to the medical college),

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[25] A total cost of 5 *livres*, 12 *sous* and 11 *deniers.* Bonnel and Bonnel, "L'anatomie à Montpellier un enseignement prestigieux. De la dissection à l'anatomie virtuelle." They do not provide the primary source "*Pour l'éminent et très savant maître Jean Faucon, doctissime interprète de l'histoire du corps 20 sous. Pour le prosecteur, 20 sous. Pour le vase de verre destiné à recevoir les intestins, ainsi que pour le feu et les étoupes, 5 sous 10 deniers. Pour l'encens employé à assainir la salle, 18 deniers. Pour le garde de l'hôpital, qui a bénévolement livré le cadavre, 5 sous. Pour la femme dudit garde, qui a prêté le linceul dans lequel on l'a apporté à l'École, 2 sous, afin de la mieux disposer à nous avertir lorsqu'il se présentera des corps propres à la dissection. Pour les hommes, qui ont amené le cadavre de l'hôpital au Collège de médecine 2 sous. Pour le vin, qui a servi à le laver, et pour ceux qui l'ont lavé, 2 sous. Pour une livre de chandelles, nécessaire à la poursuite de la dissection dans la soirée du jour de l'autopsie, 16 deniers. Pour le suaire d'ensevelissement, et pour les tabliers et linges de dissection, 7 sous. Pour la préparation du cercueil et de la fosse, l'appel des prêtres, le port des cierges qu'ont exigés les funérailles, 9 deniers. Pour les peines du bedeau de l'Université, qui a concouru à l'opération, en ouvrant les portes, en entretenant le feu, en fournissant de son mobilier nombre d'ustensiles dont on avait besoin, 5 sous. Pour sa femme, qui a ensuite nettoyé la salle, 12 deniers. Pour ses enfants, qui ont également prêté assistance, soit en aidant les opérateurs, soit en courant chercher tout ce qu'il fallait, 4 deniers. Pour le prêtre de Saint-Claude et pour le fossoyeur, 6 livres. Pour les prêtres, qui ont accompagné le corps au cimetière Saint- Barthélemy, et les pauvres qui leur ont fait cortège, 9 sous. Pour le prêtre ou prieur de l'hôpital, 2 sous. Pour les porteurs, qui ont transféré le corps au lieu de la sépulture, 4 sous. Pour les prêtres de Saint-Mathieu, 3 sous 4 deniers. Au cimetière de l'église Saint Barthélemy, 12 deniers. Pour le lit du curé de la paroisse Saint Firmin, 4 livres. Pour le cercueil, 12 sous. Pour les chapes, la croix et les prêtres de Saint Firmin, 7 sous. Pour une messe, dite à l'intention du disséqué, 20 deniers.*"

[26] Medical students had free entry to autopsies from about the mid 1530s. Bonnel does not precise what years these fees were in place. However, one might speculate that the students were paying general training fees and these included anatomy demonstrations.

wine to wash the body and hiring someone to wash it, candles for working at night, cloth and aprons, coffin and burial expenses.[27] A dissection was an enterprise, involving financial and personnel mobilisation. Yet, once this enterprise was instaured and theatres erected, what was the scale of the dissecting activity?

Tallying up

Between 1670 and 1674 and in 1677, 1680, and 1683, one or two dissections were performed by Sebiz each year at the anatomy department in Strasbourg. Full anatomy demonstrations were additionally performed in 1675, 1678, 1682, and 1687.[28] The latter were momentous events in the medical school. The mobilization of a body and the circumstances under which to dissect it publicly were not common. University colleagues, notables and foreigners were invited to attend these demonstrations. That of 1678 lasted ten days and that of 1687, sixteen days. Sebiz was succeeded by Johann Valentin Scheid, a medical doctor [*Medicus ordinarius*] at the *Hôpital civil*, in 1687 and from 1687 to 1701, two public demonstrations were organized each year.

These numbers may seem low considering that the theatre had been built to accomodate, what one would expect to be, regular anatomical study. There were, in fact, additional regular daily dissections traced to 1686. Scheid claimed to have neither experience nor material to perform a solemnel demonstration in 1686 when a hanged corpse was available, and he subsequently set to change the situation.[29] It has been pointed out that Scheid used his position to access corpses from the hospital. He recensed 95 cadavers dissected between 1686 and 1695; 9 to 10 dissections per year. If they were performed in the winter months, this would mean one to two per month. These daily dissections (mentioned in passing in the secondary source) were relatively substantial in scale and scope. Scheid's predecessors in occupying the chair of anatomy and botany had medical training, but it is possible that they did not work directly with the hospital and did not have access to more cadavers for more frequent dissections. However, the anatomy theatre had been installed adjacent to the hospital in 1670 precisely for this reason. It is possible that only the most

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[27] In this particular example, Bonnel states, that burial expenses were higher than usual. Habitually dissection subjects were victims of execution, for which the school had been granted access by civil authorities since 1377, and for whom burial was minimal.
[28] Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*. 47.
[29] Ibid., 47-48. cites E. Michel, "Essai sur la chirurgie de Strasbourg", *Gazette Médical Strasbourg* , 15 (1855): 8.

momentous events were documented by the secondary sources I have consulted, or by the sources and archives that they consulted, thereby only giving a partial glimpse of the story.

In 1708, Jean Salzmann (1679-1738), chair of anatomy and surgery, made dissections obligatory for Strasbourg medical and surgery students. They were held 4 mornings a week. Additionally, each afternoon, a professorial public anatomy demonstration was held. In the winter of 1725, thirty corpses were dissected and in the winter of 1760, sixty corpses were dissected in the anatomy theatre. Further, autopsies were performed elsewhere in Strasbourg: before 1765 women who passed away in the delivery room were autopsied on the premises (after 1765, the corpses were sent to the anatomy theatre); and private dissections were held at the homes of anatomy professors and prosectors.[30] Again, the numbers of anatomy dissections recorded can be taken as a minimal count.[31]

The rare practice of dissection, not only in Strasbourg but generally, can be contributed to a number of factors, as Katharine Park argues. Contrary to somewhat common belief, she and others have recently demonstrated that anatomical study via dissection was not prohibited by religious powers and was long accepted in medical milieu.[32] However, dissection material, human bodies, was not material that was accessed by just anyone or anywhere.

The utility of anatomy until and persisting into the Renaissance responded to the exigencies of medical education, as well as to the demands of natural philosophy, but did not serve medical practice. That is, as Andrea Carlino, states "much of the knowledge acquired about the human body, especially about its internal organs, could not be applied in any significant way within the available clinical paradigm"; it was not an instrument for saving lives.[33]

The study of anatomy escalated nationally and internationally in the seventeenth and eighteenth centuries with the development of practical anatomy.[34] The first publication in practical anatomy is considered to be that by Théophile Bonet (1620-1689), Swiss anatomist,

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[30] Ibid., 62-63.
[31] This observation was made by Mandressi for the Montpellier dissections. Rafael Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident* (Paris: Editions du Seuil, 2003), 179.
[32] Park cites Andrew Dickson White's *A History of the Warfare of Science with Theology* (New York: D. Appleton, 1896) as the source of the myth that medieval church prohibited human dissection. Park, "Myth 5"; Cunningham, *The anatomist anatomis'd*, 14; Michael Sappol, *A traffic of dead bodies: Anatomy and embodied social identity in nineteenth-century America* (Princeton, NJ: Princeton University Press, 2002).
[33] Carlino, *Books of the body*, 5.
[34] Yves Gingras, Peter Keating, and Camille Limoges, *Du scribe au savant. Les porteurs du savoir de l'Antiquité à la révolution industrielle* (Montreal: Boréal, 1998).; Michel Foucault, *Naissance de la clinique*, 5th ed. (Paris: Presses Universitaires France, 1983), 126.

of 2 volumes of *Sepulchretum seu anatomia practica* in 1675 and 1679.[35] Bonet's work, subtitled *Practical anatomy from cadavers dead from disease. Setting out histories and observations of virtually all illnesses of the human body, and revealing their hidden causes*, compiled over 3000 autopsies and methodically classed diseases observed. The frontispiece of his publication was an illustration of the anatomist, not armed with a scalpel behind the dissecting table, but armed with a pen behind a desk.

Figure 2.5 Frontipiece from 1628 and in-folio from 1679. Blade vs pen.
These contrasting frontispieces oppose anatomy instruments: blade versus pen. The image on the left is the frontispiece from Jean Riolan *Oeuvres anatomiques* (Paris, Deny Moreau, 1628/29) and the image on the right the in folio image in a number of Théophile Bonet's works such as *Medicina septentrionalis* (Genève, 1686/87).[36]

The books lining the shelves behind Bonet and those piled in front of him stress the importance of medical publications. In this context collecting disease histories was one of the conditions in the emergence of pathological anatomy. Compilations of pathological cases became a recognized form of publication and the most significant type of pathological writing. Albrecht von Haller, for example, published seven volumes of compilations from over 200 dissertations and publications from about 1660 to 1760.[37] Whereas cadavers were the new source from which knowledge was read in the Renaissance, they were now not

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[35] Cunningham, *The anatomist anatomis'd*, 190-191.
[36] The two books are in the library of the Université de Nancy medical school and they have published these images online: http://www.professeurs-medecine-nancy.fr/fonds_bibliotheque.htm
[37] Cunningham, *The anatomist anatomis'd*, 194-195.

sufficient. It was in writing observations and then compiling them into books that anatomy knowledge was taken to another level. It became "practical" and began to study disease.

The validation of dissection in medical training and for intellectual interest not only produced a credentialed place for studying anatomy, but also engendered a rising demand for corpses. Increasing demand generally results in increasing supply or higher prices, in economic models. Addressing the question of supply compels exploration of the sourcing of the material, i.e., corpses. Where were corpses coming from? In the sixteenth century examples mentioned above, the corpses redirected to theatres were criminals. Those of seventeenth and eighteenth century practical anatomy, however, increasingly depended on anatomising those who died of disease. These were two different material sources, in both cases how were they procured by anatomists?

2.1.2 Cadavers and cadaver procurement

Corpses by definition are dead bodies, usually human bodies. Cadavers, on the other hand, have a slightly different definition: "dead bodies destined for dissection or for use in medical education or research."[38] It is unclear when, and even if, a distinction between these two terms was made. It does not seem that this distinction is recognized in French dictionaries, or in German. In French texts, *cadavre* was used in the nineteenth century and seems to have had technical overtones, but *corps* or *sujet* have been used most commonly by anatomists in the twentieth century.[39] Interestingly *corps* or *sujet* are equally terms used to refer to living bodies. On the other hand in French *cadavre* is considered too overtly material. In German the equivalent may be *Leiche,* which is used notably in "scientific" contexts, i.e., criminology and medicine.

It has been suggested that "cadaver" dates to c. 1500 meaning "dead body" and probably from a perfect participle of *cadere* "to fall, sink, settle down, decline, perish."

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[38] Cf. "cadaver," *dictionary.reference.com*, n.d., http://dictionary.reference.com/browse/cadaver. Cf. "cadaver," *Online Etymology Dictionary*, n.d., http://www.etymonline.com/index.php?search=cadaver&searchmode=none.

[39] In response to my interrogation on the term used in French, Docteur Jean-Marie Minor, professor of anatomy at Université de Strasbourg, responded: "En français, depuis environ 1919 je pense la tradition des anatomistes est d'employer "corps" ou "sujets" ou "sujets anatomiques". Le terme de "cadavre" était classique au 19e mais à présent a pour nous une connotation trop crue, trop matérielle, et un peu irrespectueuse. Il y a peut être une part de "politiquement correct" mais à mon sens plutôt une volonté de respect et d'humanisation. D'ailleurs, dans les grandes revues scientifiques morphologiques internationales (je suis membre du comité de rédaction et/ou referee pour plusieurs), le terme de "cadaver" n'est jamais employé dans le chapitre "Matériel et méthode" mais toujours "bodies" ou "individuals"" Private communication, March 2011.

Although in everyday usage this difference may be subtle, it is actually quite significant.[40] Testifying a medical use of deceased bodies, herein alleges a demand for corpses. A use of corpses by anatomists means that they had to be procured. Cadaver procurement herein refers to the emergence and development of supply in response to a demand. I herein use the term corpse to refer to a dead body and cadaver that is specifically destined for anatomical study. This use aligns with English definitions of the terms, but also corresponds to the historically used terms in French.

Historically, anatomy and dissection led to new forms of knowledge production, as suggested above.[41] Behind this, however, is a story of mobilizing material and material resources, and specifically cadavers. Behind anatomical knowledge were logistics.

Executed corpses

Human dissections were initially conducted on executed criminals; for example, in 1422, the university of Bologna was granted two corpses of executed criminals or foreign vagabonds and in 1539, a Paduan judge interested in Vesalius' work made corpses of executed criminals available for dissection.[42] This was not uncommon and there are innumerable examples of executed criminals being subjects of anatomy demonstrations. For example, the university of Montpellier had also received privileged permission from civil authorities to procure executed convicts for dissection as early as 1377.[43] Access to these corpses was limited to those with medical and institutional credentials, leaving artists and other academics to obtain corpses by subversive means.[44]

The 1517 dissection in Strasbourg, mentioned above, was similarly performed on a criminal executed by hanging and donated for dissection by the *Magistrat* of Strasbourg.[45] The *Magistrat* henceforth granted corpses for dissection. In 1566, for example, of three

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[40] Professor Richard Wassersug, professor of anatomy and neurobiology at Dalhousie University, for example, stated "In 30 plus years of teaching in the gross anatomy laboratory, I have in fact never used the word "corpse." It is always "cadaver"." Private communication, October 2010.

[41] Similarly, Rafael Mandressi focuses his historical study on the history of a knowledge system [*dispositif de connaissance*] in which the body is object. Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*.

[42] Le Breton, *La chair à vif*, 65, 88; Gingras, Keating, and Limoges, *Du scribe au savant*, 309-311; Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*, 176-202; Chamayou, *Les corps vils*, esp. 21-95. Mandressi further mentions that condemned criminals were obtained for dissections in Ancient Greece by Herophilus of Chalcedon and Erasistratus of Chios. Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*, 19.

[43] Ferrari, "Public Anatomy Lessons and the Carnival," 59.

[44] Park, "Myth 5," 49.

[45] Le Minor et al., *Anatomie(s) & pathologies. Les collections morphologiques de la Faculté de Médecine de Strasbourg*, 9.

criminals that were hanged, one was dissected.[46] The corpses dissected by anatomy students in the late seventeenth century in Strasbourg continued to include executed criminals.[47]

In Paris, the medical faculty was granted sole rights to executed bodies in Paris in 1551.[48] That is, the dean of the medical faculty was the only individual who could authorize appropriation of executed and Hôtel-Dieu corpses, which were delivered to the medical faculty.[49] Further laws reinforced this monopoly in 1604 and 1615, by granting the dean the power to re-appropriate or confiscate corpses sourced without his approval.[50] This meant, notably, from surgeons or anyone else performing dissections without the faculty's approval and who were taking corpses by force from executioners. The granting of executed criminals for dissection ensued from a legislative attribution of material to recognized medical institutions.

Procuring executed criminals has been intrepreted as indicative of the significance or debasing act of human dissection. Grégoire Chamayou discusses the taboo associated with public dissection, which limited the act to *corps vils*.[51] He defines the *corps vils* as a body both easy to obtain and without value or dignity, such as those of executed convicts.[52] Andrew Cunningham and Andrea Carlino also identified public dissection as further chatiment for the convict, performed publicly to as dissuasion.[53]

Purchased corpses

The well-documented procurement of cadavers in the United Kingdom provides a contrast to the French situation. Here there was no defined supply of cadavers. Andrew Cunningham gives the example of William Hunter, who studied anatomy in Paris in the winter of 1743/1744.[54] He opened a private anatomy school in London in 1746 and advertized that his students would be able to undertake the dissection of human corpses themselves, like in Paris.

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[46] Further the bones of this cadaver were used for a prepared skeleton.

[47] Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 47.

[48] Jeanne Rigal, "La communauté des maîtres-chirurgiens jurés de Paris au XVIIe et au XVIIIe siècle" (Thèse de doctorat, Université de Paris: Vigot Frères, 1936), 35-36 Rigal cites Docteur Chéreau unpublished history of medicine in Paris (from the Bibliothéque Historique de la Ville de Paris. Manuscrit 26.169) as his source.

[49] Further medical doctors had to be present at all anatomy dissections. Surgeons could not perform dissections without the presence of medical professionals.

[50] Rigal suggested that these Parlementary decisions were initiated by medical doctors who sought to hamper surgeon training. Rigal, "La communauté des maîtres-chirurgiens jurés de Paris au XVIIe et au XVIIIe siècle," 35.

[51] Chamayou, *Les corps vils*, 25.

[52] Ibid., 11.

[53] Cunningham, *The anatomist anatomis'd*; Carlino, *Books of the body*.

[54] Cunningham, *The anatomist anatomis'd*, 135-139.

It was his brother, John Hunter that procured corpses from resurrection men. This example is notable as it draws on the contrast been French and British situations; William Hunter formed an anatomy school that was not representative of UK anatomy schools.

Condemned criminals could, however, be purchased in transactions negotiated prior to the execution.[55] That is, Londonian criminals sold their own cadavers. In the United Kingdom, the Murder Act of 1752 only permitted corpses of executed murderers for dissection. Expectedly demand outstripped supply; the supply of executed corpses was insufficient due to both the continuing expansion of medical schools, and the creation of a number of private medical schools, which lacked legal access to cadavers. A thriving black market arose in cadavers and body parts, leading to the creation of an entire profession of body-snatcher or gravedigger, and even more extremely, the infamous 1827 and 1828 Burke and Hare murders of Edinburgh, in which 17 people were murdered in order to sell the corpses to anatomists.[56] Subsequently, the Anatomy Act of 1832 provided for the needs of physicians, surgeons and students by giving them legal access to corpses that were unclaimed after death, in particular those who died in prisons or workhouses. Further, a person could donate their next of kin's corpse in exchange for burial expenses. These cadavers became part of commercial exchange: in exchange for burial fees, in exchange for a sum, or in exchange for charity care while alive. In her studies of Oxford and Cambridge Universities, Elizabeth Hurren has called this the "business of anatomy."[57]

The difference between the thusfur described French and British cases, are a question of supply not meeting demand and the means, albeit morally and legally extreme, of increasing supply beyond authorized allocations. The procurement of cadavers as such involved a defined and legal supply of cadavers for dissection in France. Legislation dictated that executed criminals and unclaimed hospital corpses be directed to medical schools.

Incidents of cemetery ravaging can be also found in France, indicating a scarcity of cadavers and a problem of access to them; for example, in Montpellier in the 1550s, in Paris in the early 1600s, and Lyon in 1768, as well as private operating theatres obtained their

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[55] Chamayou, *Les corps vils*, 26.

[56] Lisa Rosner, *The anatomy murders: Being the true and spectacular history of Edinburgh's notorious Burke and Hare and of the man of science who abetted them in the commission of their most heinous crimes* (Philadelphia: University of Pennsylvania Press, 2009).

[57] Elizabeth T. Hurren, "Whose body is it anyway? Trading the dead poor, coroner's disputes, and the business of anatomy at Oxford University, 1885-1929," *Bulletin for the History of Medicine* 82 (2008): 775-819.; Elizabeth T. Hurren, "A pauper dead-house: The expansion of the Cambridge anatomical teaching school under the late-victorian poor law, 1870–1914," *Medical History* 48, no. 1 (2004): 69–94.

material from surreptitious exhumations.[58] This was issue of the legal granting of material for dissection to recognized and credentialed institutions. Among these were medical schools and medical school professors, and their anatomy departments. In 1695, a group of Strasbourg medical students stole the key to the morgue in order to obtain more corpses.[59]

Without going into the moral or ethic facet of the issue, it may be questionned whether the demand went beyond the official legal arrangements and translated into a commercial market, black market or otherwise. Historiography has stated no. But there is a trace of money being exachanged that must be considered here.

The Paris medical school paid executioners 3 *livres* per corpse. Chamayou suggests that it was a price put on the corpses. He evokes an 1604 *Arrêt* stipulating that executioners could sell victims of the death sentence to medical schools or to surgeons for 3 *livres* each.[60] The idea of a fixed price attached to the corpses is interesting as it implies that cadavers were (treated as) merchandise. However, it seems that there may be some ambiguity; the nature of this payment is unclear. It might be reasonable to suppose it was remuneration for services surrounding the holding, preparing or transporting of corpses, an indirect means of payment.[61] Executions constituted only a part of the executioners revenue. Amongst a number of other sources of income was the 3 *livres* fee from the medical faculty for anatomy cadavers.[62] They provided two cadavers per year to medical students. Surgeons, on the other hand Florence Renucci suggests, arranged to obtain cadavers at a higher fee, but as this was illegal, executioners asked surgeons to feign theft and violence in order to avert suspicion. For example, in a 1659 case, surgeons had purchased a cadaver for fifty-five *livres*, but the executioner had to return the fee. In this particular case, the sanction was weak, but from 1672 a thousand *livres* fine was instituted.

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[58] Examples of incidents in 1622 and 1632: Rigal, "La communauté des maîtres-chirurgiens jurés de Paris au XVIIe et au XVIIIe siècle," 38; Examples from the 1550s: Bonnel and Bonnel, "L'anatomie à Montpellier un enseignement prestigieux. De la dissection à l'anatomie virtuelle."; Examples of incidents in 1622 and 1632, and others: Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*, 38, 177-184; An example in 1768: Chamayou, *Les corps vils*, 30; Véronique Campion-Vincent, *Organ theft legends* (Jackson: University Press of Mississippi, 2005), 42-43.

[59] Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 48.

[60] Chamayou, *Les corps vils*, 26. And they could be sold to surgeons from 1633, Ibid. Chamayou cites: Pascal Bastien, *L'exécution publique à Paris au XVIIIe siècle : une histoire des rituels judiciaires* (Seyssel: Editions Champ Vallon, 2006), 188. See also: Pascal Bastien, "La parole du confesseur auprès des suppliciés (Paris, XVIIe-XVIIIe siècle)," *Revue Historique* 634, no. 2 (2005): 283. I thank Pascal Bastien for his transcription of the primary source, a series of parlimentary excerpts from 1551 to 1533 from the BNF, Paris.

[61] Note, that transportation and washing of the corpse in wine cost a total of 11 *sous* a century earlier, in the 1527 Montpellier dissection cited above. (20 *sous* = 1 *livre*)

[62] Executioners additionally collected fees for a number of other tasks, like killing stray dogs, and cuts or taxes of grain sales. Florence Renucci, "L'exécuteur des sentences criminelles en France au dernier siècle de l'Ancien Régime," *Revue d'Histoire du Droit* 76 (2008): 373-391.

Jeanne Rigal, another secondary source to speak of the 3 *livres* fee did not define it as a price.[63] She suggested it was more along the lines of a financial enticement or kickback.[64] In fact, the original document does not stipulate overtly that corpses could be sold as such, but rather that one could not pay the executioner *more than* 3 *livres* "as had long been the practice."[65] Unfortunately, the historicity of this payment, which would clarify its nature, is unknown. It can be assumed, that although there was not a true or legal commerce, payment was common prior to and following the onset of the seventeenth century. The 1604 *Arrêt* indicates that the state intervened at this moment and prevented this fee from becoming subject to laws of supply and demand, which would have driven the sum above the 3 *livres*.

The situations in France and in the United Kingdom mentioned above indicate that the logistics of dissection involved some sort of monetary exchange in both countries. Be it the contractualized selling of corpses by to-be executed criminals in Great Britain or fees for information, services or corpses themselves in France. Anatomists were entrepreneurs.[66]

Charitable corpses

An important and reputed source of cadavers were those who had died in hospices and hospitals. French hospitals were populated with the poor and indigenous.[67] Paris was particularly reputed for the availability of corpses from the hospital for autopsy from the seventeenth century.[68] The anatomy teaching is Paris described at length by Cunningham, but

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[63] Rigal, "La communauté des maîtres-chirurgiens jurés de Paris au XVIIe et au XVIIIe siècle," 35-36; It is also mentioned but not discussed by others: Ernest Wickersheimer, *La medecine et les médecins en France à l'epoque de la Renaissance* (Paris: A. Maloine, 1906), 43; Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*, 179.

[64] Similarly, in the case of the 1527 Montpellier anatomy dissection, the hospital guard (surveillant) and his wife were paid not only for their services but also to ensure they informed the medical school of available bodies for future dissections.

[65] The *arrêt* was a report on a number of cases of surgeons stealing bodies destined for the medical faculty. It reinstates the legislation and mentions a long tradition of conferring 3 *livres* for the cadavers: "*Et ne pourra l'Executeur de la haute justice de cette Ville, prendre ny exiger desdits Aspirans à la Maistrise pour la délivrance desdits corps, plus grande somme que de trois livres, suivant l'usage ancien : fait aussi inhibitions & défenses à toutes personnes de quelque qualité & condition qu'ils puissent estre, d'en tirer ny prendre aucun droit sous quelque pretexte que ce soit*." Arrests portans defenses d'enlever les cadavres sans permission du Doyen de la Faculté de Medecine de Paris, de faire Anatomie qu'en la presence d'un Docteur de ladite Faculté, aux Officiers de Justice de prendre aucuns droits pour l'enlevement desdits Cadavres, & à l'Executeur de la haute justice d'exiger plus grande somme que de trois livres. BNF, F 23668 (56), p. 19.

[66] Anita Guerrini, "Anatomists and entrepreneurs in early eighteenth-century London," *Journal of the History of Medicine and Allied Sciences* 59, no. 2 (2004): 219-239.

[67] Olivier Faure, "Le regard des médecins," in *Histoire du corps*, vol. 3 (Paris: Editions du Seuil, 2005), 21-22. cites Fleury Imbert, *De l'observation dans les grands hôpitaux et spécialement dans ceux de Lyon* (Lyon: impr. de L. Perrin, 1830), 5-9.

[68] Thomas Bartholin (1616-1680), Danish anatomist, is cited by Cunningham as observing that "bodies were freely available in Paris and Rome." He further commented that the supply in Copenhagen was rich for a time,

the origin of the corpses is not often clear. Executed criminals were subjects of public dissection at the *Jardin royal* in the anatomy theatre that held up to 600 spectators and attracted many foreigners. Another example, is that of the *Collège royal de chirurgie de Paris* was, in 1768, supposed to be officially "provided by the *Hôpital Général* (that is, the *Salpêtrière*) for free, but the hospital administrators were loathe to supply them and so there was much grave robbing. In 1760 there is a document indicating that the school was buying two corpses every ten days."[69]

In Strasbourg, the first chair of anatomy and botany, Johann Albrecht Sebiz (1614-1685), of the *Faculté de Médecine* obtained hospital corpses for anatomy work.[70] The anatomy department was situated adjacent to the hospital. The proximity facilitated their delivery and annulled transportation costs. This was a strategic and economic choice for the location of the anatomy theatre built in 1670.

In 1707, the *Edit royal de Marly* regulated medical training at French medical faculties and promoted both theoretical and practical teaching of anatomy via dissection.[71] Specifically, Article 25 of the edict enjoined magistrates and directors of hospitals to provide professors with corpses.[72] The supply was restricted, however, to the winter months for hygiene reasons and in the absence of family members claiming the body of the deceased.

In 1803, 131 cadavers were dissected in Strasbourg for anatomy lessons, medical surgery lessons, confection of pieces for the collection, student dissections, research of the source and cause of disease.[73] In 1820, Jean-Frederic Lobstein (1777-1835), chair of

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but then it dried up. He began compiling autopsy notes for publication at the same time that Bonet published his 1675 volume. It has been indicated that Bonet prepared his compilations after going deaf and no longer being able to practice medicine. It is interesting that their shift in knowledge production methodology corresponded to a change in circumstances and a cease in active dissection. Cunningham, *The anatomist anatomis'd*, 190.

[69] Ibid., 108. Cunningham does not cite his sources for this.

[70] Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 47.

[71] Arlette Grimot and Patrick Micaud, "Edit de Marly," *Archives de France*, n.d., http://www.archivesdefrance.culture.gouv.fr/action-culturelle/celebrations-nationales/2007/autres-anniversaires-signales/.

[72] *"Enjoignons aux magistrats et aux directeurs des hôpitaux de fournir les cadavres aux professeurs pour faire des démonstrations d'anatomie, et pour enseigner les opérations de chirurgie."* Foucault cites Gilbert, *L'anarchie médicinale* (Neuchâtel, 1772), tome 1,100. The translation from Michel Foucault, *The birth of the clinic*, trans. A. M. Sheridan (London and New York: Routledge, 2003), 154; Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*; Chamayou, *Les corps vils*, 28.
For the same quote, Chamayou cites Jean Baptiste Denisart, *Collection des décisions nouvelles et de notions relatives à la jurisprudence*, Veuve Desaint, Paris, 33.
Chamayou also indicates that in 1708 an *édit du duc de Lorraine* also advised magistrates "*pour faciliter les études de chirurgie, de disposer des corps provenant des prisons et des exécutions judiciaires en faveur de l'université.*"

[73] These included 57 males, 56 females, 6 children and 12 foetus. Jean-Frédéric Lobstein, *Rapport sur les travaux exécutés à l'amphithéâtre d'anatomie de l'Ecole de médecine de Strasbourg pendant le premier semestre de l'an XII* (Strasbourg: Levrault F. G, 1804), 45.

pathological anatomy, boasted three hundred cadavers were made available annually.[74] In the 1820s, autopsies were additionally performed on prison and hospices corpses and the homeless.[75] Charles-Henri Ehrmann (1792-1878) worked alongside Lobstein from his appointment as prosector in 1818.[76] He was *chef des travaux* from 1799 to 1826 and then, from 1826, chair of anatomy at the medical school and deputy obstetrician of the hospital.[77] He succeeded Lobstein in 1835. By mid-century, under Ehrmann, nearly all bodies passing away in the Strasbourg hospital were autopsied.[78] Whereas hospitals were hospices and places of charity, it can be deduced that those who sought this charitable service and care gave indirectly, in exchange, their corpse for autopsy.

The study of medicine and surgery increasingly required cadaveric material for dissection exercises and represented a demand for human bodies. Dissection in medical schools and the procurement of cadavers followed an economic logic: one of supply and demand. To some extent, this can be considered the foundation for what partially resembled a demand-driven market. The donation (and illicit sale) of the corpses of executed criminals was a legislated and principal source, or supply, of cadavers in France. As such there was not a massive body-snatching phenomenon in France.[79] But at the same time theft and sale of cadavers formed another supply for this medical material. The effective exchange of money in transactions involving cadavers illustrates that corpses were, to some degree, merchandise. In all cases, by and large, transferring cadavers to dissection rooms or anatomy theatres was a

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[74] Jean-Fréderic Lobstein, *Compte rendu a la Faculté de Médecine de Strasbourg sur l'etat actuel de son muséum anatomique* (Strasbourg: F.G. Levrault, 1820).
[75] For example, the heads of three aliénés recorded in: Ibid., 62. And seven entries of specimens from bodies of homeless in: Charles Henri Ehrmann, *Compte rendu à la Faculté de médecine de Strasbourg des travaux anatomiques exécutés à l'amphithéatre de cette faculté pendant les années 1824 et 1825* (Strasbourg: Levrault, 1827).
[76] The hierarchy within the anatomy department of the medical faculty was: anatomy assistant [aide d'anatomie], prosector, chef des travaux, professor or chair. Prosectors and chefs des travaux were nominated by competition [concours]; see for example, "Ordonnance concernant le mode de nomination à la place de chef des travaux anatomiques près les Facultés de Médecine," *Archives Générales de Médecine, Journal Complémentaire des Sciences Médicales, IIe série* 12 (1836): 119. on the legislation for the appointment of chef des travaux ; or "Concours pour la place du chef des travaux anatomiques de la faculté," *Bulletins de la Faculté de Médecine de Paris.* 3 (1814): 152-155. for an example of competition requisites.
[77] The incongruity of these very differing practices – attending births and post-mortems – may come as unexpected, but may also be discussed in terms of the cleanliness. Ehrmann was notorious for his "love of cleanliness." Eugène Koeberlé, "Notice sur le Professeur C. H. Ehrmann" (Impr. R. Schultz et Co., 1878).
[78] David Le Breton, *La chair à vif. Usages médicaux et mondains du corps humain* (Paris: Editions A. M. Métailié, 1993), 104. Systematic autopsies of all deceased in the Dupuytren service in Paris dates the beginning of the nineteenth century. Le Breton also cites 1842 as the date from the Conseil Général des Hospices permitted autopsies if the *chef de service* requested. Germany adopted a similar legislation. This was significantly later in the USA where the first state Anatomy Acts were implemented in 1831, but most in the latter part of the century and as late as 1913. Sappol, *A traffic of dead bodies*, 4. Despite the increasing commonality of the act, Mandressi points out that it did not become banal. Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*, 170-172.
[79] This is argued in Chamayou, *Les corps vils*.

trade. Not only in the acquisition of corpses, but in the tasks and people that accompanied them (transport, preparation, etc.).

2.1.3 Anatomy and Pathology

Anatomy departments and institutes within medical schools were recognized and herein credentialed or privileged places to which French legislation directed cadaveric material. These places were given access to material that was otherwise non-circulating. Being granted the privilege of accessing this material was a first, and non-negligible, step in the natural history approach that anatomy adopted: the gathering of materials.

The source of the materials was determinant in how it produced knowledge. Executed bodies were dissected frequently in public demonstrations. Public demonstrations were ritualistic in nature and served public and medical student education.[80] They were demonstrating representative human anatomies and especially young healthy muscular corpses were selected. The anatomist was not seeking novelty or disease in these dissections. Very different were systematic and numerous autopsies of corpses from hospitals. These were corpses that were diseased and their autopsy presented lesions. These were, at times, identifable and confronted with some form of clinical or symptom history.

The approach aligning lesions and symptoms initially in medical schools in the early nineteenth century, can be coined by quoting Xavier Bichat, "open a few cadavers and the obscurity that simple observation could not dissipate will disappear."[81] Similarly, in Strasbourg, Thomas Lauth (1758-1826), chair of anatomy and surgery from 1785 to 1826, defined the purpose in pathological anatomy dissections in 1805: "Cadaveric study is not an end in itself, but a means, via constant confrontation between symptoms and lesions, of acquiring medical knowledge such that the medical practitioner can directly know the causes and prognostic of the disease from the symptoms."[82] This corresponded with the autopsying of huge numbers of cadavers. In Paris at the *Hôtel-Dieu*, Bichat opened over 600 cadavers in

[80] He describes it as a public and social event, a ritual, until the late eighteenth century. Cunningham, *The anatomist anatomis'd*. 47.
[81] Xavier Bichat, *Anatomie générale : précédée des recherches physiologiques sur la vie et la mort*, vol. 1, 2nd ed. (Paris: Ladrange, 1818), 51.
[82] Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 87. cites Thomas Lauth, Sermo academicus de fine anatomiae pathologicae, 1805. (My translation.)

the winter of 1801-1802 and a few years later, Jacques Lisfranc also in Paris used about a thousand cadavers per year for his surgery course.[83]

The anatomo-clinic approach central to nineteenth century pathological anatomy put cadavers at the centre of knowlege production. The large numbers of autopsies performed in Paris and in Strasbourg (but also in other cities) required a means of managing increasing numbers of patient and cadaver cases and growing disease histories. Further to contribute to teaching, as well as the compilation schemes associated with disease histories, were preserved cadaveric pieces.

2.2 Collection material. Preservation and Presentation.

2.2.1 Paper preparations

Dissection was an ephemeral event. Putrefaction of cadavers required anatomists to work fast and in what were not the most pleasant circumstances.[84] The 1517 dissection in Strasbourg was the subject of a drawing by Hans Wechtlin. This was printed and distributed as a fugitive page by printer Johann Schott.[85] This illustration made the dissected cadaver, neatly and odorlessly, available for viewing indefinitely.

[83] Erwin Ackernecht, *Medicine at the Paris hospital, 1794-1848* (Baltimore: The Johns Hopkins University Press, 1967), 51 and 141.
[84] As early as the early fourteenth century there is evidence of getting around putrefacation such constraints by drying pieces in the sun, exposing the cadaver to running water, or boiling the flesh off the bones to reveal the skeleton. Le Breton, *La chair à vif*, 59 discusses the work of Mondino (1270-1326) from Bologna.
[85] Numerous other publications were also printed in the same year in Strasbourg. They were not of the dissection itself. But the anatomy demonstration may have provoked interest in or demand for such illustrations. On the publications: Le Minor et al., *Anatomie(s) & pathologies. Les collections morphologiques de la Faculté de Médecine de Strasbourg*, 9.

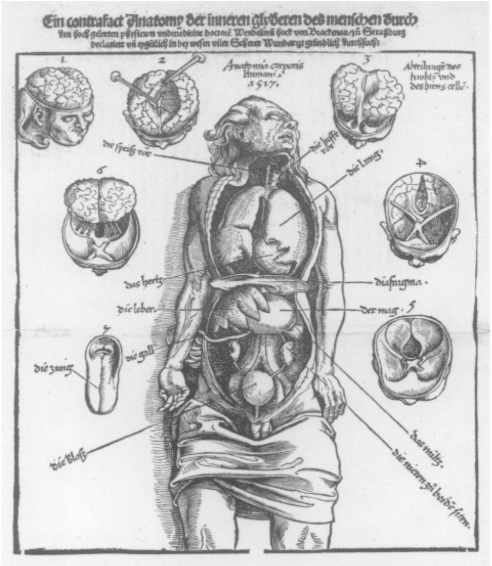

Figure 2.6 Example of dissection woodcut published in Strasbourg, 1517.
Hans Wechtlin (or Wachtlin), *Anatonmia corporis hliuliani*, Strasbourg, J. Schott, 1517.[86]

Similarly the quintessential illustrated *De humani corporis fabrica* included detailed and anatomical exact representations of cadavers and organs; such that, the dissected cadaver was placed in front of the eyes of the reader.[87] Vesalius made a parallel with geometry and other mathematical disciplines in which graphic representations contributed to understanding doctrine.[88] Such images incarned knowledge in a durable form.

In the establishment of anatomy iconography, illustration or two-dimensional representation was the production of another anatomy material, that of published books, prints and anatomy diagrams.[89]

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86 This corresponded to the first dissection in Strasbourg in 1517. And for the period, it was a relatively realistic woodcut. However, this depiction traits that show that the drawing was not entirely influenced by the dissection. The liver is represented with lobes that are typical of animal anatomy indicating that this example negociates between the two "books" of life. (This was pointed out to me by Christian Bonah.) Reproduced from: Héran, *L'histoire de la médecine à Strasbourg*, 70.

87 Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*, 95 cites André Vésale, La Fabrique du corps humain (préface), Bâle, Johannes Oporinus, 1543, 41.

88 Ibid., 95 cites Vésale, 43-45.

89 Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*.; The practice continued and for example, hundreds of hand-drawn and painted anatomy diagram charts were prepared and integrated into the pathological anatomy courses and collections between 1872 and 1918 in Strasbourg. Le Minor et al., *Anatomie(s) & pathologies. Les collections morphologiques de la Faculté de Médecine de Strasbourg*, 118-119.

Figure 2.7 Flap images or fugitive sheets, mid-16th century
An example of the flapped images printed in Strasbourg. Anatomical fugitive sheet. Part of the engraving is composed of printed paper flaps that, when lifted, reveal the internal organs of the figure.[90]

Escaping this flatland or paper surface was accomplished with fugitive sheets or flap books.[91] That is, by superposing paper images, such that turning up the first image, ex. skin, would reveal another image, e.g. organs, and turning it up would reveal another, e.g. skeleton, etc. The first such flapped images may have been made in Strasbourg in 1538.[92] One notable publication for students in Strasbourg dates to 1541 by Balthasar Beck.[93]

Drawings as paper preparations and presentations represented a new form of intermediary between the ephemeral visuality of dissection and the written word of books. Knowlege became de-materialized from a corpse's ephemeral state, could be didactically arranged and circulated. A similar perpetuation and materialization of knowledge with an analogous finality was sought in preparing and preserving dissected pieces. The preparation techniques stopped the effects of putrefaction and transformed the ephemeral pieces themselves into something durable and therein collectable.

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[90] 1566 engraving, by Lambert van Noort, Frans Huys, Pieter Huys, Gaspar Beccera and Nicolas Beatrizet. Source: http://sangbleu.com/?attachment_id=20343

[91] Andrea Carlino, *Paper bodies: A catalogue of anatomical fugitive sheets 1538-1687*, trans. Noga Arikha, Medical history. Supplement No. 19 (London: Wellcome Institute for the History of Medicine, 1999). There is also a very beautiful exhibition on these fugitive sheets, as well as more recent versions at Duke University, North Carolina, USA: *Animated Anatomies*, (April 6-July 17, 2011) http://exhibits.library.duke.edu/exhibits/show/anatomy

[92] The earliest catalogued were from 1538: one from Strasbourg and one from Augsburg. The same Strasbourg artist, Heinrich Vogtherr, also printed others in 1539. Ibid., 93 and 348.

[93] This 10-page publication included recopied (plagarized) woodcuts and did not present original works. Ibid., 51.

2.2.2 Gross preparations

In Strasbourg, a municipal prosector was hired to prepare dissection specimens for preservation. These preparations were intended to enrich anatomy studies and Strasbourg's anatomy collection. Inherent to autopsy and dissection is the management of bodies, but also of parts removed from the bodies; pieces. Indeed, the etymology of the word anatomy, from Greek ana- "up" + temnein "to cut", reflects the act of cutting and separating fragments of the human body.[94] The municipal prosector appointment was created in 1733.[95] This position was associated with the anatomy department of the medical school and shared the same facilities. Johann Christian May (1701-1736) was the first to fulfil the position. In 1737 May's successor, Jean Louis Hommel (1706-1743), published a catalogue in which he described 65 specimens he had prepared, pictured in the opening of this chapter.[96]

In anatomy and pathological anatomy practices were initially focused on natural history tradition of collecting, describing, naming, comparing, and organizing. Precursory to this however were material practices; gathering and preparing specimens. The next section details their preparation.[97] Preparing specimens for medical school teaching and research involved transforming the decomposable piece into something durable.[98]

Visual representations and reproductions of anatomy observations were key to diffusion of knowledge in medical schools. Pedagogical tools also included preserved pieces. The most common preservation technique was putting organs or pieces in a jar of liquid such as formaldehyde, phenol, arsenic, or zinc chloride. One of the oldest preservation techniques was desiccation or drying. And finally, constructing and sculpting anatomical models in wax, plaster or paper maché allowed observations to be frozen in time.

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[94] Le Breton, *La chair à vif*, 27.; "Anatomy" http://www.etymonline.com/.

[95] On prosector positions in general, Le Minor cites H Schierhorn, "Der Prosektor und seine Stellung in der Hierarchie anatomischer Institutionen, demonstriert vor allem an den Anatomie in Berlin, Halle, Leipzig, Rostock und Greifswald," *Anatomischer Anzeiger* 195 (1985): 311-346.

[96] *Musaei Anatomici Mayiani Supplementum primum seu Catalogus Sexagenarium praeparatorum anatomicorum numerum superans quae, ut Inclito Magistratui Argentoratensi pro innumeris in se collatis beneficiis studium suum et demonstret et commendet. Anno MDCCXXXVII. Praeparavit tantorum nominum humillimus cliens Johannes Ludovicus Hommel.* Archives de Saint-Thomas, Université 343, 20-22. ACUS.

[97] Of the material practices, §2.1 has described "gathering" and §2.3 "collecting" and "organizing." Chapter 3 will discuss social and reproductive practices.

[98] The same durability of specimens was sought generally in natural history and natural science. Jacqueline Eidelman and Michel Van Praët, *Muséologie des sciences et ses publics : regards croisés sur la Grande galerie de l'évolution du Musée national d'histoire naturelle* (Paris: Presses Universitaires France, 2000).

Natural anatomy preparations

Preservation techniques used for anatomy and pathological anatomy museums included a number of different means of preserving gross specimens; s uch as, desiccation (drying or curing) or pickling (in a liquid).

Preparation of dissected pieces or models of them was an art, midway between sculpture and medicine and required great precision.[99] For example, the expression "tireless zeal" was used to describe those performing anatomy work.[100]

These were rare and singular objects, that could be procured quite easily, provided one had technical or financial means.[101] They were produced and sold to collectors, medical schools and museums.

Desiccation

The Strasbourg anatomy department purchased a female skeleton in 1671 and another female skeleton, as well as a bear, a dog, a fox and a wolf skeletons in 1678.[102] The display of skeletons in an anatomy theatre was common and formed the beginnings of anatomy cabinets in which specimens were displayed and studied. Reducing cadavers to dessicated skeletal structure was the earliest form of preservation used for teaching and anatomical study.[103]

Figure 2.8 Anatomical pathology oestological preparation. Strasbourg collection, 19th century.
Pathol. n° 5916 : Fractura humeri sanata.[104]

The first anatomy preparations were skeletons or osteological preparations. This is not surprising; bones withstood putrefaction. A skeleton was prepared by Vesalius in 1543, while

[99] On the contributions of sculptures and the use of desiccation in art faculties, see Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*, 254-268.
[100] Lobstein, *Compte rendu a la Faculté de Médecine de Strasbourg sur l'etat actuel de son muséum anatomique*, vj.
[101] Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*, 261.
[102] Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 63.
[103] The oldest preserving technique would be artificial mummification, as practiced in ancient Egypt. From about 2500 BC, this involved removing organs and drying out the corpse with a natural sodium, natron, over seventy days. These preservations had religious significance and were not used in medical education per se.
[104] Source: Le Minor et al. *Anatomie(s) et Pathologies*, 148.

in Basel.[105] The technique used by Vesalius involved macerating and boiling bones to remove all soft structures.[106] This was first developed around the eleventh or twelfth centuries during the crusades, to repatriate bodies of victims to their native country for burial. After having removed the majority of the soft tissues, the specimens were covered with lime and placed it in a perforated wooden casket. Subsequently, the casket was firmly tied down at the bottom of a river, where the current gradually removed the remaining soft tissues as it flowed through the casket. Finally it was assembled by assembling limbs with copper wire and fastening the vertebral column to a metal rod.

Drying tissues was introduced in the sixteenth century by Bartolomeo Eustachi in Rome and later perfectionned in the second half of the seventeenth century by Frederik Ruysch in Leiden.[107] The techniques they used, and those described by Jean-Joseph Sue in 1765, would be similar to those employed by Strasbourg prosectors May, Hommel and their successors in Strasbourg.[108] The piece to be preserved was first soaked in spirits of wine [*esprit de vin*] for eight to fifteen days, then plunged in vinegar acid [*esprit de vinaigre*]. It was then exposed to air and carefully positioned with wood and wire structures, pins, horsehair, etc. Once dry, white varnish in spirits of wine [*vernis blanc à l'esprit de vin*] was applied repeatedly. Then colour was ground with oil and thinned with the varnish solution; carmine to give a flesh colour to muscles, vermillon for red arteries, blue ash or Prussian blue for blue veins, lead white to nerves. More spirits of wine or turpentine oil was brushed or poured on the prepared pieces to preserve them from mites and parasites. The result was a preparation that maintained the volume and consistency of hollow parts, colours were artificially reproduced, and further any unwanted fatty or soft matter could be dissolved with corrosive liquids.

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[105] The skeleton of Jakob Karrer, a murderer of Alsatian origin.
[106] Regis Olry, "Andreas Vesalius on the preparation of osteological specimens," *Journal of the International Society for Plastination* 13, no. 2 (1998): 8-12. Carlino, *Books of the body*. The source of the techniques are the illustrations provided in the illustrated capital letters and initials, notably *C*, *P* and *O* of Vesalius' *Fabrica* 1543 and 1555 editions.
[107] Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*, 255-258.
[108] Jean Joseph Sue, *Anthropotomie ou l'art d'injecter, de disséquer, d'embaumer et de conserver les parties du corps humain* (Paris: P. G. Cavelier, 1765); Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*, 255-258.

Figure 2.9 Anatomical pathology desiccated preparations. Strasbourg collection, 19th century. *Pathol. N° 4984 Cystovarium.*[109]

Desiccation was also described by Ernest Alexandre Lauth (1803-1837) in his *Nouveau Manuel de l'Anatomiste* published in 1835.[110] It had been used in Strasbourg until about 1900.[111] In the nineteenth century the process entailed first replacing all the blood in the specimen with water, then immersing it in a series of baths of desiccants (such as arsenic), which were equally injected in the principal vessels. The empty organs would be inflated. Finally, the piece was varnished.

Desiccated specimens could be picked up and touched, in addition to artificial colourings, these were visually and tactually impressive preparations in medical teachings.

Immersion in liquids

Although dried specimens were most common in the first decades (or even century and a half) of the collection, pieces were also conserved in liqueur. From the mid-1600s "spirit of wine" or ethyl alcohol was used. The technique involved simply cutting the piece to expose the view of choice and putting it in a jar of liquid.

[109] Source: Le Minor et al. *Anatomie(s) et Pathologies*, 157.
[110] Ernest Alexandre Lauth, *Nouveau manuel de l'anatomiste* (Levrault, 1835).
[111] Sébastien Mahler, "Les préparations anatomiques sèches de l'Institut d'Anatomie Normale de la Faculté de Médecine de Strasbourg. Inventaire actuel et aspect technique." (Thèse de médecine, Strasbourg: Université Louis Pasteur, 2004).

Figure 2.10 Anatomical pathology immersed preparations. Strasbourg collection, 19th century. The immersed or wet preparations were most commonly preserved in alcohol.[112]

Preserving specimens in a permanent bath of formaldehyde was the most prominent preserving technique after formaldehyde was discovered in 1868. The formaldehyde acted as an antiseptic and an anti-microbial, but did not prevent the loss of coloration. Other substances used included phenol, arsenic and zinc chloride.

This technique required meticulous dissection to get a clean exposure of the piece. But the preservation means were simple and immediate. However, the pieces quickly lost all their colouring and swelled. Alcohol became acidic over time and caused decalcification.[113] In the long term, the initial shape was not preserved and chemical changes interfered with later study of the piece.

Artificial anatomy preparations

Anatomical models were included in Strasbourg's anatomy collection from 1824. Anatomical models had the advantage of freezing details of an observation in time. They further allowed true colour to be portrayed. Models were made of sculpted wax, plaster or paper maché.

The first models were 36 wax preparations that had been prepared by Charles-Henri Ehrmann while he was *chef des travaux anatomiques*.[114] The number of models increased significantly around 1840. The 1843 catalogue listed, in addition to 17 existing wax models, 85 *carton pierre* models from M. F. Thibert in Paris, 34 cast plaster models moulded from

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[112] Source: Le Minor et al. *Anatomie(s) et pathologies*, 158.

[113] A. Dingerkus, "Preliminary observations on acidification of alcohol in museum specimen jars," *Curation Newsletter, American Society of Ichthyologists and Herpetologists* 5 (1982): 1–3.

[114] These included 21 models of mushrooms.

cadavers, and 5 clastic models bought from Dr. Auzoux. The 1846 catalogue added 1 more wax model, 30 more plaster models, 38 *carton pierre* models (of skin lesions), 59 models of syphilis (media not specified), 9 embossed leather models (*anatomie chirurgicale*), and 1 more clastic anatomical model. The 1857 catalogue further counted 63 wax models.

Wax models

Figure 2.11 Wax model of the heart. Strasbourg collection, late 19th century.
Signed: A. & P. Seifert praep. Berlin NW. 21 Rathenower Str. 74.[115]

Wax was a media that resembled flesh in consistency, weight and malleability. Wax models were common in medical teaching in the eighteenth and nineteenth century. They were produced commercially by craftspersons, such as Catherine Biheron in Paris or A. & P. Seifert in Berlin, who produced and sold them.[116]

The organs or structure to be modelled were dissected and covered with grease. A precise plaster mould was made on the surface. Wax – such as beeswax, spermaceti wax, Smyrne wax – was mixed with turpentine, animal fat and natural colour pigment and poured into the plaster mould. The different constituents were melted separately and the blend prepared in a lengthy and difficult process mastered by wax sculptors. The different moulded wax components were then assembled into one piece. Imperfections in the moulds and in assembly had to be corrected and nerves, arteries, veins and vessels applied, as well as eye or hair. The final model was varnished with a transparent coat to protect it.

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115 Source: Le Minor et al. *Anatomie(s) et pathologies*, 110.
116 Mandressi speaks of Catherine Biheron's enterprise. Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*, 266. Seifert's preparations are found in the Strasbourg collections. Le Minor et al., *Anatomie(s) & pathologies. Les collections morphologiques de la Faculté de Médecine de Strasbourg*, 110.

Plaster Casts

Figure 2.12 A plaster model of the upper torso, Strasbourg collection, early 20th century.
Made by Franz Josef Steger in Leipzig. (80 Marks in 1914/15?)[117]

Plaster casts progressively supplanted wax models. Their execution and preparation was simpler and faster. The anatomical structure to be modelled was covered in grease and a thin layer of plaster was applied with a brush. Once dried, it was delicately removed. This represented the negative, the mould for the model, and was filled with fresh plaster. Once this dried, the mould was removed and the model was painted and varnished.

The anatomy collection in Strasbourg included 240 plaster casts. Of these are 5 topographical models prepared in Strasbourg by Aimé Robert and Emile Küss in 1840. There were also a number of commercial models bought from Steger in Leipzig around 1880 and from the Nicolas-Augier-Roux anatomy collection in Paris between 1919 and 1939.[118]

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[117] Source: Le Minor et al. *Anatomie(s) et pathologies*, 117.
[118] Ibid., 114.

Paper Maché

Figure 2.13 A paper maché ear, Strasbourg collection.[119]

Paper maché for anatomical models was developed by Louis Auzoux (1797-1880). The model was obtained by pressing a paper paste into lead moulds. Details such as nerves and vessels were later added and they were painted. These were light weight pieces; easy to transport and to mount. They permitted models on different size scales, thereby magnifying or reducing details. There are a number of Auzoux's models in Strasbourg's anatomy institute collection.

Carton-Pierre

Carton-pierre was a blend of animal glue and chalk that allowed, like paper maché, to obtain lightweight, but solid models. In Strasbourg there are a number of primate skulls modelled in carton-pierre in the anatomy collection. (No images available.)

Scientific preparations

Anatomical preparations were three-dimensional objects. They could be held and touched, examined and compared, moved and aligned. Their placement on shelves was not negligible, as their integration into medical museums (in the next section) will show.

Anatomy preparations are an early and preponderant example of transforming bodies into objects. Historically, and as exemplified above, dissection served medical research and teaching which in turn allowed identification of disease in the deceased. That is, cadavers were transformed into teaching tools. The anatomo-clinic approach further lead to disease identification in the living. The practices and steps in the preparation of bodies and body parts

[119] Photo de Christian Creutz, Service régional de l'inventaire/AMUSS/Jardin des sciences de l'Université de Strasbourg.

transformed them for different purposes. Mandressi identifies such preparations as both singular and belonging to a coherent (and virtually infinite) ensemble of the hidden facet of the human body.[120] The transformation of body parts into preserved specimens through the eighteenth century to the mid-twentieth century may be considered a story of new scientific objects pouring forth and old ones fading away, to use Lorraine Daston's terms.[121] The focus of Daston's volume, as well as the MPIWG project on scientific objects, is the coming into being of phenomenon for scientific study.[122] It further has considered historical scientific objects as "objects in transition" that come into being, are transformed, marginalized and neglected.[123]

> "Frequently, public attention is drawn to scientific objects. They can appear in museums, as cultural icons, or in commercial contexts, and thus potentially lose their scientific character."[124]

According to Daston, objects were scientific, cultural, and commercial and the three realms were not necessarily exclusive. The case of anatomy and pathological anatomy collections was singular in that objects were not purely constructed or invented, but they involved the transformation of body parts.[125] As for dissection, this included a form of commodifying the human body and knowledge of the body. Preparations were products that could be perserved, collected and stored; they had added value. They were thus accumulating knowledge and value that could be stocked and exchanged.[126] As scientific objects of a natural history tradition, they were integrated into and displayed in museums.

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[120] Mandressi, *Le regard de l'anatomiste. Dissections et invention du corps en Occident*, 261; John Pickstone, *Ways of knowing: A history of science, technology and medicine* (Manchester: Manchester University Press, 2000), 62-64.

[121] Lorraine Daston, "Introduction: The coming into being of scientific objects," in *Biographies of scientific objects* (Chicago: University of Chicago Press, 2000), 5.

[122] Lorraine Daston, *Biographies of scientific objects* (Chicago: University of Chicago Press, 2000); Sophia Vackimes and Konstanze Welterbach, eds., "Wandering seminar on scientific objects" (Max Planck Institute for the History of Science. Preprint 339., 2007); "History of scientific objects," *International Max Planck Research Network*, n.d., http://scientificobjects.mpiwg-berlin.mpg.de/scientificobjectsPublic/index.html.

[123] This was notably the title of an exhibition in summer 2007. Gianenrico Bernasconi, Anna Maerker, and Susanne Pickert, eds., *Objects in transition. An exhibition at the Max Planck Institute for the History of Science, Berlin.* (Berlin: UNICOM Werbeagentur GmbH, 2007).

[124] Ibid., 2.

[125] Althougth anatomy objects did not figure in the exhibition, pathological collection of the *Charité* in Berlin was visited during the wandering seminar.

[126] The stock and exchange of preparations is equally of interest, and could be explored, in the present-day collection of tissue and sperm banks.

2.2.3 Collecting preparations

A chair of pathological anatomy in Strasbourg was created in 1819. This is indicative of and ensued from flourishing of the anatomo-clinic approach. In the eighteenth and nineteenth centuries, collections were used largely for pedagogical finalities; instructing medical students and pairing internal lesions with external symptoms and signs.[127] It is not a coincidence that the size of the collection in Strasbourg exploded in this same period, 3074 preparations were collected between 1804 and 1820 and the rise continued upward, as the graph below indicates. The collection was formalized as a museum in 1819, at which time, further efforts were made to enrich it, not only with pieces from the anatomy department, but with an appeal for donations and mobilisation of funds for purchases.

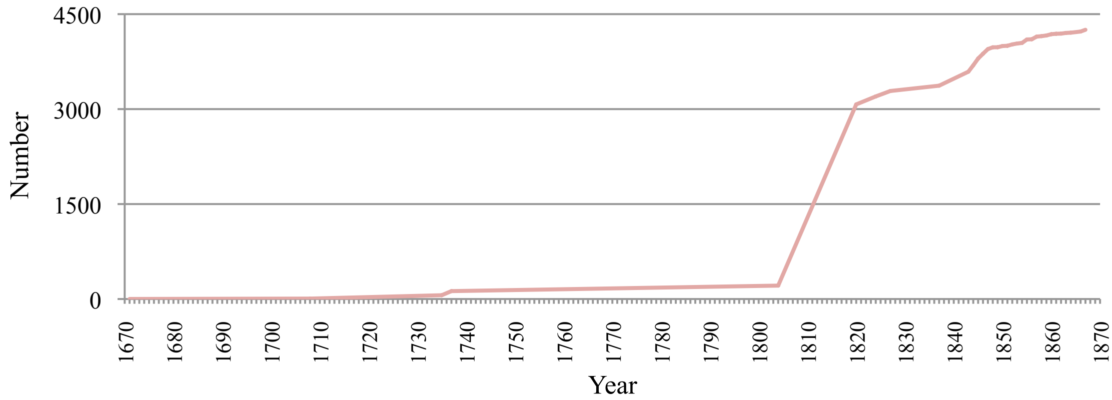

Figure 2.14 Plot of size of Strasbourg's anatomy collection.
This graph illustrates the growth of the anatomy collections between 1670 and 1867. The number of collection pieces used for this graph include primary and secondary sources.[128]

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[127] Jonathan Reinarz, "The age of museum medicine: The rise and fall of the medical museum at Birmingham's School of Medicine," *Social History of Medicine* 18, no. 3 (2005): 419-437.; Nélia Dias, "Le corps en vitrine. Eléments pour une recherche sur les collections médicales.," *Terrain* 18 (1992): 72-79.

[128] Lobstein, *Rapport sur les travaux exécutés à l'amphithéâtre d'anatomie de l'Ecole de médecine de Strasbourg pendant le premier semestre de l'an XII*; Lobstein, *Compte rendu a la Faculté de Médecine de Strasbourg sur l'etat actuel de son muséum anatomique*; Jean-Fréderic Lobstein, *Compte Rendu à la Faculté de Médecine de Strasbourg sur les travaux anatomiques exécutés à l'amphithéâtre de cette faculté pendant les années 1821, 1822 et 1823. Suivi d'un premier supplément au catalogue de son Muséum anatomique* (Strasbourg: F.G. Levrault, 1824); Charles Henri Ehrmann, *Musée d'anatomie de la Faculté de médecine de Strasbourg, ou catalogue méthodique de son cabinet d'anatomie physiologique, comparée et pathologique* (Strasbourg: Imprimerie de F. G. Levrault, 1837); Charles Henri Ehrmann, *Nouveau catalogue du Musée d'anatomie normale et pathologique de la Faculté de médecine de Strasbourg* (Strasbourg: Imprimerie Levrault, 1843); Charles Henri Ehrmann, *Notice sur les accroissements du Musée d'anatomie pathologique de Strasbourg. Suivie d'un catalogue, formant le premier supplément de celui publié en 1843.* (Strasbourg: Imprimerie de Ve Berger-Levrault, 1846); Charles Henri Ehrmann, *Accroissements du Musée d'Anatomie de Strasbourg* (Strasbourg: Berger-Levrault, 1857); Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*; Le Minor et al., *Anatomie(s) & pathologies. Les collections morphologiques de la Faculté de Médecine de Strasbourg*; Jean-Marie Le Minor and Henri Sick, "Les collections de l'Institut d'anatomie normale de la Faculté de médecine de Strasbourg.," *Cahiers alsaciens d'archéologie, d'art et d'histoire* XLIII (2000): 187-200.

As the graph illustrates, the first pieces of the anatomy collection were acquired at the time the anatomy theatre was built in 1670. The prosectors hired in 1733 prepared a number of pieces, which integrated the collection. From 1733, constituting a collection of preserved anatomical pieces was a goal in itself. Among the pieces prepared by J. C. May in the three years he acted as prosector was a remarkable series of sixteen preparations demonstrating the internal ear arranged with hinges and other mechanisms, for which he received honourable mention from the *Academie royale des sciences de Paris* in 1734.[129] He further contributed 60 preparations; 54 desiccated and 6 wet. Hommel, his successor, contributed 65 pieces; 53 desiccated and 12 wet.

There were 212 prepared specimens in the anatomy theatre in 1804.[130] In 1820, there were 3074 prepaprations in the medical school collection. Over 2800 specimens had been collected over a fifteen year period. Mobilisation to create a rich collection was taken to another level at the beginning of the nineteenth century, shortly before the collection became a museum in 1819. Following the revolution and upon the establishment of the *Ecole de santé* in 1794, professor of anatomy, Thomas Lauth, donated his own rich anatomy collection. This example was followed by other medical doctors in the city. Prosectors, such as Lobstein, Sultzer, Brossé, Uebersaal, Graul and Gustave Lauth, were herein important in preparing specimens.[131] Specimens prepared were largely from hospital cadavers, on occasion from practicing doctors' cadaveric findings, and a significant number from psychiatric hospice residents [*aliénés*].[132] For example, 400 specimens were from psychiatric hospice residents between 1821 and 1823 and 230 specimens between 1824 and 1825.[133]

Medical professors passed on their autopsy findings and their own collections. Practicing doctors in Strasbourg and cantonal doctors additionally sent rare and curious specimens from all over the *Bas-Rhin.* Between 1820 and 1824, 449 new pieces were integrated into the collection. The sources of these included: the purchase of Dr. Sultzer's

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[129] Lobstein 1820, 10 cites the *Mémoires de l'Académie royale de Paris pour l'Année 1734*, page 45.
[130] Lobstein, *Rapport sur les travaux exécutés à l'amphithéâtre d'anatomie de l'Ecole de médecine de Strasbourg pendant le premier semestre de l'an XII.*; Lobstein, *Compte rendu a la Faculté de Médecine de Strasbourg sur l'etat actuel de son muséum anatomique*, 68.
[131] Names cited by Ehrmann, *Musée d'anatomie de la Faculté de médecine de Strasbourg, ou catalogue méthodique de son cabinet d'anatomie physiologique, comparée et pathologique*, v.
[132] I do not know if the corpses were transferred to the anatomy amphitheatre or if the autopsies were performed elsewhere and pieces of interest sent to the medical school.
[133] Ehrmann, *Compte rendu à la Faculté de médecine de Strasbourg des travaux anatomiques exécutés à l'amphithéatre de cette faculté pendant les années 1824 et 1825*.

private collection (60 pieces), various individual donations (26 pieces), and the remainder from persons affiliated with the medical school.[134]

Autopsy pieces were further prepared on site. Medical students prepared them.[135] The position of *chef des travaux* was appointed through competition where the candidate had to prepare one specimen which was integrated into the collection, leading to the periodic acquisition of some particularly well-prepared pieces.[136] In 1831, Charles Henri Ehrmann also created a *Prix d'Anatomie pratique*, whose entries became property of the medical school.[137] In 1857, Ehrmann made a request of local, national and international colleagues to conserve "altered organs" from autopsies for him.[138] Ehrmann was looking for pathological pieces of interest.

The collection was a reputable collection in Europe. Its location at the heart of the medical school not only illustrates its role as a teaching tool, but as a vitrine to a rich medical centre.[139] The large collection was a source of renown for the medical school: "individuals and institutions with the largest and most complete collections … had always been recognized as authorities in their fields."[140] Namely, a large collection was not only worthy of repute, it also served a wider and richer selection for choosing samples for teaching.

2.2.4 Housing preparations: Museums

The first oestological preparations in Strasbourg were purchased shortly after the installation of the anatomy theatre in 1670. These skeletons furnished the theatre, as props and even as decor, but also as teaching tools. The preservation of anatomy pieces on site followed shortly afterward. Prior to having a permanent place to use or store them, they were of little interest

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[134] Lobstein, *Compte Rendu à la Faculté de Médecine de Strasbourg sur les travaux anatomiques exécutés à l'amphithéâtre de cette faculté pendant les années 1821, 1822 et 1823. Suivi d'un premier supplément au catalogue de son Muséum anatomique*, 5.These include: Dr. Ehrmann (chef des travax), Mr Alexandre Lauth (medical student), Dr. Aronssohn, Mr Voelmy (medical student) and Mr Eckert (medical student).

[135] Lobstein, *Compte rendu a la Faculté de Médecine de Strasbourg sur l'etat actuel de son muséum anatomique*, 70.

[136] These candidates included: Ehrmann; Gustave Lauth; Dr. Bach; Dr. Küss and Dr. Martin to mention those acknowledged in the catalogue prefaces.

[137] Ehrmann, *Musée d'anatomie de la Faculté de médecine de Strasbourg, ou catalogue méthodique de son cabinet d'anatomie physiologique, comparée et pathologique*, viij.

[138] Ehrmann, *Accroissements du Musée d'Anatomie de Strasbourg*.

[139] This display of material in glass cabinets almost brings to mind a boutique presenting its wares. The specimens were, however, not for sale to the public. What the medical school supplied was medical training and knowledge. Albeit, some of the collection specimens had been sold to the anatomy department, such as that of May. Generally pieces were bought and sold by private collectors for curiosity cabinets. Anatomical models were equally sold. See for example Hector Bossange, *Catalogue général de Hector Bossange* (Saint Cloud: Imprimerie de Belin-Manden, 1845).

[140] Paula Findlen, *Possessing nature: Museums, collecting, and scientific culture in early modern Italy* (Berkeley: University of California Press, 1994), 257; Reinarz, "The age of museum medicine," 5.

to the medical school. At the medical school, the collection grew and became an medical entity in itself. Where were these preparations kept? How were they displayed? Did they contribute to knowledge production? If so, how?

The first European anatomy museums opened in the last decades of the eighteenth century.[141] Collections and museums were a common denominator to medical schools in the nineteenth century, which Jonathan Reinarz has titled the age of museum medicine and John Pickstone the great age of scientific museums.[142] By the nineteenth century, museums were expressions of national and imperial power; they were places of knowing and they had state interest in their development.[143] In France, the *Musée Dupuytren* and the *Musée Orfila* were exemplary museums dating to this period.[144] The *Musée Orfila* was founded in 1847 and the *Musée Dupuytren*, along with the creation of a chair of pathological anatomy at the *Faculté de Médecine de Paris* in 1835; the *Conservatoire d'Anatomie* in Montpellier was created in 1794 and transformed into the anatomy museum of the *Faculté de Médecine de Montpellier* in 1851; an anatomy museum was founded at the *Ecole préparatoire de Médecine* in Lyon in 1854; an anatomy museum at the *Ecole de Médecine et Pharmacie* in Bordeaux in 1865 and at the *Hôpital Saint Louis* in Paris in 1889. The specimens and models stored in these museum were the foundation for practical teaching and were pedagogical tools. Not only was the anatomy theatre a central place for practical anatomy teaching, but anatomy museums evolved out of it.

From cabinet to museum

In Strasbourg, the collected anatomy artefacts were first displayed in the late seventeenth century anatomical theatre.[145] In the theatre, cabinets containing the preparations were located between high windows.[146] But as the collection grew, larger and larger facilities were needed to house the displays so that they could be easily viewed, notably by medical students.

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[141] For example, London in 1780, Amsterdam in 1789, Leyden in 1793, Berlin in 1796.
[142] Reinarz, "The age of museum medicine." Reinarz looks to draw attention to teaching in what has been titled hospital medicine or library medicine; Crawford and Olff-Nathan, *La science sous influence*, 73.
[143] Pickstone, *Ways of knowing*, 73.
[144] M Sakka, "Le musée Dupuytren," *Histoire et archéologie* 97 (1985): 53-57.; Dias, "Le corps en vitrine. Eléments pour une recherche sur les collections médicales."
[145] In the early eighteenth century, a merchant from Hamburg published advice for amateurs on collection display and organisation. C. F. Neickelio, *Museographia: oder Anleitung zum rechten Begriff und nutzlicher Anlegung der Museorum oder Raritäten-Kammern* (Leipzig and Breslau: M. Hubert, 1727).
[146] Jean-Marie Le Minor and Jean-Luc Kahn, "Anatomie : création de la chaire (1652) et de l'amphithéâtre (1670)," in *L'Histoire de la médecine à Strasbourg*, ed. Jacques Héran (Strasbourg: La Nuée Bleue, 1997), 114.

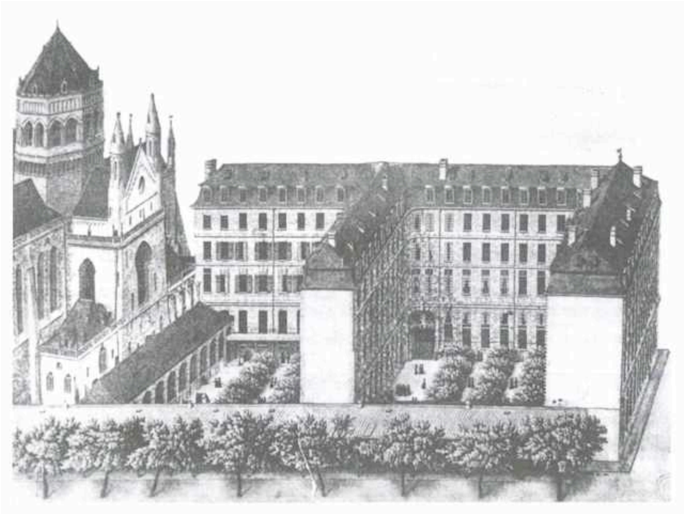

Figure 2.15 The *Ancien Séminaire Episcopal*, also known as the *Grand Séminaire*.
The seminary was located at the foot of the cathedral (*Bien National* after the revolution) housed the *Ecole de Santé* and later the *Faculté de médecine,* as well as the anatomy collection between 1798 and 1824. [147]

Figure 2.16 The *Hôtel de l'Académie*.
The *Faculté de médecine* was in the *Hotel de l'Académie* from 1824 to 1866. The collections were displayed here from 1825 to 1857. [148]

In 1794, the medical school moved to the *Séminaire épiscopal*. The collections moved in 1798, at which time a segregation of the collection was carried out.[149] A number of pieces remained in the anatomy theatre cabinets and were to be used during lectures, whereas the pieces that would later form the core of the anatomy museum were transferred to the new

[147] Reproduced from: Le Minor et al., *Anatomie(s) & pathologies. Les collections morphologiques de la Faculté de Médecine de Strasbourg*, 26. (Source not indicated)
[148] Reproduced from: Ibid., 39. (Dessin à la plume de L. A. Perrin lithographié par E. Simon, illustrant l'ouvrage de C. H. Ehrmann, *Musée Anatomique de la Faculté de Médecine de Strasbourg*, 1837)
[149] Despite some contestation, Le Minor et al., *Anatomie(s) & pathologies. Les collections morphologiques de la Faculté de Médecine de Strasbourg*, 24-26.

location.[150] The new locale was larger and brighter. It provided storage, but it further allowed medical students to view specimens arranged on shelves. The largely pedagogical finality of the prepared specimens determined whether they remained in the amphitheatre or were displayed in the new location.

Strasbourg's anatomy museum was officially founded in 1819. This was a turning point for the growing medical school collection. Georges Cuvier (1769-1832), *conseiller d'Etat au Conseil Royal de l'Instruction publique* in Paris, was influential in establishing a chair of pathological anatomy and director of the anatomy museum in Strasbourg.[151] In 1819, after working with the collection for sixteen years as anatomy *chef de travaux* Jean Frédéric Lobstein was appointed to this chair and director of Strasbourg's new anatomy museum. Lobstein delegated the responsibility of the museum to Ehrmann in 1821.[152] Ehrmann was appointed chair of anatomy in 1826. He further succeeded Lobstein, in 1835, as chair of pathological anatomy, director of the anatomy museum, chief obstetrician at the hospital, and professor at the midwifery school; the positions amalgamated with the chair of anatomy and the chair of pathological anatomy dissipated.

In 1820, 452 pieces, 12% of the total, were located at the theatre, while the remaining 2834 were in the (newly titled) anatomy museum. The pieces were all classified in a total of thirty eight vast armoires, by system. The pathological anatomy armoires were labelled with specifics of diseases. The normal anatomy and physiology, organs were arranged physiologically, by system and then by function. The pieces were labelled in French with a reference number, that corresponded to the catalogue entry. A large number of pieces were also designated with a letter which referred to medical history records.

In 1825, the museum moved, along with the medical school, to the *Hôtel de l'Académie*.[153] Ehrmann describes the locale as offering well-lit spacious rooms that permitted arranging and classifying the pieces more methodically.[154] Indeed, methodical or systematic classification was a concern of Ehrmann's; he re-organized the collection into 3 sections: 1) physiological state of humans and animals; 2) anormal state in terms of form, position and

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[150] Le Minor and Sick, "Les collections de l'Institut d'anatomie normale de la Faculté de médecine de Strasbourg.," 189.
[151] In the numerous MD theses on the anatomy collections, the founding of the anatomy museum is dated as 1812 and Lobstein position at 1819.
[152] Charles Rousselet, "Charles-Henri Ehrmann (1792-1878) et les catalogues du Musée Anatomique de la Faculté de Médecine" (Thèse de médecine, Strasbourg: Université Louis Pasteur, 1999), 23.
[153] This has previously been the *Maison des Enfants-Trouvés.*
[154] Ehrmann, *Nouveau catalogue du Musée d'anatomie normale et pathologique de la Faculté de médecine de Strasbourg*, vji.

development; 3) pathological state with alteration of structure and tissue.[155] Each was then divided into sub-sections according to anatomical systems.

Between 1794 and 1857, the anatomy theatre and dissection facilities, located in the Saint-Erhardt chapel were separate from the medical school and the anatomy museum.

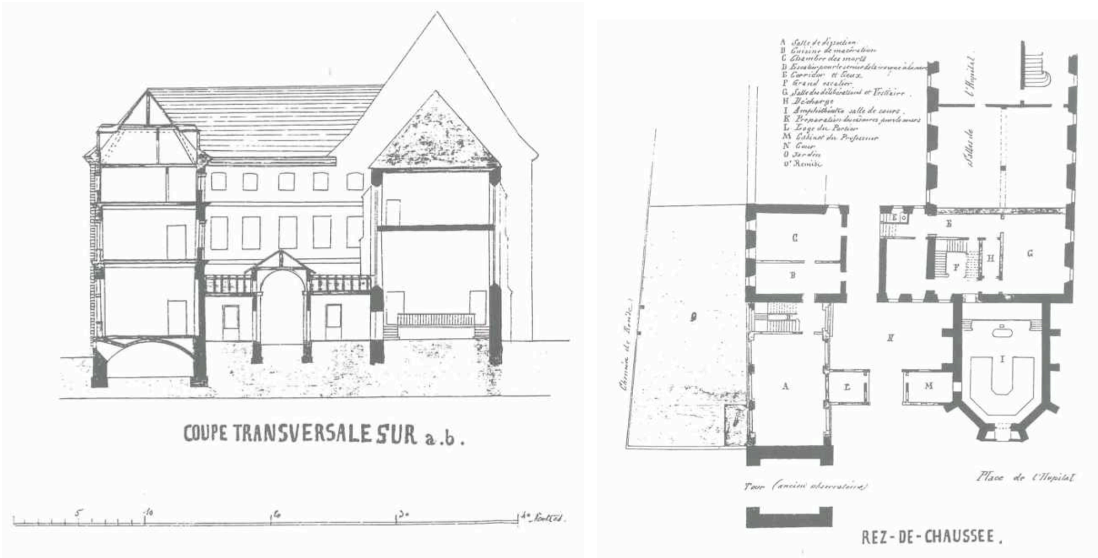

Figure 2.17 The anatomy facilities as they were built in 1856. [156]

The museum moved again in 1857 into a new anatomy building, adjacent to the anatomy theatre by the hospital.[157] The main floor housed the anatomy theatre, the prosector's chamber, a meeting room, the autopsy chambers and a dissection room. The museum was located in four rooms on the second floor, one of which contained the teaching collection. On the third floor was the surgery "arsenal," a consultation room, offices for the professors and a classroom.[158]

In 1872, with the creation of a German university in the annexed Alsatian territories after the Franco-Prussian war, the *Pathologische Institut* integrated the *Pathologisches Museum Strassburg* under the direction of Friedrich von Recklinghausen.[159] The previously pathological anatomy part of the collection formed the heart of a new museum, which was relocated to a new building in 1878, and where it remained until its dismantlement in 1936.

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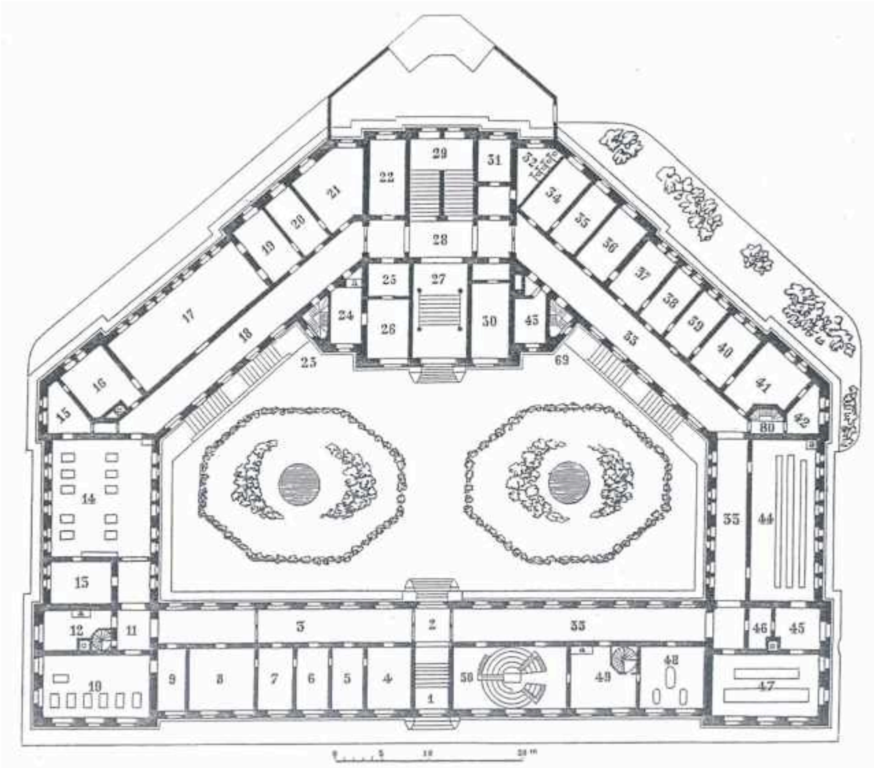
[155] Ehrmann, *Musée d'anatomie de la Faculté de médecine de Strasbourg, ou catalogue méthodique de son cabinet d'anatomie physiologique, comparée et pathologique*.
[156] Reproduced from: Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 372.
[157] Anatomische Institut, 51-53. Das Bürger-Hospital von Strassburg und seine Umgestaltungen in der Zeit von 1872 bis 1898. 27 AL 641 ADBR.
[158] Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 353.
[159] On the German *Reichuniversitat*, and for a biographical account of Recklinghausen, see Bonah, "Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXeme siècle."

The collection was exhibited principally in three rooms on the upper floor of the building, titled *Pathologische Sammlung*, on the floor plans pictured below. The preparations were set in glass walled armoires that were 2.3 metres high. They were principally used for teaching and so were easily accessed and easy viewed. Curtains protected them from direct sunlight when they were not in use. A fourth room further housed more of the collection, *Reserve Sammlung*. It might be estimated that the collection occupied a third of the institute's floor space. The importance of the collection in the *Anatomische Institut* is also apparent; it occupied four rooms and just over a third of the floor space.

Figure 2.18 The exterior of the *Anatomische und Pathologische Institut*. [160]
This photo from the late nineteenth century illustrates the first constructions of the German medical school. Aligned along the same street, which bordered the fortification, were the physiology institute, the anatomy and pathological anatomy institute and in the foreground the biochemistry institute.

[160] Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 608.


a.

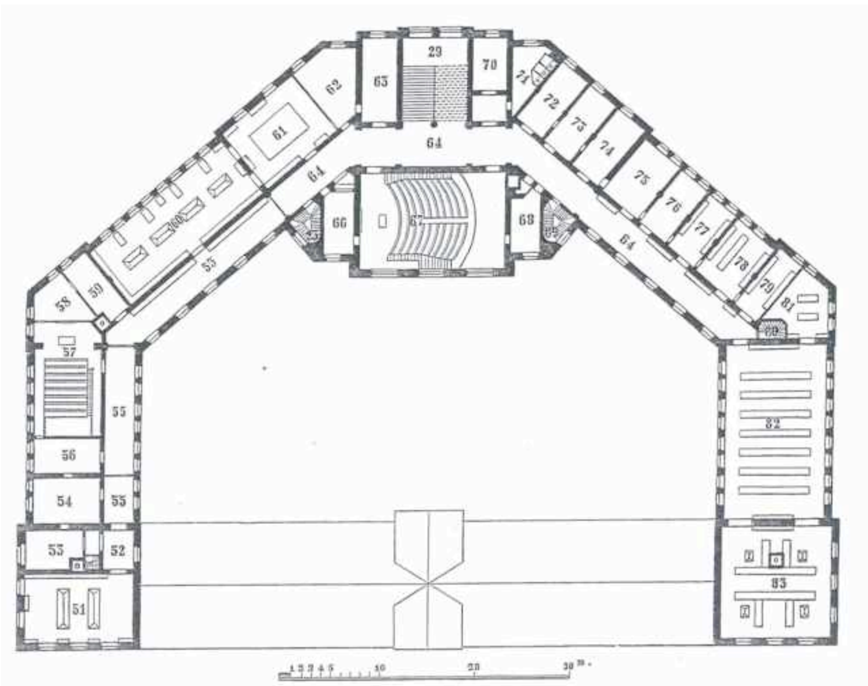

b.

Figure 2.19 The floor plan of the anatomy and pathology building in 1894.
a. Illustrates the main floor.
b. Illustrates the upper floor. The left side of the building housed the *Institut d'Anatomie normal* and the right side the *Institut d'Anatomie Pathologique*. The pink zones indicate the locations of the anatomy and pathological anatomy collection displays.[161]

[161] *Festschrift für die 58. Versammlung Deutscher Naturforscher und Ärzte : Die naturwissenschaftlichen und medicinischen Institute der Universität und die naturhistorischen Sammlungen der Stadt Strassburg* (Strassburg: Heitz, 1885), 83 and 86.

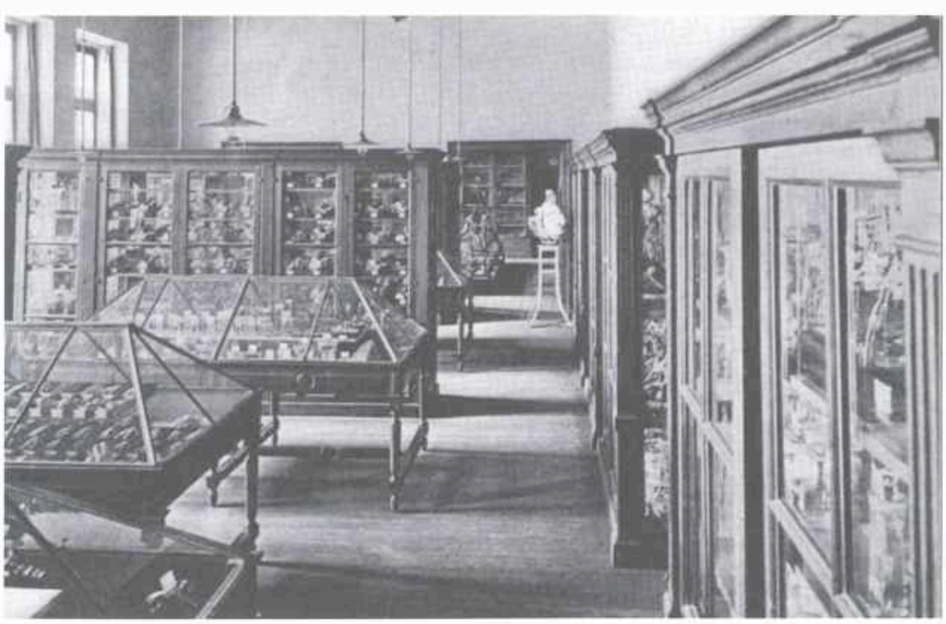


Figure 2.20 A photo of the *Anatomie normal* museum in 1925.
The *Anatomie pathologique* museum may have been similar to this. It was located in the same room on the opposite side of the building and equally had glass cabinets that were just over 2 metres in height.[162]

The changing location of the collection is indicative of its growing size, but also of the important role of the collection in medical teaching and in public showcases. Effectively, this was an important and recognized anatomy collection even before its expansion in the 1820s. In 1766, R. de Hautesierck drew attention to the locale, and notably the quality of the collection: “The hospital […] contained nearly six hundred beds. To its right is an anatomy amphitheatre highly esteemed for the fine pieces it contains, and the regular anatomy courses the medical faculty of the city offers each year.”[163] In 1785, the anatomy theatre and cabinet’s desiccated and wet preparations were highlighted in Charles Hautemer’s guidebook to Strasbourg.[164] He described the theatre as one of the most visited in Europe. Jean Frédéric Hermann (1743-1820) not only commended the anatomy museum, but also praised the cabinet located at the anatomy theatre in 1819.[165] Hermann pointed out that the public was taking an interest in the collections, in addition to students of medicine.[166] The museum was

[162] André Forster, “L’Institut d’Anatomie de l’Université de Strasbourg,” *Methods and Problems in Medical Education* Third series (1925): 132.
[163] R. de Hautesierck, *Recueil d’observations de médecine des hôpitaux militaires. Tome I* (Paris, 1766), 220 My translation.
[164] Charles Hautemer, *Description historique et topographique de la ville de Strasbourg et de tout ce qu’elle contient de plus remarquable en faveur des voyageurs* (Strasbourg, 1785).
[165] Jean Frédéric Hermann, *Notices historiques, statistiques et litteraires sur la ville de Strasbourg. Tome II. Strasbourg* (Strasbourg, 1819), 387-390.
[166] Ibid., 387. (My translation : “l’un de l’instruction publique ordinaire ; l’autre, celui de l’instruction extraordinaire et d’un degré supérieur.”)

effectively open to visitors, and in 1820 in his first report to the medical school, Lobstein reported that

> "the [Anatomy] Cabinet is open to the public once a week, and is visited by several hundred people each time. The students have access every day. Foreigners are welcomed at all hours and upon request."[167]

The museum was further mentioned in a number of guidebooks for travellers. The museum in the buildings of the *Séminaire épiscopal* was recommended in an 1828 guidebook, which indicates that it was open to the public on Thursdays afternoons between 12:00pm and 2:00pm.[168] An 1862 guidebook described a number of the museum preparations and artificial pieces.[169] The presentation of the collections in a museum opened the doors of the medical school to the public.[170]

Natural history

In addition to their role as pedagogical instruments and their attraction to travellers, the collection filled a natural history way of knowing.[171] Natural history approaches concentrated on describing and collecting, identifying and classifying, utilize and displaying for pride of possession, for intellectual satisfaction, and for commerce and industry.[172] Collections present a number of advantages over direct observation in natural history, in anatomy, as well as in more recent undertakings. Latour discusses three in particular: a) they allow the objects to be examined at leisure; b) once classified specimens from different places and different moments in time become contemporary, they present a synoptic table across distance and time; c) specimens can be displaced, they are mobile and recombinable like characters of a printing

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[167] Lobstein, *Compte rendu a la Faculté de Médecine de Strasbourg sur l'etat actuel de son muséum anatomique*, 69. (My translation.)

[168] J. Fargès-Méricourt, *Description de la ville de Strasbourg* (Strasbourg, 1828).

[169] Hippolyte-Jules Demolière, *De Strasbourg à Bâle* (Paris: Hachette, 1862). Cited by Carole Dormann, "Les préparations anatomiques sèches du Musée anatomique de la Faculté de Médecine de Strasbourg : aspects historiques et catalogues anciens." (Thèse de médecine, Strasbourg: Université Louis Pasteur, 2004).

[170] Nélia Dias in her study of Paris anatomy museums mentions that such museums were not destined to receive non-initiated visitors and were somewhat isolated from the public. Dias, "Le corps en vitrine. Eléments pour une recherche sur les collections médicales."

[171] Crawford and Olff-Nathan, *La science sous influence*, 73; Edward Porter Alexander and Mary Alexander, *Museums in motion: An introduction to the history and functions of museums* (Lanham, Md: Altamira Press, 2008); Ibid.

[172] Crawford and Olff-Nathan, *La Science Sous Influence. L'Université de Strasbourg enjeu des conflits franco-allemands 1872-1945*, 60.. See also: Stéphane Jonas et al., *Strasbourg, capital du Reichsland Alsace-Lorraine et sa nouvelle université: 1871-1918* (Strasbourg: Editions Oberlin, 1995).; Paul Lawrence Farber, *Finding order in nature: The naturalist tradition from Linnaeus to E. O. Wilson* (Baltimore and London: Johns Hopkins University Press, 2000).; Findlen, *Possessing nature: Museums, collecting, and scientific culture in early modern Italy*.; Paul Geroski, *The evolution of new markets* (Oxford: Oxford University Press, 2003).; Spary, *Utopia's garden*.; Pickstone, *Ways of knowing*, Chapter 3.

press.[173] Just as in Latour's account where the plant and earth specimens were more easily studied when assembled in the controlled and comfortable laboratory workspace rather than in the forest, anatomy specimens were more easily studied when prepared and assembled in the comfort of a museum or workspace rather than in the midst of an autopsy or dissection. The anatomy collection effectively presented these qualities. Once prepared, they could be examined at any moment in time and without the temporal (and olfactory) constraints of a dissection. Further, in normal anatomy specimens from different corpses presented a synoptic table across ages, and in pathological anatomy specimens from different corpses presented a synoptic table across different stages of different pathologies. Prepared specimens could equally be placed in an array according to system.

In order to fully exploit and learn from classification and observation of collections, large numbers of objects are needed. In anatomy and pathological anatomy, prepared specimens were accumulated, amassed even. The transit from post-mortem to cabinet was facilitated when those in charge of the museum or the collection were simultaneously responsible for autopsies, as was the case in Strasbourg.

The collections and museums deepened and characterized natural historical understanding of the period. To facilitate understanding of disease and disease histories, preserved organs and lesions at different moments of development could be lined up and compared. They were first classified physically through shelf arrangement. But more and more shelf space was needed. There was subsequently a division in the collection: the pedagogical pieces and the museum pieces. Collection organisation was indicative of specimen use.[174] The former being used while teaching in the anatomy theatre and the latter figuring in the museum array for medical students and public visitors. Growing numbers of preparations meant that some kind of list or inventory was needed in addition to classification and shelf arrangement. If such inventories were initially manuscript lists, they became a literary genre during the nineteenth century alongside other academic publications. From collection to exposition, tasks of the directors of museums came to include publishing catalogues.

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[173] Bruno Latour, "Le 'pedofil' de Boa Vista - montage photo-philosophique," in *Petites leçons de sociologie des sciences* (Paris: Editions la Découverte, 1993), 182-185.

[174] The categorization witnessed in catalogue and in museum also reflects sub-disciplinary divide and medical perception of normal and pathological. On normal and pathological, see Keating and Cambrosio, *Biomedical platforms*, 69-77.; Georges Canguilhem, *Le normal et le pathologique*, 10th ed. (Paris: Presses universitaires de France, 2006).

2.3 Paper material. Catalogization and Compilation.

2.3.1 Catalogues

Inaugural dissertations, medical masters and doctoral theses, articles and booklets were consecrated to describing observations of pieces in the anatomy museum.[175] Such academic publications are usual for a medical school. However, a further media featured the anatomy collection pieces: a series of catalogues published in the nineteenth century. Medical school collection contents were published in the form of catalogues for local and international consultation.[176] Such catalogues witness distinctions between comparative anatomy, normal anatomy and pathological anatomy. These catalogues trace the location and the size of the collections historically, as they had contemporarily.

French published catalogues, 1820-1857

Catalogues detailing the museum contents were renewed regularly as the collections grew; seven catalogues correspond to the 1820-1857 period.[177] The catalogues contain lists of the collection contents, which allude to the natural history tradition of seeking order in anatomy and in pathological anatomy. Lobstein in the preface to the first of these catalogues affiliates natural science museums with order. "In these museums, where nature is virtually represented

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[175] Le Minor et al., *Anatomie(s) & pathologies. Les collections morphologiques de la Faculté de Médecine de Strasbourg*, 21-22.

[176] Examples of those with pathology collections: Félix Thibert, *Musée d'anatomie pathologique. Bibliothèque de médecine et de chirurgie pratiques, réprésentant en relief les altérations morbides du corps humain..* (S.l.: s.n., 1844); Allan Webb, *Pathologiq Indica, or the anatomy of Indian diseases* (Calcutta: Thacker, 1848); Charles Nicolas Houel, *Manuel d'anatomie pathologique générale et appliquée : contenant la description et le catalogue du Musée Dupuytren* (Paris: Baillière, 1857); Charles Nicolas Houel, *Catalogue des pièces du Musée Dupuytren* (Paris: Paul Dupont, 1877); Gerardus Vrolik, Justus Ludovicus Dusseau, and Willem Vrolik, *Catalogue de la collection d'anatomie humaine, comparée et pathologique de Ger. et W. Vrolik* (Amsterdam: De Roever Krober, 1865); John Barnard Swett Jackson, *A descriptive catalogue of the anatomical museum of the Boston Society for Medical Improvement* (Boston: W. D. Ticknor, 1847); J. Jackson, *A descriptive catalogue of the monstrosities in the cabinet of the Boston Society for Medical Improvement* (Boston: Freeman and Bolles, 1847); J. Jackson, *A descriptive catalogue of the Warren anatomical museum* (Boston: A. Williams and company, 1870); Alphonse Devergie, *Musée de l'Hôpital Saint-Louis* (Paris: G. Masson, 1877).

[177] Lobstein, *Compte rendu a la Faculté de Médecine de Strasbourg sur l'etat actuel de son muséum anatomique*; Lobstein, *Compte Rendu à la Faculté de Médecine de Strasbourg sur les travaux anatomiques exécutés à l'amphithéâtre de cette faculté pendant les années 1821, 1822 et 1823. Suivi d'un premier supplément au catalogue de son Muséum anatomique*; Ehrmann, *Compte rendu à la Faculté de médecine de Strasbourg des travaux anatomiques exécutés à l'amphithéatre de cette faculté pendant les années 1824 et 1825*; Ehrmann, *Musée d'anatomie de la Faculté de médecine de Strasbourg, ou catalogue méthodique de son cabinet d'anatomie physiologique, comparée et pathologique*; Ehrmann, *Nouveau catalogue du Musée d'anatomie normale et pathologique de la Faculté de médecine de Strasbourg*; Ehrmann, *Notice sur les accroissements du Musée d'anatomie pathologique de Strasbourg. Suivie d'un catalogue, formant le premier supplément de celui publié en 1843.*; Ehrmann, *Accroissements du Musée d'Anatomie de Strasbourg*.

in abridged form, we see classified in order all that she spread in sublime confusion over the Earth's surface."[178]

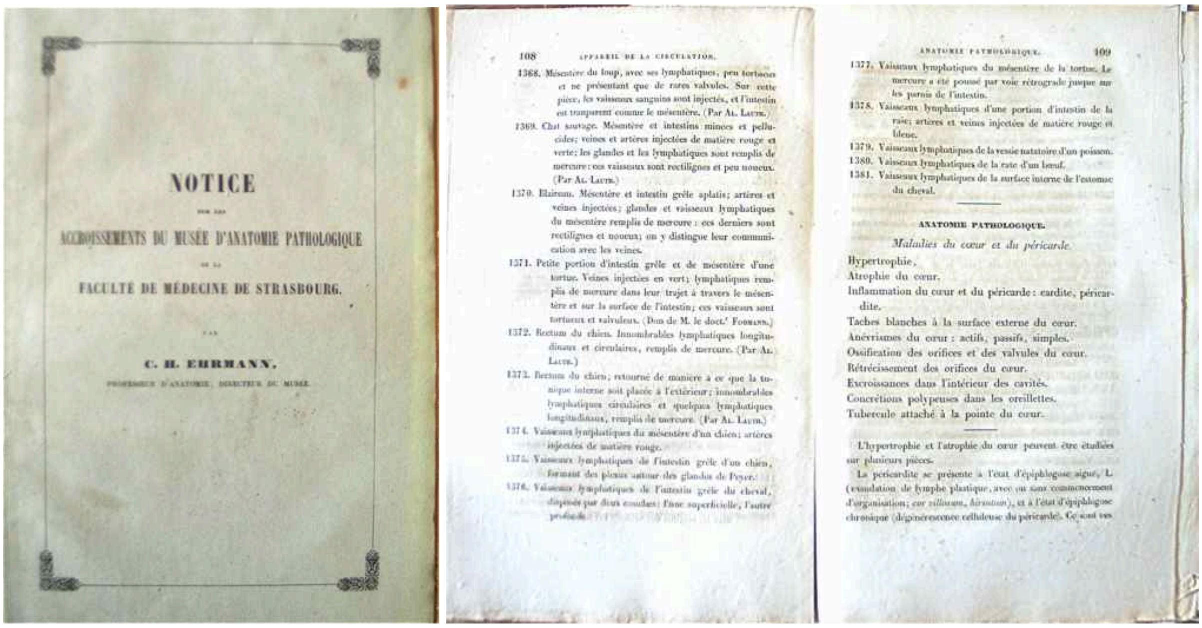

Figure 2.21 Example of catalogue format, cover and sample page, 1846.
Charles Henri Ehrmann. *Notice sur les accroissements du Musée d'anatomie pathologique de Strasbourg. Suivie d'un catalogue, formant le premier supplément de celui publié en 1843*. Strasbourg: Imprimerie de Ve Berger-Levrault, 1846.[179]

Lobstein categorized the collection (which was one collection comprising of normal and pathological preparations) into two distinct parts: physiological or normal and pathological.[180] The entries in the catalogue were arranged by system and then by function. In 1820 normal anatomy preparations outnumbered pathological preparations, 1977 or 60% normal and 1309 or 40% pathological. This ratio remained the same in the 1824 and 1827 catalogues. In 1837, the percentage of pathological preparations rose to 50% and continued to occupy a full half of the collection until at least 1857.

[178] Lobstein, *Compte rendu a la Faculté de Médecine de Strasbourg sur l'etat actuel de son muséum anatomique*, 1. (My translation.)
[179] Photo: T. Close-Koenig
[180] Ehrmann, *Musée d'anatomie de la Faculté de médecine de Strasbourg, ou catalogue méthodique de son cabinet d'anatomie physiologique, comparée et pathologique*. See also Le Minor and Sick, "Les collections de l'Institut d'anatomie normale de la Faculté de médecine de Strasbourg."

Anatomie Physiologique		**Anatomie Pathologique**	
Système Osseux	1-1129	Système Osseux	1-426
Système des organes de la digestion	1130-1288	Maladies des muscles, des vaisseaux sanguins et lymphatiques	427-462
Système musculaire	1289-1299	Maladies du coeur et des grosses artères	463-519
Système de la circulation	1300-1474	Maladies de la plèvre, du poumon et de la glande thyroïde	520-583
Organes de la respiration et de la voix	1475-1520	Maladies des organes de la digestion	584-759
Systèmes des voies urinaires	1521-1542	Maladies des voies urinaires	760-837
Cerveau, nerfs et organes des sens	1543-1794	Maladies du système nerveux	838-925
Système sexuel	1795-1977	Maladies des organes de la génération de l'homme	926-950
		Maladies des organes de la génération de la femme	951-1056
		Foetus monstreux	1057-1135
		Production et organisations nouvelles	1136-1309

Figure 2.22 Lobstein 1820 catalogue categories

The two distinct numerotation schemes of the entries, as listed above, reinforces the distinction between the two halves of the collection. This equally parallelled their placement in the museum: twenty cabinets contained first human organs followed by analogous animal organs, and eighteen cabinets of organs in state of disease were arranged in anatomical order.[181]

Categorization schemes are indicative of epistemic value.[182] Once assembled, museum contents were organized and re-organized to present and reveal knowledge of anatomy and disease. But knowledge production was not limited to this process of ordering. The preparations in the museum were further described and examined in dissertations, articles and observations. Lobstein designated a large number of specimens with a letter, in addition to

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[181] Lobstein, *Compte rendu a la Faculté de Médecine de Strasbourg sur l'etat actuel de son muséum anatomique*, 3.

[182] The different classification schemes in these catalogues could be explored further in terms of what Michel Foucault discusses Morgagni's categorization and Bichat's categories of tissues in his review of pathological anatomy treatises of the nineteenth century. Morgagni's categorization is like others of the eighteenth century to which anatomical localization was the directing principle of nosological analysis and the final cause. Bichat's categorization with spatialization secondary to tissue structure (i.e. cells, nervous tissue, arteries, veins, bones, muscular tissue, etc.) was issue of analysis of different types of lesions and was the seat or original site. Foucault, *Naissance de la clinique*.

their reference number, which referred to medical case histories. These were filed in twelve large boxes.[183]

Figure 2.23 Cabinet for organizing medical histories, *Institut d'Anatomie Pathologique*.[184]
The origin and date of this cabinet in the *Institut d'Anatomie Pathologique* is unknown. It does however correspond to the fourteen large boxes in which Lobstein might have filed case histories.

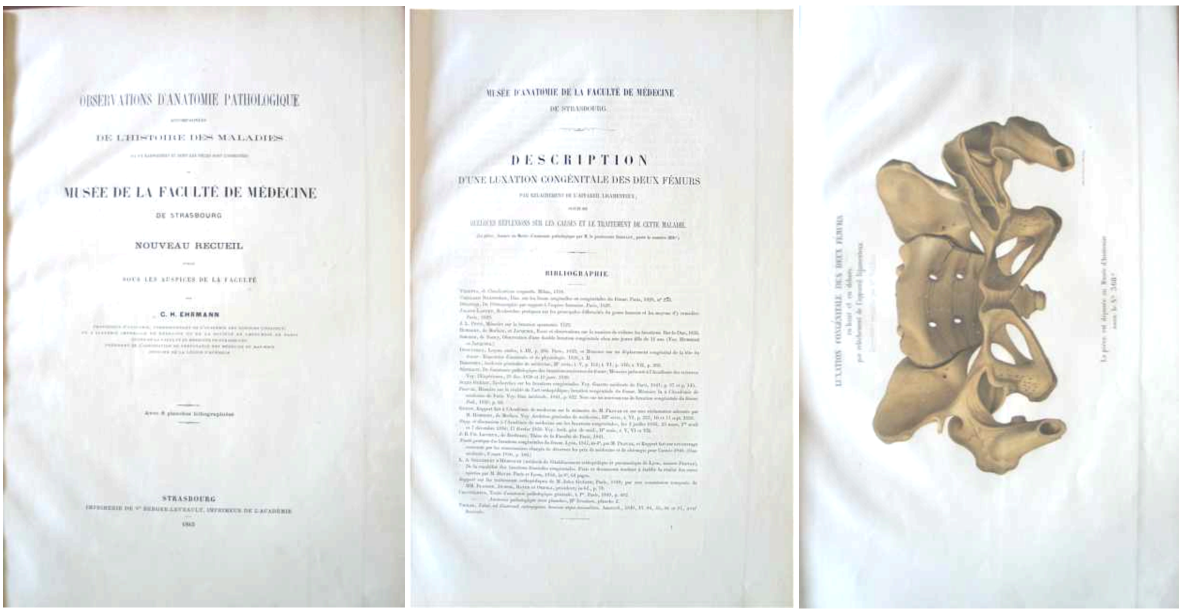

Figure 2.24 Title page, first page with sample text and illustration from Ehrmann's 1863 *Observations.*
Charles Henri Ehrmann *Observations d'anatomie pathologique, accompagnées de l'histoire des maladies qui s'y rapportent et dont les pièces sont conservées au musée de la Faculté de médecine de Strasbourg.* Strasbourg: Veuve Berger-Levrault, 1863.[185]

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[183] Two other larges boxes contained 119 drawings and colour prints.
[184] Photo: T. Close-Koenig

In 1863, Ehrmann also published compilations of observations, in which he associated and detailed the preserved specimens and the disease histories.[186] They were descriptive in nature and included illustrations, as pictured above. These discussed preparations from the collection, including the patient history and other similar cases from academic literature.[187]

Collections that were organized uniquely in terms of spaces on shelves indicated small or manageable numbers. Translating the shelf contents to catalogue pages, between 1820 and 1857, echoed larger numbers and cataloguing involved significant reductionism. Once accumulated, classified and put into order however, the world of preparations could be parallelled and aligned with other worlds and ways of knowing. This was the case of the anatomo-clinical method associating pathologist findings with medical case histories. The pages of the catalogues could be shuffled and compared with disease histories. This echoes the series of patient histories described by Volker Hess and Andrew Mendelsohn.[188] It also resembles the idea behind the unique and strategic natural history catalogues of John Edward Gray at the British museum.[189] Each species in the British museum catalogue was written on a separate leaf, which could then be redistributed and rebound differently or according to different classification rules.

Knowledge production was based on the underlying categorization process, but it was simultaneously a form of "paper technology" linked to administrative and bureaucratic practice. As catalogue entries, specimens became numbers and names. Specimens travelled from the morgue to shelves of a cabinet in an anatomy theatre or a museum and to the pages of a catalogue. They were further published for local and international consultation and as

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[185] Photo: T. Close-Koenig

[186] Charles Henri Ehrmann, *Observations d'anatomie pathologique, accompagnées de l'histoire des maladies qui s'y rapportent et dont les pièces sont conservées au musée de la Faculté de médecine de Strasbourg*. (Strasbourg: Veuve Berger-Levrault, 1863).

[187] Charles Henri Ehrmann, *Structure des artères, leurs propriétés, leurs fonctions et leurs altérations organiques*, 1 vols. (Strasbourg: F. G. Levrault, 1822); Charles Henri Ehrmann, *Musée anatomique de la Faculté de médecine de Strasbourg. Histoire des polypes du larynx.* (Strasbourg: Vve Berger-Levrault, 1850); Charles Henri Ehrmann, *Musée d'anatomie de la Faculté de médecine de Strasbourg. Description de deux foetus monstres, dont l'un acéphale et l'autre monopode* (Strasbourg: Berger-Levrault, 1852); Ehrmann, *Observations d'anatomie pathologique, accompagnées de l'histoire des maladies qui s'y rapportent et dont les pièces sont conservées au musée de la Faculté de médecine de Strasbourg.*

[188] Volker Hess and J. Andrew Mendelsohn, "Case and series: Medical knowledge and paper technology, 1600-1900," *History of Science* 48 (2010): 287-314; Nick Hopwood, Simon Schaffer, and Jim Secord, "Seriality and scientific objects in the nineteenth century," *History of Science* 48 (2010): 251-285.

[189] Gordon McOuat, "Cataloguing power: Delineating 'competent naturalists' and the meaning of species in the British Museum," *British Journal of the History of Science* 34 (2001): 1-28; Gordon McOuat, "From cutting nature at its joints to measuring it: New kinds and new kinds of people in biology," *Studies in History and Philosophy of Science* 32, no. 4 (2001): 613-645.

such contributed to a collective of publications.[190] Lobstein and Ehrmann placed particular emphasis on the categories chosen for ordering the collection. This was an important part of managing the museum, but also of understanding (and presenting) anatomy and disease. By attributing each prepared specimen a reference number it could be easily located on the museum shelves. This was a directory specifying the number and placement of stocked goods. and such a list of goods or materials might equally form a stocklist or inventory. This is in concordance with Pickstone's description of natural history as a register of facts or inventory.[191]

French national inventory, 1844-1868

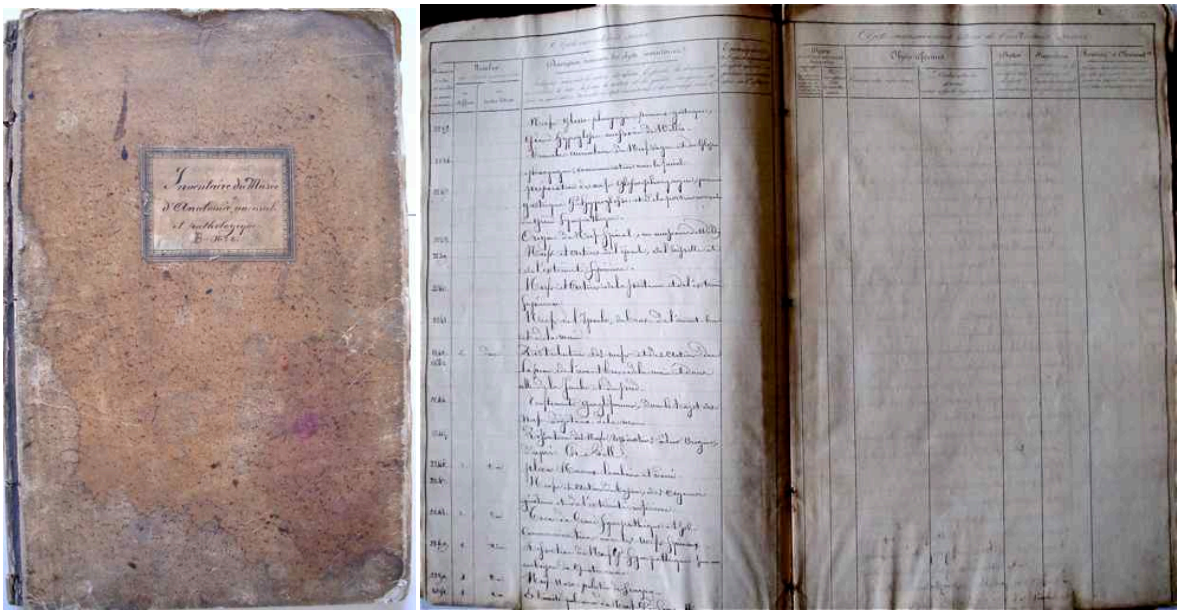

Figure 2.25 Public inventory title page and sample inventory lists.

An inventory of the collection was kept until 1868.[192] Inscribed in the front page of the inventory ledgers: *En execution de l'article 8 de la loi du 26 juillet 1829 et de l'arrêté du conseil royal de l'instruction publique du 17 octobre de la même année*. This was an inventory of public property. The formatted pages of the inventory registers put columns for

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[190] Which would include, amongst innumerous others: Thibert, *Musée d'anatomie pathologique. Bibliothèque de médecine et de chirurgie pratiques, réprésentant en relief les altérations morbides du corps humain..*; Houel, *Manuel d'anatomie pathologique générale et appliquée*; Houel, *Catalogue des pièces du Musée Dupuytren*; Devergie, *Musée de l'Hôpital Saint-Louis*.

[191] Terms used by John Pickstone in contrasting natural history and natural philosophy, the latter being a matter of causes and explanation. Pickstone, *Ways of knowing*, 60.

[192] *Inventaire du Musée d'Anatomie normale et pathologique - B n° 2.* As well as: *Inventaire des objets mobiliers du Musée d'Anatomie - B n° 3. Inventaire de l'amphithéâtre d'Anatomie et les salls de dissection - H.* AIAPS.

inventory description on the left side. The right side was for indicating and justifying the discarding of material. There was no principal organising feature in claiming property rights and since the scientific catalogue existed, it was simply recopied.

This was an inventory of goods or property for an outside authority, aiming to count them and signed by an accountant. Contrary to the catalogues, an inventory of public capital was not intellectually, but bureaucratically motivated. This was the same as the inventory of furniture or of instruments in the anatomy theatre.

German handwritten catalogue, 1872-1918

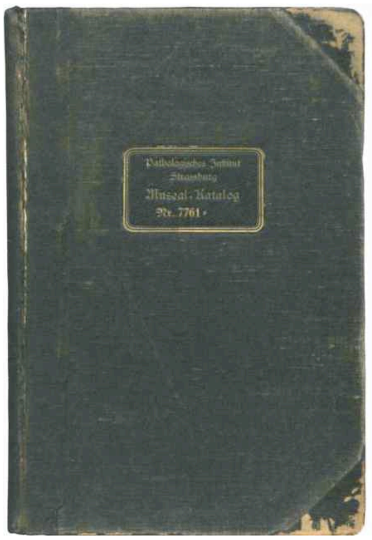

Figure 2.26 ***Pathologisches Institut Museal Katalog. Band 4.***[193]

A third form of catalogue was created for this collection after the Franco-Prussian military hostilities under the new German rule.[194] Contrary to the earlier two, the books were large black hardcovered volumes and the title was in German. New masters implied new schemes of classification, and re-organizing meant re-appropriation. In the 1872 university re-construction, the collections were definitively separated in time and in space. The independent pathological anatomy institute aspired to its own separate collection.

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[193] Reproduced from: Le Minor et al. *Anatomie(s) et Pathologies,* 139

[194] Under the German Empire of 1871-1918, the territory, including and surrounding Strasbourg, constituted the Reichsland or Imperial Province of Elsass-Lothringen. The area was administered directly by the imperial government in Berlin and corresponded to the French départements of Bas-Rhin (in its entirety), Haut-Rhin (except the area of Belfort and Montbéliard), and a small area in the northeast of the Vosges département, all of which made up Alsace, and the départements of Moselle (four-fifths of it) and the northeast of Meurthe (one-third of Meurthe), which were the eastern part of Lorraine.

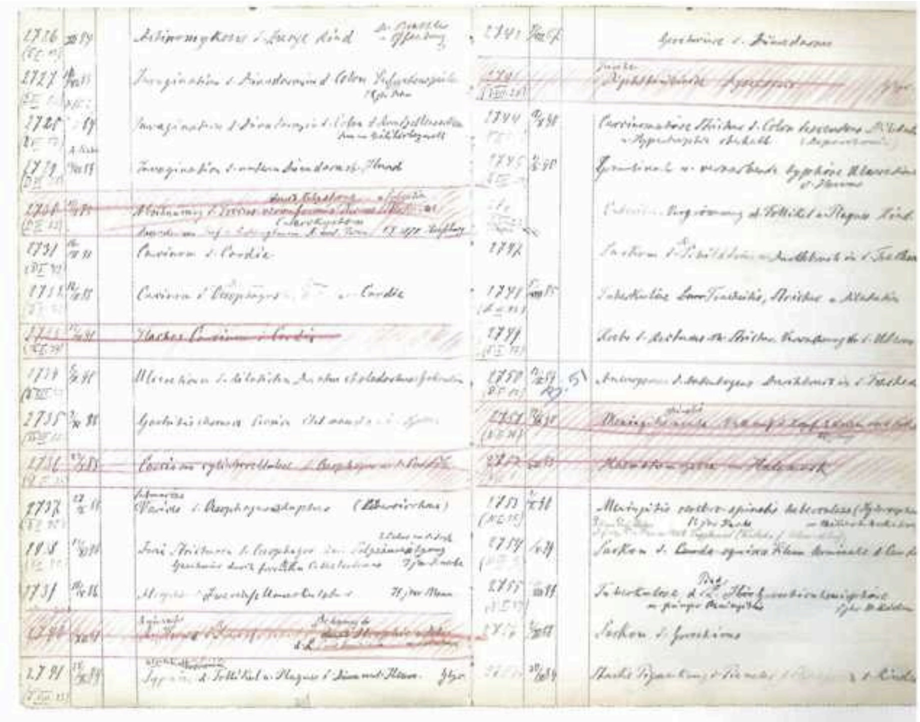

Figure 2.27 ***Pathologisches Institut Museal Katalog. Band 1.***
The cover and a page from the first volume (n° 1 to 3511) of the museum catalogue of the *Institut d'Anatomie Pathologique* illustrating entries 2726 to 2757. This volume was prepared and upkept by Recklinghausen from 1872.[195]

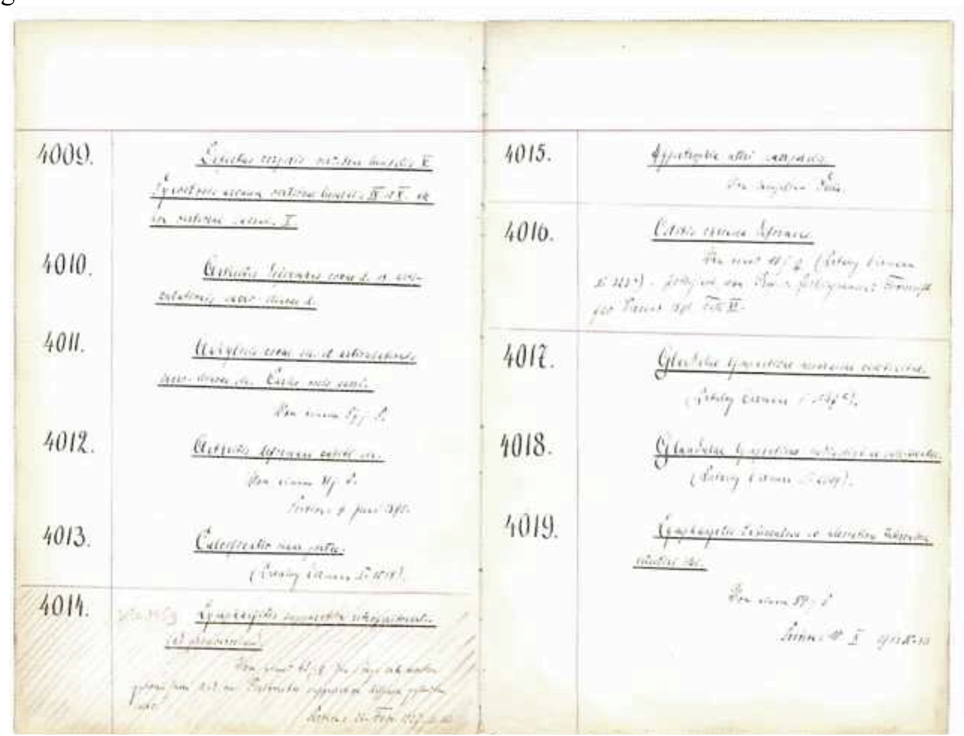

Figure 2.28 ***Pathologisches Institut Museal Katalog. Band 2.***
A page from the second volume (n° 3512 to 5708) of the museum catalogue of the *Institut d'Anatomie Pathologique* illustrating entries 4009 to 4019. This volume was prepared and upkept by Hans Chiari from 1906.[196]

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[195] Reproduced from: Le Minor et al. *Anatomie(s) et Pathologies,* 139
[196] Reproduced from: Le Minor et al. *Anatomie(s) et Pathologies,* 139

From 1872 to 1906, Friedrich Daniel von Recklinghausen (1833-1910) maintained a general catalogue of the pathological collection titled *Pathologisches Institut Strassburg Museal-Katalog*.[197] The director (*Ordentliche Professor*), Recklinghausen, was appointed prosector.[198] In the late nineteenth century, as a service to physicians and the hospital, the institute performed autopsies and gross organ examination to study and confirm diagnosis.[199] Novel organ lesion or tissue equally served research and figured in academic publications.[200] New specimens to the collection were inventoried, that is registered chronologically in a catalogue. These were principally specimens from autopsies performed in the pathology institute, as well as donations. The entries anterior to 1872 from the anatomy museum were renumbered and were described in German. They were, however, accompanied by the corresponding excerpt of Ehrmann's 1843 catalogue.

The entries in collection catalogues described the material entering the institute; the input. The entries were numbered, their source was at times indicated, and they were described. Recklinghausen's general catalogue (Volume I) was maintained from 1872 to 1906, including entries 1 to 3511. The pages were divided into four columns. The first indicated the entry number, 1 to 3511, and the corresponding number of the sub-collection. In the second column the year the specimen entered the collection; frequently indicating the date of the autopsy. The third column specified the source, the name of the donor or the reference from Ehrmann's 1843 catalogue. The last column described the piece and at times made reference to a scientific publication in which the piece figured.

The later three catalogue volumes (II-IV) were maintained by Recklinghausen's successors: Hans Chiari recorded entries 3512 to 8087 between 1906 and 1916; Georg Benno Grüber and Max Busch completed entries 8088 to 8174; and the last entries, 8174 to 8329, by Johann Georg Mönckberg. The entries in these three volumes were slightly different from the first volume. The entry number was written in bold characters either in the margin or above a text written in German. The text provided details of the clinical history, name and origin of

[197] Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 196.
[198] Recklinghausen's activities and personal contributions has been considered representative of the medical school of the KWU in Strasbourg. See Bonah, "Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXeme siècle," Chapter 8.
[199] The autopsy performed by the pathologist was an act of disease identification and an act of discovery. That is, superposing internal lesions and external complaints or symptoms indirectly served the clinic, by educating physicians and medical students.
[200] The role of the post-mortem examination for diagnosis (as education) and for research continued to the mid-twentieth century as systematic autopsies were performed at the Institut d'Anatomie Pathologique in Strasbourg. In the latter twentieth century, they figured more prominently in legal medicine than in routine practice. Philippe, "Louis Frühling."

donation, date of arrival in the institute or the date of the autopsy. By 1918, the *Museal* catalogue's 8329 entries filled four volumes.

These volumes were a Germanization of the French pathological anatomy collection. In some respects they almost appear to be a continuity of the French catalogues, albeit, handwritten like a notebook. On the other hand, the German museum catalogues differed significantly from the prior catalogues. From Lobstein to Ehrmann, the published catalogues expressed scientific classification and order as central. They were scientifically organized. This organization meant that earlier catalogues needed to be extended with "supplement" publications, that were difficult to integrate into a vision of the whole. However scientific system prevailed in collecting practices. This is how the German catalogues broke with prior inventories. Starting with Recklinghausen's catalogue, the chronological organisation of entries, void of categorization, makes it simply an index in which the reference numbers of the preparations were recorded. Handwritten and practical, this catalogue was a working tool compiled by a medical scientist and not a justification to outsiders, be they scientific peers or state authorities.

Recklinghausen kept a second catalogue, however, the *Pathologisches Institut Strassburg Systematischer Katalog bis 1906,* in which he classified the entries into 16 sub-collections.[201] This *Systematischer* or categorized catalogue reproduced and slightly rearranged prior French catalogues. It represented therefore a transitory regime between old and new rules of the university, but also between collections as tools for knowledge production and knowledge presentation. The German systematic catalogue was abandoned in 1906, after Recklinghausen's departure.

The means of organizing catalogue entries chronologically by Recklinghausen, as well as his successors, is revealing of accumulation and of collection exploitation. A shift is marked by the modification in cataloguing practices. The discarding of a categorized catalogue, like those published between 1820 and 1863 and that maintained from 1872 to 1906, suggests that such organisation was no longer central to analytical methods. The recording of entries according to their chronological preparation, from 1872, echoes very large numbers, and suggests that categorization was complex or time-consuming and did not merit the time it took.

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[201] Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 197. These included : A. Angeborene Krankheiten, B. Blutgefässe, C. Chylus und Lymphgefässe. Milz, D. Digestionsapp. Und – drüsen, E. Entound Epizoen, F. Genitalien (Frauen), G. Genitalien (Männer), H. Harnapparat, I. Nebennieren, Schilddrüse und Thymus, K. Knochen a. feucht, b. trocken, L. Lungen und Luftwege, M. Muskeln, N. Nerenapparat, O. Ohr und Aug, P. Haut, T. Tumoren.

The preparations in the collections were amassed with increasing rapidity. William H. Welch noted the large quantity of material while he was studying in Strasbourg in 1876:

> "I am astonished at the amount of pathological material here. There must be a frightful mortality somewhere."[202]

and

> "What fills me with wonder is the amount of pathological material which Recklinghausen shows us three times a week. Although Strassburg has only about 100,000 inhabitants, it is more material than accumulated in New York in a long time. There must be a terrible manslaughtering somewhere."[203]

The scale of the collection can be deduced from a 1919 account of the *Institut Anatomie*, which described the building as "invaded" by its collections.[204] The catalogues and the manner in which entries were recorded reflect this. The increased quantity naturally ensued in changing practices. But as the 1919 observation indicates, collections came to invade laboratories when preparation collection and classification were no longer prime foci, but conceived as cumbersome installations.

In the *Museal* catalogue, Recklinghausen organized data entry in columns. The pages resemble a ledger or logbook in appearance. The books themselves, from 1872 onward, were large black volumes; similar to those lining the shelves of a bookkeepers office. Although catalogue entries were qualitative and not quantitative entries, the record keeping may be parallelled to accounting records, and more specifically to inventory. Inventory management was an information processing technology developed at about the turn of the century as a means of valuation in industry.[205] It was not unlike data management in natural history collection. As mentioned above, Pickstone described natural history as register of facts or

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[202] William H. Welch to his father, 22 May 1876. WeIW. III/A. File 68/1-15 AJH. Excerpts of letters from these archives were communicated to Christian Bonah by Robert G. Frank, Jr.: MS 714 Robert Frank. Recklinghausen spent two hours twice a week exhibiting the pathological specimens accumulated during the week, displayed on a 30 foot long table.

[203] William H. Welch to Fred Dennis, 1 July 1876. Frederic S. Dennis collection. NYAMA. Excerpts of letters from these archives were communicated to Christian Bonah by Robert G. Frank, Jr.: MS 714 Robert Frank.

[204] *Travaux de l'Université de Strasbourg pendant l'année scolaire 1919-1920. Rapports présentés par le conseil de l'université et par MM. les doyens des facultés* (Strasbourg: Imprimerie Alsacienne, 1921), 59.

[205] Around 1880 there was a change in manufacturing practice from companies with relatively homogeneous lines of products to vertically integrated companies with unprecedented diversity in processes and products. Those companies (especially in metalworking) attempted to achieve success through economies of scope - the gains of jointly producing two or more products in one facility. The managers needed information on the effect of product mix decisions on overall profits and therefore needed accurate product cost information. A variety of attempts to achieve this were unsuccessful due to the huge overhead of information processing of the time. However, the burgeoning need for financial reporting after 1900 created financial accounting of stock. See Chapter 3 and Chapter 6 of: H. Thomas Johnson and Robert S. Kaplan, *Relevance lost: The rise and fall of management accounting* (Cambridge, MA: Harvard Business Press, 1991). Chandler also discussed the growing importance of inventory recordkeeping in depression era American industries, Chandler, *Strategy and structure*.

inventory.[206] It was also not unlike inventories prepared and maintained of public capital.[207] The presence of the piece was written in black ink and pieces disposed of were signaled with red lines. Further information was also inscribed, such as reference to academic publications in which it appeared. This was not just property value, but scientific value.

2.3.2 Collection as Capital

The inventory kept between 1844 and 1868 indicates that the state considered the collection pieces to be public property. In addition to property capital, the use of the collection pieces in Ehrmann's *Observations* and in Recklinghausen's publications, indicate that the collection pieces were exploited as scientific value. However, these were pieces that had been prepared from body parts. Leaving ethical issues aside, it might be useful to explore briefly what and how these pieces were considered (to be) material.

Leichenmaterial

The word *material* has multiple uses and is adjective and noun. Originally and primarily it is defined as "pertaining to matter."[208] However, it equally implies opposition to immaterial or spiritual.[209] This term is not commonly associated with humans.[210] Labelling or referring to human corpses and body parts as material may be surprising or disconcerting. Yet the term was used in this context. In late nineteenth century German medical schools, patients were called *Krankenmaterial* and corpses were labelled *Leichenmaterial*.[211] Corpses had long been material for research and teaching. This chapter has explored, for example, the sources and the roles of material in anatomy and pathological anatomy historically.

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[206] Terms used by John Pickstone in contrasting natural history and natural philosophy, the latter being a matter of causes and explanation. Pickstone, *Ways of knowing*, 60.

[207] The appropriation of the anatomy theatre and collection by the *Ecole de Santé* in 1795, according to a preliminary inventory of its contents by the professor, would be an example. Procès verbal du 9 octobre 1797: "*portant que ledit inventaire dressé en double a été côté et paraphé ne varietur et que la remise des objets y désignés a été faite entre les mains du citoyen Tinchant conservateur de l'école susmentionnée aux fins de mise à la disposition de cette école d'iceux par l'extradition des clefs dudit cabinet anatomique contre récépissé du conservateur.*" Cited by Le Minor et al., *Anatomie(s) & pathologies. Les collections morphologiques de la Faculté de Médecine de Strasbourg*, 24-25.

[208] "material," *Online Etymology Dictionary*, n.d., http://www.etymonline.com/index.php?term=material.

[209] In philosophical contexts, materialists deny the existence of spirit and look for physical explanations for all phenomena.

[210] Slavery would be the exception. On related questions see: Baud, *L'affaire de la main volée. Une histoire juridique du corps*.

[211] Bonah, "Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXeme siècle," 591.

In the 1870s, *Krankenmaterial* (sick material) was a term used in discussions of teaching and learning in German universities.[212] Similarly, patients were referred to as the "raw material of medical science" in 1874 by French physiologist and politician, Paul Bert.[213] Access to patients was a prerequisite in the establishment of a German medical faculty in Strasbourg in 1872, in order to fulfill the research imperative of modern German universities.[214] There was equally a second category of material needed for research and teaching in the medical faculty, *Leichenmaterial* (cadaveric material). Friedrich von Recklinghausen underlined the importance and abundance of *Leichenmaterial* available to him.[215] In 1877, he advocated three conditions for the new pathology institute: light, air and cadavers. Recklinghausen, as prosector of the *Bürgerspital*, receptioned corpses from the hospital for autopsy, thereby accessing a rich source of dissection material. The pathology institute was built in proximity to the *Bürgerspital* and corpses could be transported through an underground tunnel between the two buildings.[216] Welch, quoted above, expressed his awe in the quantity of this material.

Designation of patients and corpses as material supports Helen MacDonald's argument that the sanctity of human bodies disappeared from the viewpoint of "medical men." She describes dissection in pre-1832 Commonwealth: the "successive erasure of identity from the moment of death. By the time a man wrote up his work, the process was complete. Human beings had been reduced to their gender, age, cause of death and anatomical peculiarities."[217] She traces the process as one of transformation. Corpses have herein been identified historically as material in medical (and especially anatomy) contexts. This history has also been read in terms of politics and power by Michel Foucault.[218] He historicizes modern

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[212] Christian Bonah, "For patients' well-being or for science? Knowledge, patient care, and medical institutions in upheaval: The cases of Strasbourg and Nancy, 1870-1914," Manuscript, 2011, 1. cites Theodor Billroth, *Über das Lehren und Lernen der medicinischen Wissenschaften an den Universitäten der deutschen Nation*, Wien: Gerold's Sohn, 1876.

[213] Ibid., 3. cites Paul Bert, *Rapport de la commission chargée d'examiner les propositions de création de Facultés de médecine,* Procès verbaux de l'Assemblée Nationale, volume 32, N° 2293, Paris, 16.03.1874: 582-651, 605.

[214] Ibid., 6. cites Billroth, 1876, 36-42.

[215] Bonah, "Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXeme siècle," 598; 617.

[216] Ibid., 617. cites Friedrich von Recklinghausen, *Rede zur Eröffnung des Neubaus für die anatomische und pathologische Anstalt der KWU Strassburg, 29.10.1877*. éd. Fischbach, Strassburg, 1877, 7. Recklinghausen stated that the quantity of cadavers was largely superior to other universities in German.

[217] Helen MacDonald, *Human remains, dissection and its histories* (New Haven and London: Yale University Press, 2006), 155.

[218] Foucault, *Naissance de la clinique*; Isabelle von Bueltzingsloewen, "Enseignement clinique et médicalisation de la société dans l'Allemagne des XVIIIème et XIXème siècle" (Thèse de doctorat d'histoire, Lyon: Université Lyon 2, 1992); Isabelle von Bueltzingsloewen, *Machines à instruire, machines à guérir : les hôpitaux*

medicine, in part, via patients as scientific objects, notably after their death and with the anatomo-clinic method: "It is when death became the concrete a priori of medical experience that death could detach itself from counter-nature and become *embodied* in the living *bodies* of individuals."[219] This history has also been read by Gregoire Chamayou who asks whose bodies are those that can become cadaveric material for medical science.[220] They have not yet, however, been considered in economic contexts, as stated in the opening of the chapter.[221]

Stock & turnover

A list of materials is an inventory. Inventory management is primarily about specifying the number and placement of stocked goods. By attributing each prepared piece a reference number it could be easily located on a shelf and as such placed physically and theoretically alongside other pieces. In the nineteenth century, there were catalogues and inventories of the anatomy collection that did exactly this.

Inventory represents one of the most important assets that most businesses possess. An accounting practice. This is usually because the turnover of inventory represents one of the primary sources of revenue generation and subsequent earnings. Like commerical stock, they figured in inventories and were stored in warehouses. However, usual commercial tendencies are to keep stock low by adapting merchandize flow between entry and delivery. The logic being that accumulation engenders more overhead costs. However, in the case of the pathology collections and museums, this was the contrary, the accumulation of inventory was

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universitaires et la médicalisation de la société allemande : 1730-1850 (Lyon: Presses universitaires de Lyon, 1997).

These works and their exploration of clinics may provide a thread of interest. With hospital or clinic medicine, patients were admitted to hospital facilities. They were provided with care and necessities. There may be an underlying exchange or right to their corpse for autopsy or dissection after their death. This is an idea that may merit further study.

[219] Foucault, *The birth of the clinic*, 243.

[220] Chamayou, *Les corps vils*.

[221] Albeit a rising interest in commodification of bodies does address this on the contemporary front. Cf. E. Richard Gold, *Body parts: Property rights and the ownership of human biological materials* (Washington, D.C: Georgetown University Press, 1996); Lesley A. Sharp, "The commodification of the body and Its parts," *Annual Review of Anthropology* 29 (2000): 287-328; Robert Mitchell, "Owning shit: Commodification and body wastes," *Bad Subjects* 55 (2001), http://eserver.org/bs/55/mitchell.html; Lori Andrews and Dorothy Nelkin, *Body bazaar: The market for human tissue in the biotechnology age* (New York: Crown Publishers, 2001); Nancy Scheper-Hughes and Loïc Wacquant, eds., *Commodifying Bodies* (London: Sage Publications, 2002); Robert Mitchell, "$ell: Body wastes, information and commodification," in *Data made flesh: Embodying information*, ed. Robert Mitchell and Phillip Thurtle (New York: Routledge, 2003), 121-136; Michele Goodwin, *Black markets: The supply and demand of body parts* (Cambridge: Cambridge University Press, 2006); Catherine Waldby and Robert Mitchell, *Tissue economies: Blood, organs, and cell lines in late capitalism* (Durham, NC: Duke University Press, 2006); Lesley A. Sharp, *Bodies, commodities, and biotechnologies* (New York: Columbia University Press, 2009).

of particular interest and value was stocked. The material was accumulated, not usually in a commercial or sales exchange, but largely in (unproclaimed) donation or gift exchange.

There were however a number of financial and commercial exchanges that involved dissection and collection activities. The anatomy demonstrations performed in Strasbourg in the late seventeenth century offered a supply of human fat for pharmaceutical and medical use.[222] This byproduct was sold to pharmacies for pharmaceutical preparations.

Further, collection pieces prepared by prosectors, municipal employees were later sold as private collections to the medical school. For example, the first municipal prosector, May assembled a private collection of preparations, which was eventually purchased by the municipality for the medical school.[223] Incidentally, there was something of a war with the prosectors [*Prosectorenkrieg*] that began with Jacob and his financial ambitions. Later, Isengarth, prosector, and Professor Jean Frédéric Lobstein (1736-1784) waged feud.[224] It is possible that this was related to the opportunistic sale of the prosectors' private collections; opportunistic as their collections were obtained through their day job. The prosecture activity held other commercial or financial "perks." There were means of topping up one's salary if working with the corpses. Cadavers and body parts were also dissected in private lectures in exchange for student fees. The first prosectors, May and Hommel, gave private anatomy and surgery demonstrations in the evenings.[225] That is, they brought corpses to their homes to use for private, paying anatomy classes.[226] This illustrates an ambuigity in the propriety of the corpses and of the preparations.

After the collection officially became an anatomy museum, there were additional private collections and individual preparations that were bought by the medical school: for example in the early 1820s, the purchase of Dr. Sultzer's private collection or the purchase of artificial anatomy models in the late nineteenth century.

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[222] Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 47. On human fat for pharmaceutical and medical use, Le Minor cites: *Pharmacopeia Argentoratensis. Catalogus medicamentorum tam simplicium quam compositorum in officinis pharmaceuticis Argentinensibus usualium, Strasbourg, 1725, 10 ; Pharmacopeia Argentoratensis. Catalogus et taxatio medicamentorum tam simplicium quam compositorum quae in officinis pharmaceuticis civitatis Argentinensis prostant et prostare debent…* (Strasbourg, 1725), 13-14.

[223] The city paid *3500 Livres Tournois*. Taking the price of eggs as a reference, the value of 1 Livre Tournois is about 8 Euros and the collection could be claimed to have sold for about 28000 Euros.

[224] Louis François Hollender and Emmanuelle During-Hollender, "La chirurgie entre enfin à l'Université," in *L'Histoire de la médecine à Strasbourg*, ed. Jacques Héran (Strasbourg: La Nuée Bleue, 1997), 125.; Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 63. cites F. Wieger, *Geschichte der Medicin und ihrer Lehranstalten in Strassburg vom Jahre 1497 bis zum Jahre 1872.* (Strasbourg: Trübner ed., 1885).

[225] Hollender and During-Hollender, "La chirurgie entre enfin à l'Université."

[226] Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 65.

Whereas the corpses, cadaveric material, anatomy preparations and models are considered material, are transformed from raw to end product (with added value) and are acquired through exchange, donation or transaction, the anatomy collection was central to an anatomy entreprise. The catalogues and inventory format confirm this. The maintaining of a list of preparations echoes a theme of order and the practice of filing.[227]

Delphine Gardey explains that filing practices traditionally interests three social spaces: “office spaces and administrative world; library and book spaces; laboratory spaces and scientific knowledge.”[228] The anatomy and pathological anatomy theatre, museums and institute all sat on the cusp between these social spaces. As such, the recordkeeping devices of the anatomy collection resemble the forms used in accounting and bookkeeping on multiple levels.

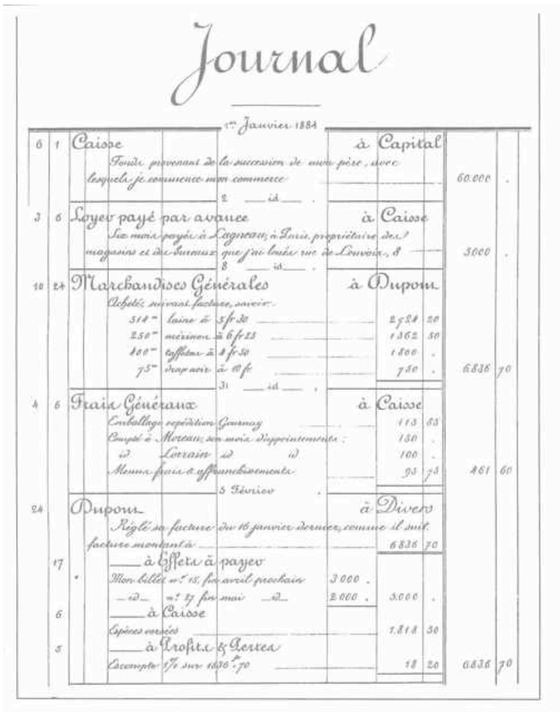

Figure 2.29 An accounting ledger, 1882.
This was a model for bookkeeping.[229]

[227] Ted Porter has emphasized that effective quantification is never a matter simply of discovery, but always also of administration, hence of social and technological power. Quantitative objectivity is in a way a form of standardization, the use of rules to confine and tame the personal and subjective. In his work, he has inverted the usual account of the relations between natural and social science, by showing how some of the crucial assumptions and methods of science began in social science or even as a feature of administrative practices. Theodore M Porter, *Trust in numbers. The pursuit of objectivity in science and public life* (Princeton, NJ: Princeton University Press, 1995).
[228] Gardey, *Écrire, calculer, classer*, 147.
[229] Source: Gabriel Cassagne, *L'écriture commerciale et administrative, cours théorique et pratique.* (Delagrave, Paris), 1882. Reproduced in: Gardey, *Écrire, calculer, classer*.

The museum catalogues resemble accounting ledgers on a superficial level. The page layout and entry of information in columns and rows pictured here looks similar to the French inventory and to Recklinghausen's catalogues.

The administrative tasks, such as recordkeeping, involved in managing material input and output was precursor to laboratory administration and concurrent to hospital administration. Example of their crossover is illustrated in these 1916 photos of the bacteriology laboratory of the military hospital in Strasbourg.

Figure 2.30 Bookkeeping at the Lazaret military hospital in Strasbourg, 1916. [230]

Upon first glance these two administrative offices are and look identical. Both feature employees involved in recording and bookkeeping activities. In fact, the upper photo is the *Bakteriologische Buchführung* – bacteriology bookkeeping – of the Lazaret military hospital in Strasbourg and the lower the *Verwaltung* – administration – of the Lazaret military

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[230] Source: "Hôpital, Lazaret, Intérieur" *Das Festungs-Lazarett* (Strassburg im Elsass, 1916): 10.

hospital. They both show three desks with large open books on them and three administrative employees inscribing data. They both have large charts on the wall behind them. The upper image with the graphs on the wall is the bacteriology administration and the lower with the map of Europe and the chalkboard is the hospital administration. Both photos date to 1916. There were about 2340 bacteriology specimens to examine per month or 78 per day.[231] This required order and administration.

Similarly, the paper materials produced by pathologists at the medical school in Strasbourg structured and traced their activities. Inventories recorded what was stocked. Bookkeeping is the recording of financial transactions, including sales, purchases, income, and payments. The pathology records equally record transactions, albeit they were not limited to financial transactions.

2.3.3 Collection as knowledge

These recording practices were not only means of administration and inventory. They trace knowledge production. Volker Hess and Andrew Mendelsohn have argued that paper technologies went beyond organizing and storing knowledge, to producing knowledge.[232]

The museum catalogues, as a directory specifying the number and placement of stocked goods, were designed to ease the collection, organisation, and storing of knowledge. The museum collection was organized and re-organized on shelves and in catalogues to present and reveal knowledge of anatomy and disease. But they were also re-organized in boxes and in other publications. In the preface to the 1820 catalogue, Lobstein identified natural science museums as ordering all that is scattered in disarray over the globe.[233] Collections that were organized uniquely in terms of spaces on shelves indicated small or manageable numbers. Translating the shelf contents to catalogue pages, between 1820 and 1857, echoed larger numbers and cataloguing involved significant reductionism. Once accumulated, however, the pages of the catalogues could be shuffled and compiled in disease histories, like the series of patient histories described by Hess and Mendelsohn.[234] Knowledge production in the nineteenth century was based on an underlying categorization process that involved paper technologies.

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[231] This count is based on the number of boxes in another photo, pictured below in Figure 3.15.
[232] Hess and Mendelsohn, "Case and series."
[233] Lobstein, *Compte rendu a la Faculté de Médecine de Strasbourg sur l'etat actuel de son muséum anatomique*, 1.
[234] Hess and Mendelsohn, "Case and series"; Hopwood, Schaffer, and Secord, "Seriality and scientific objects in the nineteenth century."

A similar process is witnessed with Recklinghausen's German catalogues. Nearly 5000 preparations were integrated into the collection catalogue in the ten years after Recklinghausen's departure. Categorization was not the knowledge producing process: the categorized catalogue was not continued by Recklinghausen's successors. This explosion in collection size may have compromised categorization, but it rendered inventory management all the more necessary.

Paper technologies are behind the practices of Strasbourg anatomists and pathologists. The writings on the pages of catalogues are testimonies of materials and practices of the pathological anatomy museum and workspaces, the increasing accumulation of anatomy preparations, and of political shifts. But they are more than historical sources. They are integral to knowledge production processes. Catalogues and inventories were kept as material registries as early as the eighteenth century and throughout the nineteenth century. Pathologists extracted records from the catalogues and combined them to establish and document disease in a analytical way of knowing. State inventory, on the contrary, remained but an inventory.

Collecting and exhibiting anatomy and pathological anatomy preparations from the seventeenth to the nineteenth century was an enterprise of scientific, social, and economic nature. Collections were progressively assembled in a longstanding effort of preserving, preparing, and inventorying. They were first and foremost scientific and didactic tools, but they also became artistic collections of natural history and human body. Through their public use they integrated scientific knowledge with cultural and economic value. Inventories thus became not just scientific classifications, but administrative and bureaucratic lists of objects and property, icons of scientific and economic wealth. By the nineteenth century, collections received buildings and organizational structures that established them as independent entities alongside other museum collections of arts and crafts. The age of museum medicine declined in the late nineteenth century with laboratories replacing collections and museums as places of knowledge production.

Pathologists continued to extract records and combine them to document disease into the twentieth (and even twenty-first) century, but in laboratories instead of musems. In the next chapter, how the anatomopathology laboratory became a place of production that emulated manufacturing management and practices is portrayed. Production refers to the economic process of converting of inputs into outputs. Production uses resources and materials to create goods or services that are suitable for exchange. Corpses remained materials around which pathological anatomy economies were structured, but the scale and the nature of production moved from gross to microscopic structures. Laboratories, like collections and museums, were not just a place of production of medical knowledge, but a place in which material circulated, was transformed, stocked and exchanged.

Chapter 3

Preparing slides & producing knowledge

The creation of histopathology knowledge and expertise in medical school research in interwar Strasbourg

Introductory material. The indexed slides.

The thousands of numbered and indexed boxes of *Institut d'Anatomie Pathologique* microscope slides are issue of pathological anatomy collecting and adjacent recordkeeping processes. Presently these are stored in the attic of Strasbourg's *Insitut d'Anatomie Pathologique* building. The attic has stairs leading down to an autopsy room. The large room is lined with shelves. At one time, it is likely that this was a serviceable reserve. Many of the shelves hold dusty aged jars of preparations. These are the remaining traces and pieces of the pathological anatomy collection. The museum was dismantled and moved to the attic in 1936.

Figure 3.1 Some of the remnants of Strasbourg's pathology collection.[1]

[1] Photo on the left: T. Close-Koenig. Photo on the right reproduced from Le Minor et al. *Anatomie(s) et Pathologies*, 126.

Figure 3.2 Shelves of microscope slides and pieces embedded in parafin, Strasbourg.[2]

In place of gross preparations, microscopes and microscope slides took a prominent role in research and in teaching and practical laboratory exercises. As such, gross preparations are not the only relics. There are shelves of boxes; boxes are labelled with a series of numbers and containing histology slides. These witness the new format of specimens: microscope preparations. This involved very different preparation techniques, but also, very different visualization techniques, both of which stemmed from laboratory settings. The large number of slides illustrate that although practices and workspaces changed, collecting remained important.

[2] Photos: T. Close-Koenig

Figure 3.3 Shelves of pathological anatomy registries, Strasbourg.[3]

Alongside these shelves are cabinets housing hundreds and hundreds of black hardcover books. These resemble ledgers. They did not record financial accounts of the institute, but like the catalogues described in the previous chapter, they recount pathological anatomy material and practices.[4]

Figure 3.4 Book one.

The first book is labelled on the spine with the number 1. Entry n° 1 in the book is dated 14 March 1919. This book recorded histological examinations. This book indicates two beginnings. First, the beginning of an new era in the medical school and this insitute from January 1919. Alsace returned to French rule after World War I. The French university officially opened on 22 November 1919. The full nominated teaching staff arrived in Strasbourg for 15 October 1919. On 19 November 1919, the professorial chairs were created

[3] Photos: T. Close-Koenig

[4] Paper records were produced by anatomo-pathologists at Strasbourg's medical school throughout the nineteenth and twentieth century. In the nineteenth century, these included six catalogues published between 1820 and 1857, one inventory volume on the collection maintained between 1844 and 1868, and two series of manuscript catalogues begun in 1872. In the twentieth century, the volumes produced fill shelves and shelves of cupboards in the attic and basement of the institute.

by decree of the French president.[5] The medical school, and other scientific institutes of the German university, were not abandoned and empty in the months between the armistice and the inauguration of the French medical school. On 9 January 1919, Georges Weiss was named provisional administrator. French medical professors from other institutions were sent to Strasbourg on temporary missions help re-organize the medical school. Classes began as early as 15 January 1919. Pierre Masson arrived in January 1919 to reorganize the formerly German pathology institute. The institute had been built as the first building of the German medical school in the 1870s. Secondly, this marks the beginning of an activity centered on histological, and particularly histopathological, practices.

This chapter shows how changing practices in histopathology museums succumbed to laboratories and gross preparations to microscope slides. The first section examines the appropriation of the pathological anatomy institute by the French, and notably by Pierre Masson. This involves describing what had been left behind, from the building of the institute to the prosecture activity, and how it was re-organised. The second section turns to following the raw materials coming into the institute. A post-mortem activity continued, but Masson complemented this material with another type of material, surgical pieces. The third section examines the material transformation of biological samples and the production of histology slides, something that Masson was particularly renowned for. The last section is about an intellectual transformation of the sample by the informing of slides via staining and classifying. Tissue and cellular structure identification is at the root of histopathology, which looks to identify morphological structure with diseases, their evolution, and their causes. The preparation of histology slides involved the physical and chemical transformation of a tissue sample, fixing, embedding, sectioning and staining it. Staining rendered some types of tissue and cells, and therefore that structure, visible. In establishing disease identities, there is a scheme of informing stained tissue of what they reveal or represent. As such, there was a double embedding of tissue samples: they were embedded in paraffin and preserved for transformation into histopathology slides, but they were also embedded intellectually and transformed into histopathology knowledge.

[5] Héran, *L'histoire de la médecine à Strasbourg*, 469.

3.1 A Pasteurian in a German lab

In January 1919, as the laboratory books indicate, a page turned in the history of pathological anatomy in Strasbourg. To mark the change, this section maps out first, what the French pathologist would have found upon his arrival. After a brief guided tour of the locale, the context and history of the building itself in the German university will be briefly described. This was not only a massive and impressive building, but it was heavy with late nineteenth century German university ideology. The historical aside gives elements necessary for understanding some particularities of this institution and its organization, in relation to other French institutions. The historical aside on the late nineteenth century further smoothes the chronological gap between the end of Chapter 2 and the interwar period.

3.1.1 The new pathologist arrives at the pathology institute, January 1919

The *Pathologisches Institut*, a monumental building, had been drawn in a neo-hellenistic style. It was indeed built as a temple of science in 1878, witnessing an elegance characteristic of the architect Jacques-Albert Brion.[6] The original construction stretched 86 metres long on the north facade.[7] The surface equaled approximately 9000 square metres. In January 1919, a pathologist arrived from Paris to re-organize and structure what would become a French pathology institute. The building would have likely made a marked impression upon him. Here, we will walk through the building with him.

The double doors to the normal anatomy and pathological anatomy institute loomed over his head as he approached the building. The massive wood door standing over 6 metres tall required bracing himself to pull it open. At the top of a wide stone staircase, the windows of another set of double doors presented a view of the courtyard. A stone staircase led down into this courtyard, a stone pathway ran between two sections of lawn, each with a pool for fish and frogs in the centre.

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6 He also designed the *Institut de Chimie Biologique* (1883) and the *Clinique Gynécologique* (1886), as well as the *Strassburger Bank* (1897) on *rue du Vieux-Marché-aux-Vins*, the *Hôtel de la Maison Rouge* (1898) that was at *place Kléber* and a number of residential manors, all in Strasbourg.

7 This is not including an additional 8 metres for the morgue which was added in 1927.

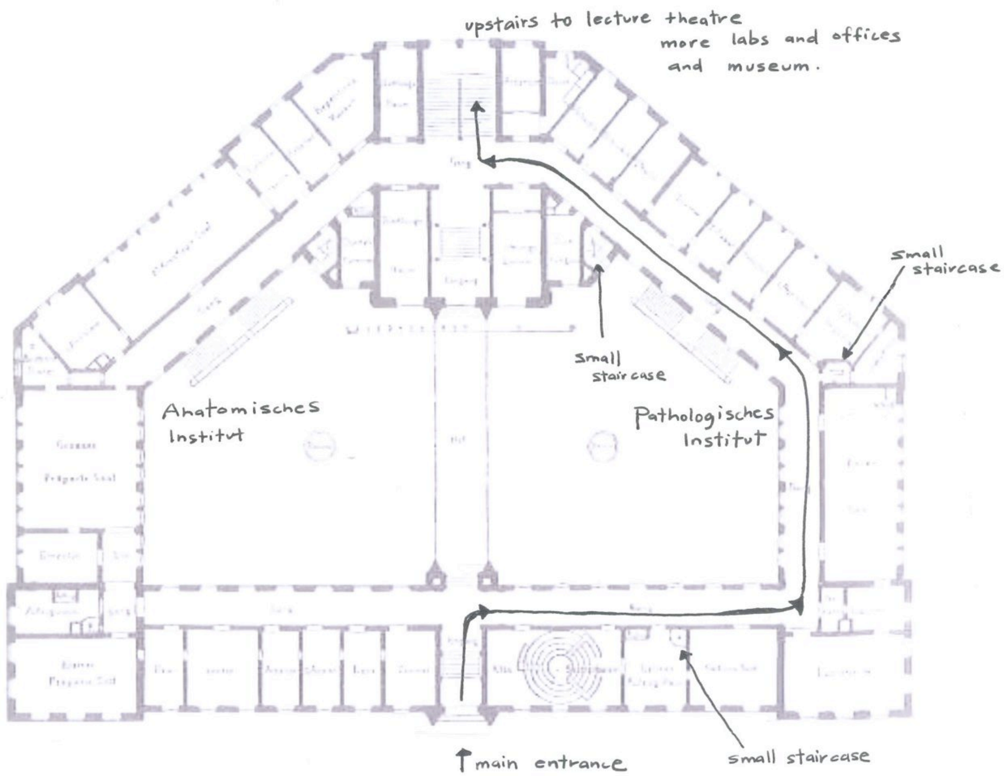

Figure 3.5 Floorplan with line & arrows indicating "visitor's" path, *Pathologisches Institut.*

To the right was a long, expansive, well-lit corridor. Turning right he entered the *Institut d'Anatomie Pathologique*. To the left was another long, expansive, well-lit corridor. Had he turned left, he would have entered what was principally the *Institut d'Anatomie normale.*[8] The two institutes occupied the east and west halves of the building. There was however no physical barrier delimitating them in the late nineteenth century and a daily exchange of work material passed through the foyer.[9] The ceiling was 5 metres high. The hallway was lined with high windows looking onto the courtyard along one side and with four or five doors on the other side. The floor was polished wood. The first door lead into a circular amphitheatre for viewing post-mortems and dissections. This amphitheatre could hold about 100 students for viewing demonstrations performed on the autopsy table in the middle.[10] Wide double doors communicated to the next room; a room with a hydraulic elevator for transferring cadavers from the basement. A narrow spiral wood staircase leading down to the basement was also located in one corner. Another door led to the next room, which was also for post-mortem examinations. These first three rooms of the institute grouped

[8] Between 1919 and 1927, the *Institut d'Histologie* shared the west half of the building with the *Institut d'Anatomie normale* and from 1929, the legal medicine morgue and facilities were installed in the basement.
[9] Presently walls and glass doors mark the entrance of the individual institutes.
[10] A similar amphitheatre was reproduced at a morgue in Paris by Brouardel. (Bouchard 1885, 461)

the facilities for post-mortem dissection. This was central to pathological anatomy teaching, through the anatomo-clinic method, and was central to pathological anatomy's prosecture service for the hospital.

The northwest corner of the main floor, with windows on two walls, was a laboratory. Two long workbenches stretched the length of the laboratory. A smaller laboratory was adjunct to it. This smaller laboratory had an instrument closet and led into a long classroom. The classroom stretched the full length of the west side of the building and student work tables extended the full length of the room. There were two types of laboratories: those destined for students to execute laboratory exercises and those where they could work at their leisure with the provided microscopes and reactive agents. In addition, there were laboratories for advanced students and assistants.

The last length of the institute housed nine study or research rooms, a library and lastly the director's office. Across from the director's office was a meeting room that equally looked out onto the courtyard. At the end of the hallway were two massive stone staircases; one to left leading down to the courtyard, one to the right leading down to the back entrance and up to the upper level. At the top of the large stone staircase was a large amphitheatre. The upper floor equally and notably housed the pathological anatomy collections. The collections were located in a large hall consisting of one very large room and two smaller rooms on either side. There were eight other rooms on the upper floor that housed research laboratories and offices. In addition to the principal back staircase, there were three wood service staircases.

There were also important services installed in the attic and in the basement. The top floor provided housing for four assistants.[11] Annex to the institute, at the back, was a building with further housing for two technicians.[12] The basement included an apartment for the concierge. It also held facilities for raising laboratory animals, a maintenance and woodworking shop, the heating system and coal storage, as well as post-mortem facilities.

Cadavers were brought into the institute basement through an underground tunnel that connected the building to the hospital. Corpses were prepared for teaching and research in rooms for preserving cadavers, for maceration and for distillation, for a fat removal apparatus

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[11] Michel Fruhling, son of Louis Fruhling, and Claude Helms-Fruhling, daughter of Louis Fruhling, recall living in one of the assistant apartments in 1952. Philippe, "Louis Frühling," 638-642.
[12] This was demolished in 1970. Presently, the old SAMU building and a parking lot occupy the area.

(*appareil de dégraissage*), and for a cold store. A waiting room and a mortuary chapel received family members of the deceased, who could enter the rooms from the street.[13]

The institute was desitute and (nearly) empty: microscopes, microtomes, chemical preparations and running water were lacking.[14] The institute needed to be renovated, but there was no financial support for this immediately following the war.[15] The new pathologist would have to make do with what he had, and he did. He would later claim to have "built" the pathological anatomy services in Strasbourg from little.[16]

In addition to the walls of the institute, with work benches, tables, hallways and doorways, the new pathologist would have found working material remaining in the institute with the imprint of the German way of doing. The pathological anatomy collection was intact and thousands of preparations were on display. The German handwritten catalogue, but also the French catalogues, were on a bookshelf. The prosecture activity was equally intact, with on-hand German typeset pages for the autopsy protocols. Before examining who this new pathologist was and how he reorganized the institute, a step back to the late nineteenth century and the history of the building, this institute and one of its particularities, the laboratories, need to be understood.

3.1.2 German medical school laboratories in Strasbourg (Strassburg), 1878

In 1878, the German pathology institute building was inaugurated in Strasbourg. It was characterized as a "scientific fortification", a scientific monastary autonomous and conscience of its mission, a window for the benefit of the world and to spread the scientific supremacy and cultural force of Germany.[17] This institute had state-of-the-art laboratories, as did the other institutes of the new German university.

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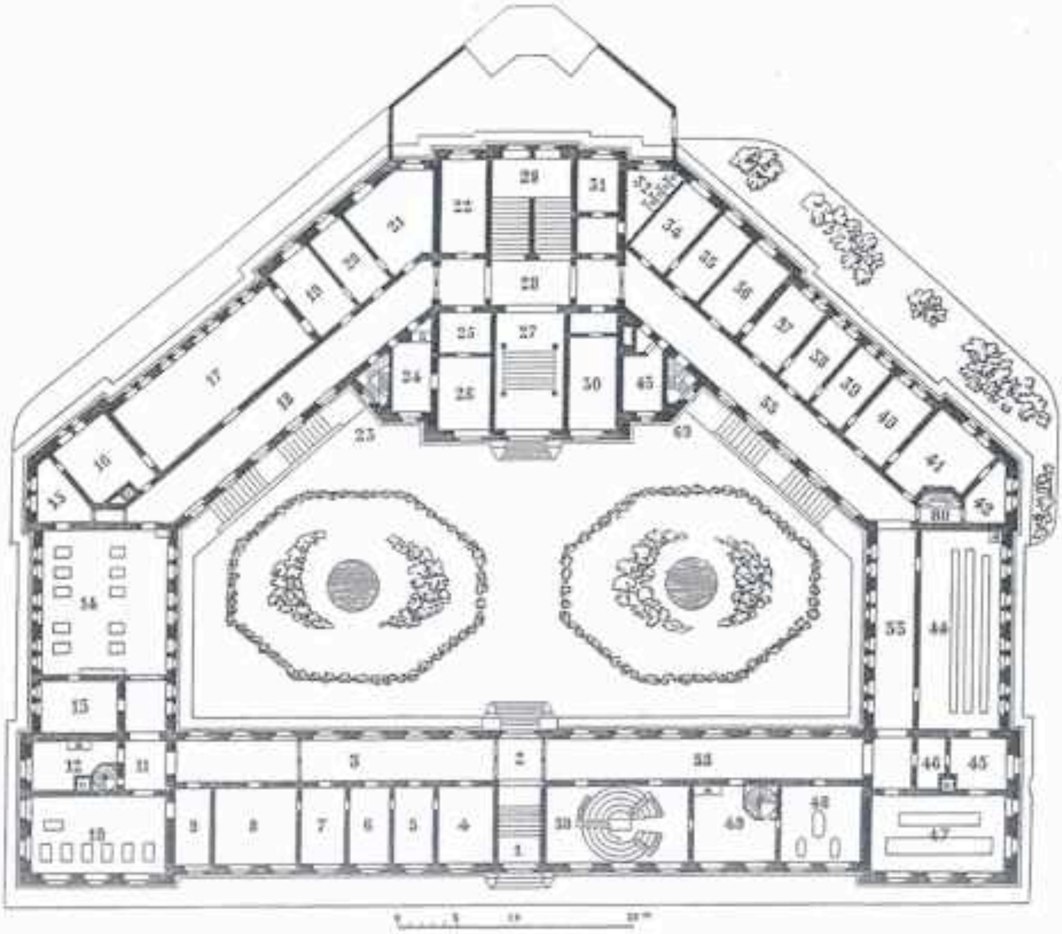
[13] This was complemented in 1927 by the construction of an addition to the northwest corner of the building to accommodate the mortuary chapel. The basement rooms were then fitted with refrigeration units and facilities for preparing cadavers (*la toilette, l'habillage et la mise en bière*).
[14] E. G., "Le Professeur P. Masson," *Gazette Médicale de Strasbourg* 13 (juillet 1924): 379-380.
[15] Ibid., 380.
[16] The context of the quote was that he was not afraid to have to do the same in Montreal. Correspondance Pierre Masson à Doyen de la Faculté de médecine. 20 octobre 1926. Cote E38, 90/7/2/1, Pierre Masson, 82. Archives de l'Université de Montréal.
[17] Bonah, "Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXeme siècle," 615-620.

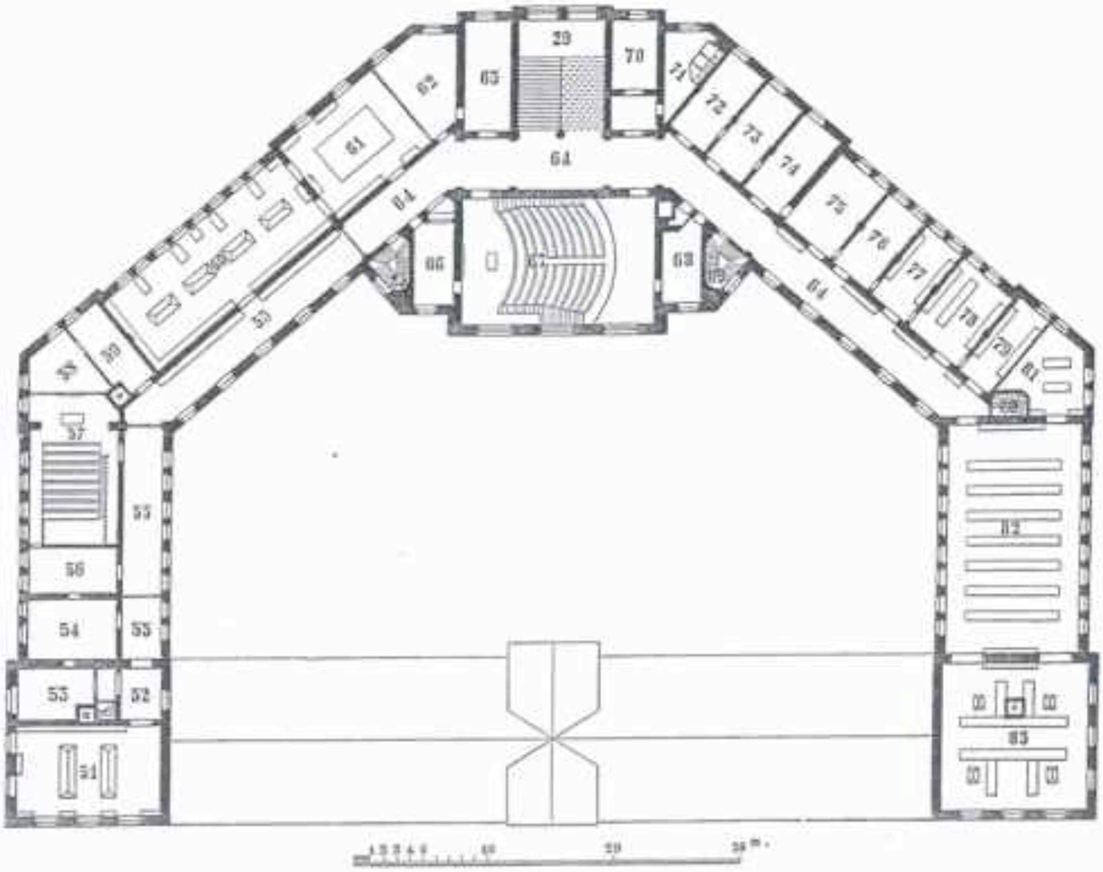
a.



Pl. I. — Anatomiſches und pathologiſches Inſtitut. — Erdgeſchoſs.

1. } Eingang.
2. }
3. Korridor.
4. Wartezimmer.
5. }
6. } Arbeitszimmer.
7. }
8. } Proſektor.
9. }
10. Kleiner Präparirſaal.
11. Eingang.
12. Leichenküche.
13. Direktor.
14. Groſser Präparirſaal.
15. I. Anatomiediener.
16. I. Aſſiſtent.
17. Mikroſkopirſaal.
18. Korridor.
19. Laboratorium.
20. Arbeitszimmer.
21. Repetitions-Muſeum.
22. Proſektor.
23. Treppe.
24. Amanuenſis.
25. Glaskammer.
26. Arbeitszimmer.
27. Eingang.
28. } Treppenhaus.
29. }
30. Sitzungszimmer.
31. Arbeitszimmer.
32. Abtritte.
33. Korridor.
34. Arbeitszimmer.
35. Bibliothek.
36. } Direktor.
37. }
38. II. Aſſiſtent.
39. Arbeitszimmer.
40. I. Aſſiſtent.
41. Spirituspräparate.
42. Inſtrumente.
43. Züchtungszimmer.
44. Kursſaal.
45. } Laboratorium
47. }
46. Geräthe.
48. Sektionsſaal.
49. Leichenaufzugsraum.
50. Klin. Sektionsſaal.
a, a, a. Aufzüge.

b.



Pl. II. — Anatomifches und pathologifches Inftitut. — Erfter Stock.

51. Anatomifche Sammlung.
52. Eingang.
53. 54. Direktor.
55. Korridor.
56. Bibliothek.
57. Kleiner Hörfaal.
58. 59. Vorbereitungszimmer.
60. 61. Anatomifche Sammlung.
62. II. Anatomiediener.
63. II. Affiftent.
64. Korridor.
66. Vorbereitungszimmer.
67. Grofser Hörfaal.
68. Vorbereitungszimmer.
69. Treppe.
70. Arbeitszimmer.
71. Abtritte.
72. Arbeitszimmer.
73. Glaskammer.
74. 75. 76. Arbeitszimmer.
77. 78. Referve-Sammlung.
79. Vorbereitungszimmer.
80. Nebentreppe.
81. 82. 83. Pathologifche Sammlung.

c. 

Figure 3.6 *Institut d'Anatomie Normale et Pathologique* in 1877.
a. The lower level with legend.
b. The upper level with legend.
c. The shaded areas highlight the rooms and what they were used for in the late nineteenth century.[18]

The 1878 building floor plan was rift with laboratories. The dark green regions of the above floor plan were pratical teaching laboratories and those in blue were research laboratories. There was equally a large space dedicated to collections, as indicated in yellow. The German institute further touted the latest in technologies; for example, a hydraulic cadaver lift. These laboratories were a new type of space for pathological anatomy in Strasbourg. Prior to the German annexation, the anatomy department of the university revolved around post-mortems and occupied a building dating to 1856.

[18] F. D. von Recklinghausen, *Rede zur Eröffnung des Neubaus für die anatomische und pathologische Anstalt der KWU Strassburg. 29.11.1877* (Strassburg: Fischbach, 1877). (My shadings.)

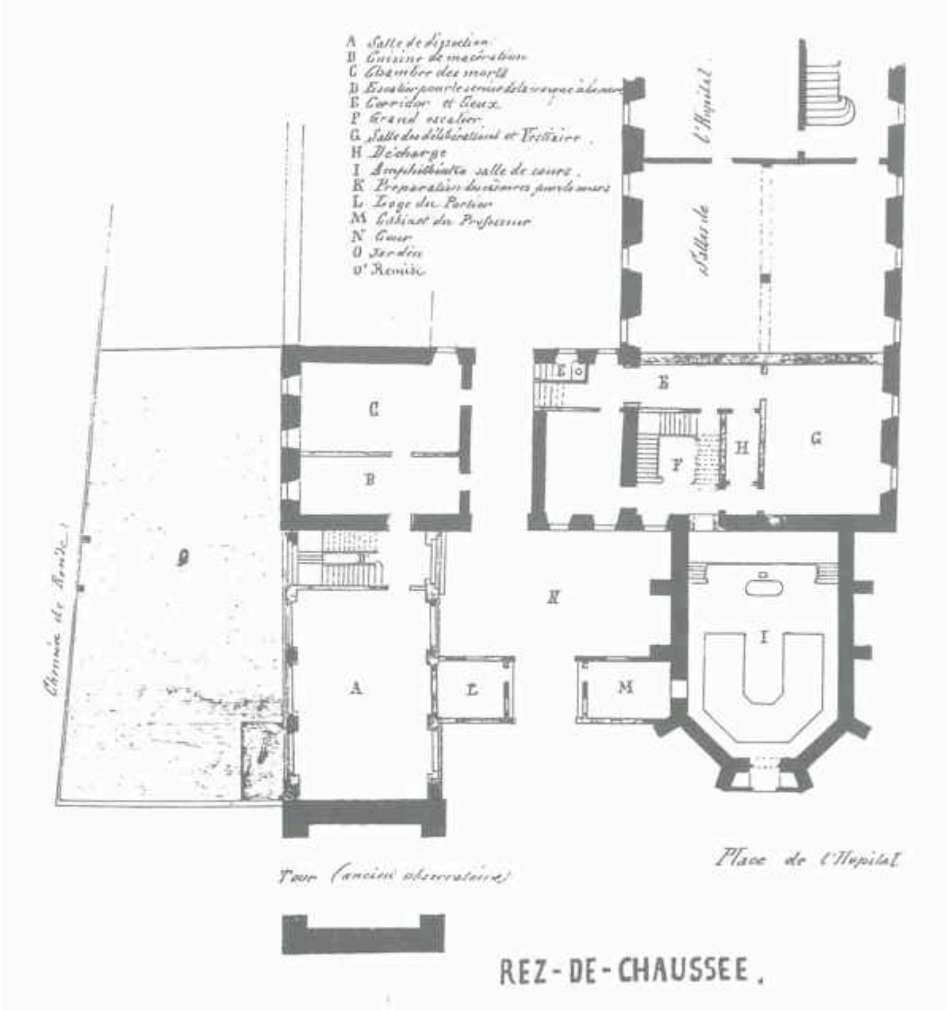


Figure 3.7 Floorplan of the anatomy department of Strasbourg's medical school, 1856.[19]

The anatomy building constructed in 1856 had been adjacent to the pre-existing anatomy theatre, adjoining the municipal hospital. The main floor had consisted of a dissection room, a maceration room, a deadroom, a meeting room, a room to prepare cadavers for lectures, the porter's lodge, an office for the professor.[20] The second floor had included four rooms for the anatomy museum, and on the top floor, a surgery arsenal, an examination room, cabinets for professors and a classroom.[21] The 1856 building floorplan did not employ the term laboratory. Post-mortems and dissections had been performed in anatomy theatres, prosector and dissection side rooms, and anatomy museums.[22] The facilities had been built to

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[19] Reproduced from: Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 372.

[20] The new constructions of 1856 included the new larger dissection room, the porter's loge and a cabinet for the professor, as well as a new entry to the anatomy theatre.

[21] The museum moved here in 1858. Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 353.

[22] For example, the first amphitheatre in Strasbourg consisted of a large room for anatomy lessons, a small room where the prosector worked, and two small rooms for student training. These were installed in an unused chapel

display the anatomy collection and to accomodate the increasing number of medical students for dissection exercises. However, shortly afterwards these facilities were described as lowly and appalling ["*basses et infectes*"] and as sinister and unwelcoming ["*finstere und unfreundliche*"].[23] These descriptions, just fifteen years after it was renovated, compared to the expanding laboratory and institute facilities in German universities.

These adjectives bring to mind the physiology research space of Claude Bernard (1813-1878). While working at the *Collège de France* in Paris, his laboratory was notoriously cramped, humid and dimly lit; for example, described as "half-cellar, half-sepulchre" by Louis Pasteur in 1868, as a "humid, unhealthy cellar" by Ernest Rénan, and as insufficiant by Bernard himself, again relative to German laboratories.[24] Adolphe Wurtz, chemist (of Alsatian origin) in Paris, travelled around Germany visiting science laboratories in 1868 on ministerial behalf. In his report, he cited Bernard's laboratory as emblematic of the sad state of science laboratories in France.[25] Even if these French descriptions are rhetoric discourse that pleaed for increased investments in science and medicine in France in the 1860s and 1870s, they nevertheless indicate rapidly changing standards of laboratory settings and equipment. The anatomy facilities of 1856 and 1878 were comparable to other science and medical research spaces in France. The descriptions of lowly, appalling, sinister and unwelcoming were pronounced in light of German research spaces in the same period.[26]

The 1856 and 1878 buildings were different, most obviously in size and stature, but also in amenities. The 1878 building was designed specifically to have quality natural light and ventilation. Every room had large windows. The main floor anatomical theatre had window casements in the ceilings. Research and examination in pathological anatomy were founded on visualisation. As such, amphitheatres and work areas had to be well lit. Ventilition was equally important to avoid stagnating air from deteriorating cadavers. The difference

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of the municipal hospital in 1670 and remained adjacent to the hospital whereas the medical school and the anatomy museum were relocated periodically. J. P. Graffenauer, *Topographie physique et médicale de la ville de Strasbourg* (Strasbourg, 1816), 284-285.

[23] C. Schützenberger, "De l'esprit de l'enseignement de la Faculté de médecine de Strasbourg et des conditions de son développement progressif," *Gazette Médicale de Strasbourg* 27 (1867): 33-37; Wieger, *Geschichte der Medicin und ihrer Lehranstalten in Strassburg vom Jahre 1497 bis zum Jahre 1872.*, 89.

[24] Mirko Dražen Grmek, *Raisonnement expérimental et recherches toxicologiques chez Claude Bernard* (Paris: Librairie Droz, 1973), 145-146; 177-178.

[25] Ibid., 178.

[26] The c. 1840 wood engraving by Wilhelm Trautschold of Justus von Leibig's (1803-1873) chemistry and physiological chemistry laboratory comes to mind as what might have been seen in Germany. This painting, albeit an idealised rendition is not necessarily representative but is rhetorically rich. It shows a room with numerous large windows that allowed well-lit space, workbenches set up under the windows with flasks and instrument cabinets, tables stretching the length of the laboratory holding with flasks and instruments of experiments in progress, a collection of materials organized on the back wall shelves, a network of interested scientists filling the room. (http://germanhistorydocs.ghi-dc.org/sub_image.cfm?image_id=2278)

between the 1856 and 1878 buildings that I want to draw on here is the presence of laboratories in the latter. These laboratories translated to distinct places for pathology examinations; rather than in morgues, autopsy rooms, or amphitheatres, examinations were interpreted in laboratories and at laboratory benches. This was a conceptional tranformation of function, in which students became active participants in medical observation and research and in pathological anatomy. This meant using microscopes and staining techniques.[27]

Such laboratories are central to histories of medical education and even medical practice. These were not limited to medical schools, but to all sciences. The *Oxford Dictionary* dates the word ‘laboratory’ to 1605 and defines it notably as a physical edifice:

> “A building set apart for conducting practical investigations in natural science, originally and especially in chemistry, and for the elaboration or manufacture of chemical, medicinal, and like products.”[28]

The shortened and familiar word “lab” dates to 1895. The two dates are somewhat benchmarks in laboratory history; laboratories for scientific investigation can be traced to (what is called) the scientific revolution and a hands-on approach to the study of nature, but the term entered common usage and was therein abbreviated in the late-nineteenth century. This corresponded to a creation of laboratories, for research and teaching of science.[29] These were imported from Germany and adopted by other countries in the late-nineteenth and early twentieth centuries.[30] William H. Welch stated at the opening of the William Pepper Laboratory of Clinical Medicine in Philadephia, 1894:

> “the birthplace of these laboratories, regarded as places freely open for instruction and research in the natural sciences, was Germany. Such laboratories are the glory today of German universities, which possess over two hundred of them. By their aid Germany

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[27] Bonah, “Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXeme siècle,” 592 . cites Friedrich von Recklinghausen, *Die historische Entwicklung des Medicinischen Unterrichts, seine Vorbedingungen und seine Aufgaben. Rede gehalten am 01.05.1883 dem Stiftungstage der KWU Strassburg*, ed. Schmidt, Strassburg, 1883, 15.

[28] The Compact Edition of the Oxford English Dictionary. 1st ed. s.v. “laboratory”

[29] Cf.Rüegg, *A history of the university in Europe*; Weisz, *The emergence of modern universities in France*; Craig, *Scholarship and nation building*; Paul, *The sorcerer’s apprentice*; Paul, “Apollo courts the Vulcans.”

[30] Cf. Thomas Neville Bonner, *American doctors and German universities. A chapter in international intellectual relations, 1870-1914* (Lincoln: University of Nebraska Press, 1963); Robert G. Frank, Jr., “American physiologists in German laboratories, 1865-1914,” in *Physiology in the American context*, ed. Gerald L. Geison (Bethesda: American Physiological Society, 1987), 11-46; John Harley Warner, “The fall and rise of professional mystery: Epistemology, authority and the emergence of laboratory medicine in nineteenth century America,” in *The laboratory revolution in medicine*, ed. Andrew Cunningham and Perry Williams (Cambridge and New York: Cambridge University Press, 1992), 110-141.

has secured since the middle of the present century the palm for scientific education and discovery."[31]

He further made an allusion to the material condition of laboratories, indicating that good lighting, a working library, a director of ability and experience, a lab assistant, a subsidiary assistant/janitor, funds, etc. were required. Welch was prominent in founding American medical school laboratories, like those in which he had studied while in Germany. Underlying nineteenth and early twentieth century (often rhetorical) promotion of medical laboratories was a veneration of medical science.[32]

In historical accounts Edwin Ackerknecht's medical cosmology triptych – bedside medicine, hospital medicine, and laboratory medicine – suggested a clean, simple, and appealing characterization of medical practices over time that attributed laboratories a leading role in disease identification and characterization. His broad sketch designates laboratory medicine as modern, beginning in the mid-nineteenth century and continuing well into the twentieth century.[33] For Ackernecht, this periodization was foremost intended to understand general patterns of medical knowledge production over long periods of time. His work inspired social science analysis, such as Jewson's on medical cosmologies and the consequences of change in medical knowledge production for patients and the physician-patient relationship. And the reduction of patients to body fragments analysed in laboratories.[34] John Pickstone has reconsidered the chronological organization of this characterization.[35] He has proposed abandoning the chronologial scheme for four persistent, complementary and competing types of medicine: biographical-bedside, analytical-hospital, experimental-laboratory, and techno-medicine. As such, he considers laboratory and diagnostic practices of modern hospitals to be part of the analytical type. This, however, does not take into consideration all the dimensions of the analysis activity, which englobes commodities with a market, such as synthetic dyes or therapeutic agents, etc. and the technological facet or industrial scale.

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[31] William H Welch, "The evolution of modern scientific laboratories (1896)," *Archives of Pathology and Laboratory Medicine* 117 (1993): 661.

[32] History of science and medicine has documented and explained tensions between laboratory scientists and clinicians over the role of science in medical practice between the mid-nineteenth century and the mid-twentieth century. Warner, "The history of science and the sciences of medicine."

[33] Ackernecht, *Medicine at the Paris hospital*.

[34] N. D. Jewson, "The disappearance of the sick-man from medical cosmology, 1770-1870," *Sociology* 10 (1976): 225-244.

[35] John Pickstone, "Classification and representation," in *Medicine and change: Historical and sociological studies of medical innovation*, ed. Ilana Löwy et al. (Montrouge and London: John Libbey Eurotext, 1993), 23-47.

One means of understanding early transfers of laboratory science to laboratory practice are by considering the actors. In order to answer the question of what a pathological anatomy laboratory would have to offer medical practitioners in the 1920s, it must be understood who was directing the institute. Who was the French pathologist that came to Strasbourg in 1919. Where did he come from? What did he bring with him?

3.1.3 A biographical parentheses: C. L. Pierre Masson (1880-1959)

Pierre Masson was born in Dijon to a family of magistrates, judges, and government officials [*hauts fonctionnaires*].[36] He studied biology in Dijon, obtaining his *Diplôme de Sciences Physiques Chimiques et Naturelles,* and then medicine in Paris. His medical studies were interrupted when he caught typhoid fever and he had to move back to Dijon in 1902. He then worked as a biology laboratory assistant [*préparateur de biologie*] for Professor Eugène Bataillon (1864-1953), whom he had previously studied under at the science faculty in Dijon. He received training in histology in this biology laboratory and earned a *Licence ès sciences naturelles* and a *Certificat de chimie générale* in 1905. Alongside his work with Bataillon, he examined cellular and tissue lesions that characterized cancers.[37] He notably studied surgical

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[36] Valerie Castel, "Pierre Masson (1880-1959) : pilier de l'anatomie pathologique de la première moitié du 20ème siècle" (Thèse de médecine, Strasbourg: Université Louis Pasteur, 2007); *Dr. Pierre Masson*, 2010, http://www.youtube.com/watch?v=T2V7g3TkU2k&feature=youtube_gdata; "Dr. Pierre Masson | www.cdnmedhall.org," *The Canadian Medical Hall of Fame*, n.d., http://www.cdnmedhall.org/fr/dr-pierre-masson; L. C. Simard, "Dr. Pierre Masson. An appreciation," *Canadian Medical Association Journal* 81 (July 1, 1959): 56-57; Joseph-Luc Riopelle, "Eloge du professeur Pierre Masson," *L'Union médicale du Canada* 88 (Déc 1959): 1590-1594; Morin, "In memorium professeur Pierre Masson 1880-1959"; Marcel Cadotte, "L'héritage scientifique du professeur Pierre Masson," *L'Union Médicale du Canada* 113 (mai 1984): 344-345; E. G., "Le Professeur P. Masson"; J Michalany, "Masson's contribution to pathology and to histological technique," *Annales de Pathologie* 3, no. 1 (1983): 85-95; Rick Fraser and Gilles Tremblay, "Pierre Masson - Pathologist extraodinaire of France and Quebec," *International Academy of Pathology News* 47, no. 1 (2006); Charles Oberling, "Pierre Masson (1880-1959)," *Annales d'Anatomie Pathologique* 5, no. 4 (1960): 427-432; L. C. Simard, "Pierre Masson (1880-1959)," *L'Union médicale du Canada* 88 (1959): 1017-1023; Gilles Tremblay and Thomas Seemayer, "Pierre Masson (1880-1959): un grand maître de l'histopathologie des tumeurs," *Bulletin du Cancer* 87, no. 9 (2000): 625-629; Marcel J. Rheault, "Pierre Masson: His influence on the teaching of pathology in Canada," *The Canadian Journal of Surgery* 28, no. 5 (1985): 456-457; J Michalany, "Pierre Masson: Master and friend," *American Journal of Dermatopathology* 7 (1985): 145-149; Marcel J. Rheault, "Pierre Masson: pilier de l'enseignement de l'histopathologie au Canada," *Annales de Chirurgie* 45, no. 9 (1991): 833-836; Marcel Cadotte, "Pierre Masson. Précurseur et histochimiste avant l'heure," *Les Sélections de Médecine/Sciences* 9 (1998): 3-5; F. Cabanne, "Pierre Masson. Précurseur et rénovateur (1880-1959)," *Annales de Pathologie* 3, no. 1 (1983): 95-97; S. Moore, T. A. Seemayer, and G. Tremblay, "The career and influence of Pierre Masson (1880-1959)," *International Journal of Surgical Pathology* 9, no. 3 (2001): 231-236; Thomas Seemayer, "The life and legacy of Professor Pierre Masson," *The American Journal of Surgical Pathlogy* 7, no. 2 (1983): 179-183; Charles Steffen, "The man behind the eponym: C. L. Pierre Masson," *The American Journal of Dermatopathology* 25, no. 1 (2003): 71-76; Joseph-Luc Riopelle, "A la mémoire du Professeur Pierre Masson, vingt ans après," *L'Union médicale du Canada* 108 (1979): 473-476.

[37] A. Bonin and J. Laporte, "Un grand patron," *Montréal Médical* (October 1, 1959): 5.

specimens passed along to him by surgeon friends.[38] He returned to Paris in 1907 and completed his medical studies in 1909. As a medical student, he worked as anatomo-pathologist and head of the laboratory [*chef de laboratoire*] with surgeon Professor Paul Reynier and then with pathologist A. Brault at the Lariboisière Hospital.[39] He acknowledged Reynier for providing him with rich study material and the means to exploit it.[40] Masson examined surgical specimens throughout his studies. His medical thesis, titled *Les Névromes Ganglionnaires du Grand Sympathique,* was in fact inspired by a request from surgeon Dr. Maurice Savariaud at the Trousseau Hospital.[41] In 1908, Savariaud requested a histological examination of a large tumour extirpated from a young girl. Masson completed his thesis under the supervision of Professor Pierre Marie, pathological anatomy professor and doctor at the *Hospice de Bicêtre*.

In 1909, Masson worked as laboratory head [*chef de laboratoire*] in the service of surgeon Professor Antonin Gosset at the *Hôpital Salpêtrière* and became laboratory assistant to biologist and bacteriologist Professor Amédée Borrel at the *Institut Pasteur*. Masson described Borrel's laboratory as a place where:

> "tables [were] strewn with enormous human and animal tumours that were brought in from all over; [Borrel] dressed fashionably moved among the specimens, wielding a Pasteur pipette, a scalpel and flasks of stains with equal dexterity. Borrel, one mustn't forget, was an accomplished histologist and on the slides he carried in his pockets, one might easily find tritons, leeches, sea lampreys or human tumours."[42]

Masson's work with Paris surgeons characterizes an exchange: surgeons provided raw material and in return pathologists provided information on the material. The years that he spent in Paris were effectively the richest in terms of his academic publications, as the graph below illustrates.

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[38] Oberling, "Pierre Masson (1880-1959)," 428.; Necrologie. Eloge du Professeur Pierre Masson prononcé au Conseil de la Faculté de Médecine de l'Université de Montréal, par le docteur Luc Riopell, le 6 octobre 1959. (Doc 27) Cote P22/N. 247. Dossiers biographiques de médecins et de l'histoire de la médecine au Québec. Pierre Masson. AUM.

[39] Jean-Paul Martineaud, *Une histoire de l'hôpital Lariboisière, ou, Le Versailles de la misère* (Paris: L'Harmattan, 1998). The volume is illustrated with photos of the facilities in the 1920s. They are very similar to photos of the Strasbourg hospital published in the 1920s. (Neither of them provide photos of laboratory services.)

[40] Bonin and Laporte, "Un grand patron," 5.

[41] Pierre Masson, "Les nevromes ganglionnaires du grand sympathique" (Thèse de médecine, Paris: Université de Paris, 1909), Introduction.

[42] Oberling, "Pierre Masson (1880-1959)," 428. (My translation.)

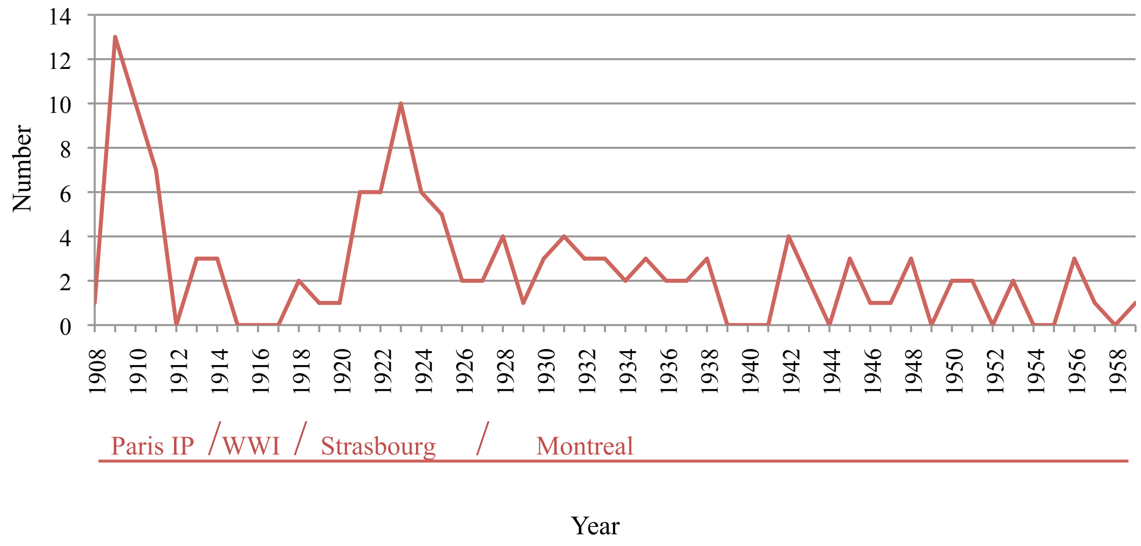

Figure 3.8 Masson's bibliographic production, 1908-1959.[43]

During World War I, Masson continued to work and collaborate with surgeons. The *Groupement de Services Chirurgicaux et Scientifiques,* initially stationed in Prouilly and later in Bouleuse near Reims, comprised medical services, radiology, bacteriology, haematology and pathology laboratories, alongside surgery facilities. The unit was headed by Claudius Regaud and included René Leriche, surgeon; Jean Louis Roux-Berger, surgeon; Thomas Nogier, medical physicist and radiologist; and Pierre Masson, pathologist.[44] The interaction within this group was not limited to the war years. Nogier was a friend of Regaud's from before the war and had introduced him to radiology techniques in Lyon. In fact, a number of these men may have crossed paths in Lyon, where Leriche, Roux-Berger, Nogier and Regaud had all spent some time, as had Justin Godart, the parliamentary under-secretary who appointed Regaud to his war post. Masson may have met Regaud at the Pasteur Institute in Paris immediately before the war.

After World War I, Masson was recruited to the French medical school in Strasbourg. He arrived in January 1919. He was named chair and director of pathological anatomy in October 1919 of what was (re)named the *Institut d'Anatomie Pathologique*.

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[43] From "Travaux scientifiques de M. P. Masson et ses collègues," *Montréal Médical* (October 1, 1959): 17-18; 28; 40.
[44] Patrice Pinell, *Naissance d'un fléau. Histoire de la lutte contre le cancer en France (1890-1940)* (Paris: Editions Métailié, 1992), 110. They also published together: Claudius Regaud and T. Nogier, "Actions des rayons X très pénétrants, filters, sur le derme et l'épiderme de la peau," *Association française pour l'avancement des sciences* 41e section (1912): 213.
(Note: Patrice Pinell indicates that this was Théodore Nogier, but I have only found trace of a Thomas Nogier.)

Figure 3.9 Pierre Masson (1880-1959) and Louis Géry (1883-1957)[45]

He invited a colleague from the *Institut Pasteur* to join him, Louis Géry.[46] Géry completed his medical studies in Paris in 1910.[47] While studying, he worked at the *Institut Pasteur* hospital first as an intern. After his studies he was prosector under Dr. Salimbeni and then *chef de laboratoire*. He had also worked with Professor Grancher at the *Hôpital des enfants malades* and as an extern for the *Hôpitaux de Paris*. In January 1919, he took a position as anatomo-pathologist at the *Institut Pasteur* hospital, where he had previously been working, in addition to *chef de laboratoire* with Professor Gosset at the *Nouvelle-Pitié*, with whom Masson had worked with before the war. In November 1919, Masson offered him a position in Strasbourg and he accepted. He would notably manage the prosector activity in Strasbourg.

Masson was one of the delegation to arrive at the medical faculty from other regions of France in the winter of 1919 to continue with that year's medical training and to decide what needed to be done to recover the abandoned institution. It was thus a French Pasteurian (having worked at the *Institut Pasteur*) who had spent his medical science career in some of the great Paris hospitals, that investigated the pathological anatomy institute and facilities left behind by German academic physicians.

[45] Reproduced from: Le Minor et al. *Anatomie(s) et Pathologies*, 135.
[46] Perhaps as further indication of Masson's renown. I only found one biographical article on Géry. Louis Frühling, "Louis Géry (1883-1957)," *Annales d'Anatomie Pathologique* 4 (1959): 371-377.
[47] Personnel: Géry, Louis. AFMS.

Masson brought with him experience, training, and institutional connections from Dijon and Paris, which translated to work habits and networks established in and from Strasbourg. There were two (Alsatian) technicians whose employment at the institute continued after 1919.[48] Scientific personnel were his colleagues from the *Institut Pasteur*, Louis Géry and J. F. Martin.[49]

The architectural framework of the pathological anatomy institute building is revealing of these activities. But what were the activities and practices that took place within these walls and floorplans? What came in? What went out? The jars in the attic and the entries in the nineteenth century catalogues remained. Masson prolonged the rich entry source of *Leichenmaterial* that had been appreciated by Recklinghausen and Chairi during the previous half century. The reorganisation was not luxurious, but it was sufficient and the equipement modern. By 1921, the pathological anatomy collection counted 15 000 pieces and the demonstration (teaching) collection 10 000 pieces, as well as an important stock of colour charts.[50] But Masson brought renewal as well.

3.2 Laboratory materials. Surgical pieces

3.2.1 Paperwork

Autopsy registries

Hundreds of black ledger-like books lining metal cabinets in the pathological anatomy institute attic, pictured in the introduction to this chapter, were issue of the prosecture activity that began in 1878. The post-mortem examinations were recorded in two series of registers: an index of corpses deposited in the morgue and the autopsy protocols. Autopsies were performed on nearly all patients deceased at the hospital. Doctors of the hospital formally requested and attended the autopsies.[51]

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[48] Pierre Masson, "Biographie de Louis Berger," *The Royal Society of Canada* (1948).
[49] Géry became chef de travaux and Martin became professor of pathological anatomy in Lyon.
[50] "Strasbourg. La faculté de médecine et l'hôpital civil." Chanteclair 157 (Mai 1921) Doc 11-19 Cote P22/N. 247. Dossiers biographiques de médecins et de l'histoire de la médecine au Québec. Pierre Masson. AUM.
[51] "Du temps allemande, la partie essentielle de l'anatomie pathologique se donnait aux autopsies et aux examens macroscopiques, les services étaient organises en consequence." *Travaux de l'Université de Strasbourg pendant l'année scolaire 1919-1920. Rapports présentés par le conseil de l'université et par MM. les doyens des facultés*, 60.

The autopsy reports, printed on forms bearing the heading *Sectionsprotokoll* or *Protocole d'Autopsie*, filled bound volumes. The forms were typeset in German until mid-1921. The autopsy was recounted in ink and most frequently signed by the *chef des travaux*.[52]

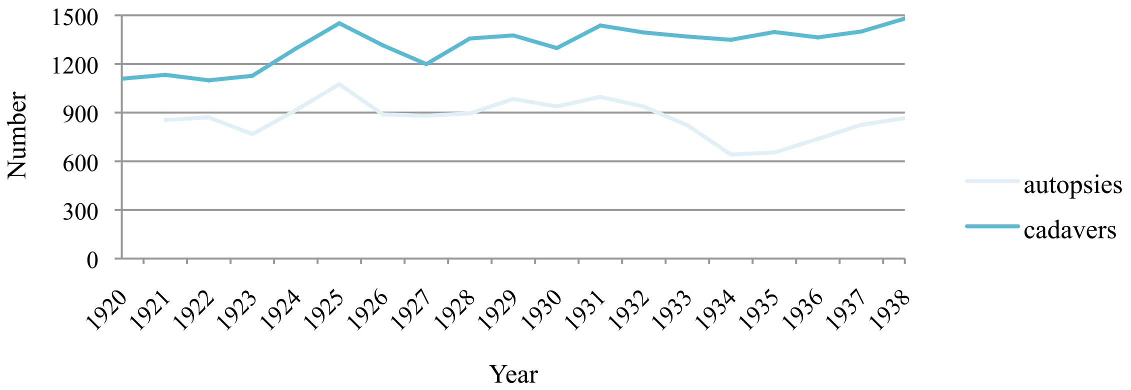

Figure 3.10 The number of cadavers and autopsies for the prosecture activity, 1920-1938[53]

During the interwar period the number of cadavers transferred to the morgue in the basement of the *Institut d'Anatomie Pathologique* was relatively constant.[54] The number of post-mortem examinations performed at the pathological anatomy institute represented 70% to 80% of those deceased. The difference between these two figures was that the body had been autopsied by another service or that the family members opposed the autopsy.

The cases of opposition were recorded in an index-like registry. That is, the word "opposition" was written in the column for recording the cause of death.

[52] There was no one with the title of prosector in this institute. Although the title was used in normal anatomy institute for anatomy demonstrators.
[53] Data for generating graph from the volumes of autopsy protocols and the auotpsy registry. AIAPS.
[54] This corresponded to corpses of those deceased in the hospital and in the clinics.

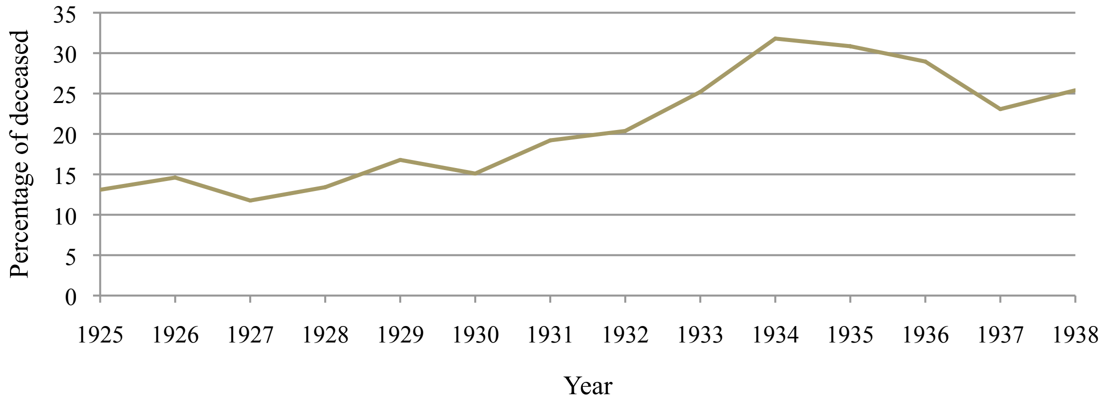

Figure 3.11 The percentage of families opposing autopsy of the deceased, 1924-1938
Note that this is indicated in the registers from 1925 onward.[55]

As an aside, it is interesting that there is a significant rise in the number of oppositions by family members to the deceased being autopsied. From 1925 to 1935 the number of oppositions doubled and concerned nearly one out of three corpses in 1934.

These registries of autopsies were a continuation of catalogue-like inventories kept in the earlier decades of the century. The protocols bound in large black books were filed chronologically. Before the autopsy was performed, an entry number, the patient name, profession and origin and clinic or service were entered in an index-like book. These were all entered by the same person. Expectedly at a later moment, the cause of death was entered and it was authorized with a signature. The latter details, of investigative nature, were not written in the same handwriting as the first details, of bureaucratic nature. These one-line entries provided an index of the autopsies performed. They further eased retrieval of the autopsy protocol, in the case that it was needed.

The recordkeeping practices of post-mortem examinations were not only administrative, but were undertaken with research goals in mind. Fine recordkeeping and filing systems in pathological anatomy were employed, for example, at Johns Hopkins. Setting aside specimens from post-mortems for further study echoed a practice described by William MacCallum of the Johns Hopkins University and Hospital Pathology Laboratory. In the 1920s, between five and six hundred autopsies were performed annually at Johns Hopkins and gross and microscopical preparations were preserved from each:

> "a representative slice of each organ from every case is preserved in colors, i.e., the heart and aorta, half of each lung, a slice of spleen, liver, kidney, and so on. These are

[55] Data for generating graph from the autopsy registry. AIAPS.

not mounted as isolated museum specimens but are kept together in a stoneware crock upon which the number of the autopsy is painted in large black figures on a white ground."[56]

The autopsy cases were discussed weekly at Johns Hopkins, and subsequently some figured in academic publications. The autopsy activity in Strasbourg, like in Baltimore, was important for medical practice, but was also rich for medical research.

3.2.2 Amassing surgical pieces

The books or registries of the institute are labelled and numbered on their spine. There is a series with a book bearing the number 1 that contains entries from January 1919 to November 1919. This was a registry that began when Pierre Masson arrived. Although the French autopsy registries formed a continuum with the German autopsy registries, there is a marked differentiation in the histology registries.

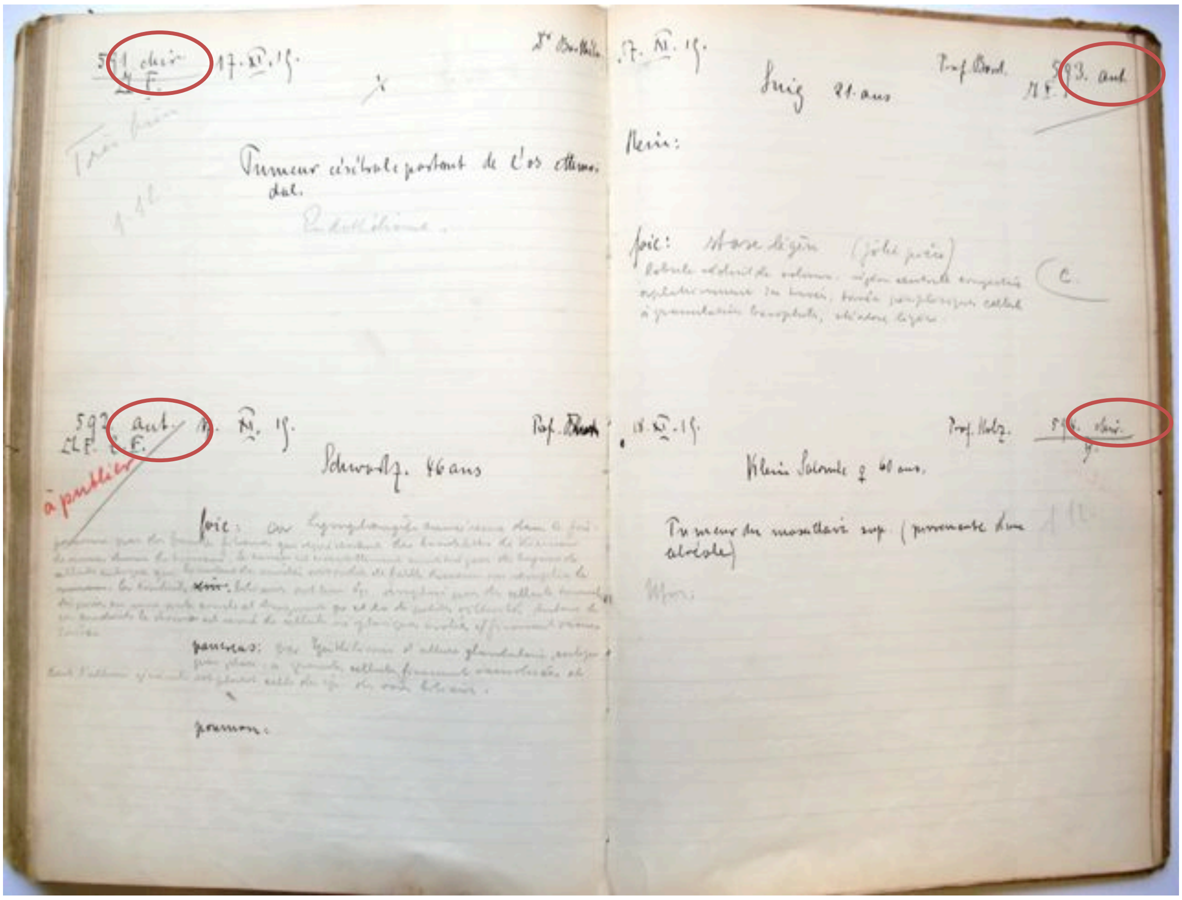

Figure 3.12 Sample page from histopathology laboratory logbook entry, 1919

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[56] William G. MacCallum, "The pathological laboratory of The Johns Hopkins University and hospital," *Methods and Problems in Medical Education* Third Series (1925): 163-180.

The open page illustrates 4 entries. In the outer margin, I have circled in red the abbreviations "*aut*" and "*chir*."[57]

The entries in this 1919 volume were each labelled: "*aut*" or "*chir*." This indicated whether the pieces were from autopsy or from surgery. Of the 689 entries in the volume, 571 or 73% were for examinations of surgical pieces and 184 or 27% for examinations of autopsy pieces. Of course, the year 1919 was not a representative year. The medical school functioned as a French medical school from mid-January 1919, but the new medical faculty was only inaugurated in the fall of 1919. The activities were provisory and the institutions were under re-structuration. It can be expected that the full staff was only secured in the fall as well, when Géry came, for example.

The re-orientation of surgical material is not surprising. With the development of anaesthesia and antiseptic surgical techniques, major surgery was increasingly performed with reduced pain and reduced risk of infection. For example, the removal of suspicious tumours and growths became the recourse for treating cancers, leading to a "triumph" for surgery and surgeons.[58] The increasing frequency of operations meant that in many medical institutions, surgery furnished pathological anatomy with a growing source of material. Pathologists took a pedagogical and a didactic interest in material extracted from the living, as well as from the deceased. A surprisingly early example of this can be found in the work of Strasbourg pathologist Charles Henri Ehrmann. In 1827, he published a description of four growths that he had removed surgically and contributed to the anatomy collection.[59] He also mentioned that cancer and cancer patients yielded many specimens in what he considered "successful" operations.[60]

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[57] Book 1. Régistres de laboratoiree. AIAPS. Photo: T. Close-Koenig

[58] Christopher Lawrence, ed., *Medical theory, surgical practice: Studies in the history of surgery*, Wellcome Institute series in the history of medicine (London; New York: Routledge, 1992); Harold Ellis, *A history of surgery* (Cambridge: Cambridge University Press, 2001).

[59] Ehrmann, *Compte rendu à la Faculté de médecine de Strasbourg des travaux anatomiques exécutés à l'amphithéatre de cette faculté pendant les années 1824 et 1825*. He discussed cancerous tumours on page 47.

[60] He stated: "*Le cancer, cette maladie si terrible et malheureusement si fréquente, nous a fourni plusieurs pièces. Je vous ai déjà parlé de celui de l'utérus; celui des mamelles peut être examiné sur deux préparations, trois autres représentent cette maladie à la lèvre inférieure. Ces derniers cancers ont été enlevés sur le vivant, et l'opération a été couronnée de succès.*" Ibid., 47. The nineteenth century pathological anatomy collection, described in Chapter 2, also included two amputated limbs donated by Dr. Marchal.

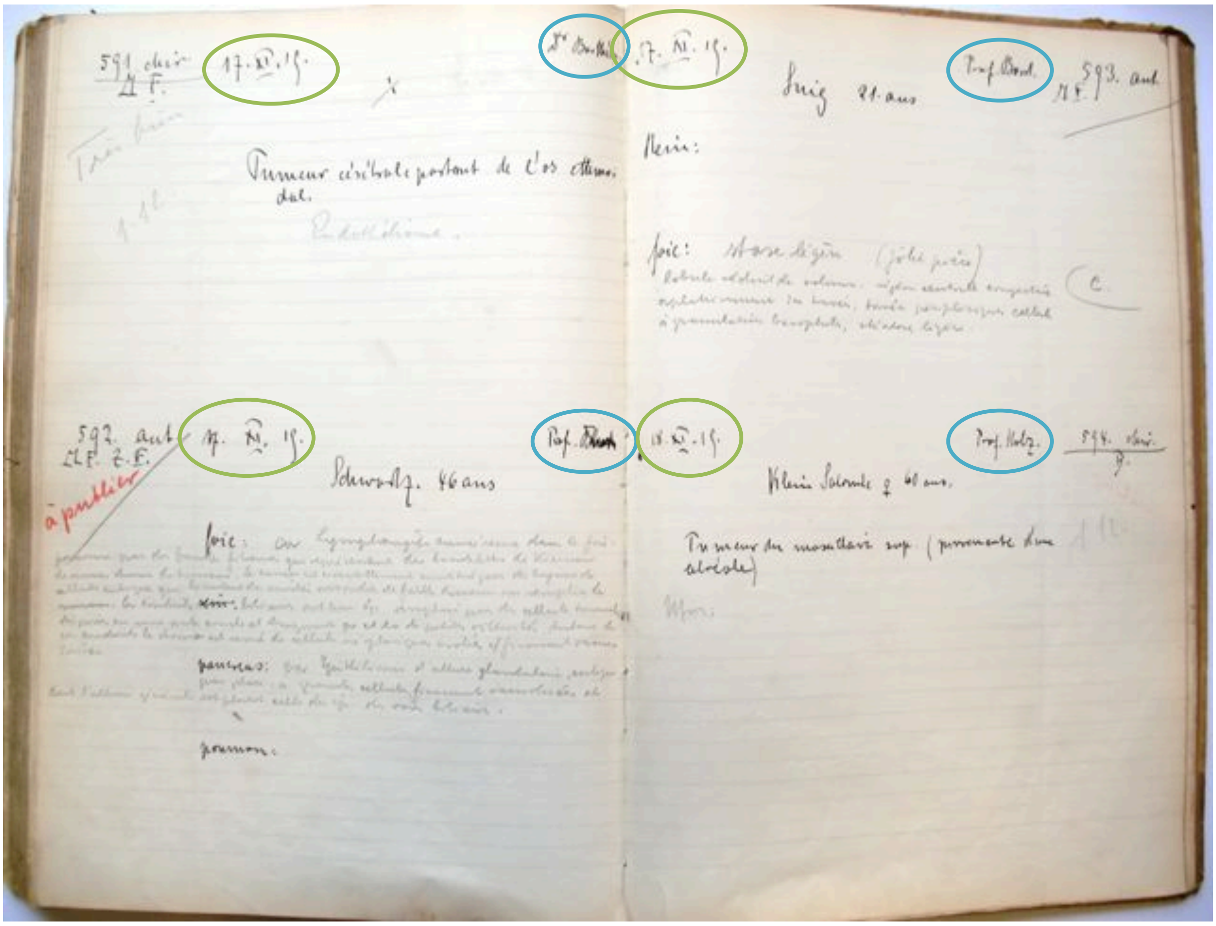

Figure 3.13 Sample page of logbook indicating the origin of the specimen.
The source of the samples are circled in blue and the date in green.[61]

In 1919, 571 surgical piece examinations were recorded. Of the 571 specimens examined, 70 percent were sent specifically from the surgical units of the medical school and hospital, *Chirurgicale I* and *Chirugicale II,* or personally from surgeons Dr. Louis Sencert or Dr. Stolz who worked in these units.[62]

The transfer of surgical specimens to Strasbourg's pathology laboratory was articulated from 1919, when Pierre Masson was appointed chair and director of the *Institut d'Anatomie Pathologique de Strasbourg.* Masson requested research material from surgeons. This translated to hundreds of extirpated specimens being redirected to his lab.

In Strasbourg, Masson's request for surgical specimens has been deduced as implicit from the laboratory logbooks, with his past experience in mind. When Masson moved to Montreal in 1927, he made a very explicit request for surgical material. He requested and received full "*contrôle scientifique*" of all anatomy, biopsy and surgical pieces from patients. This was clearly stated, initially, in a 1927 convention and again in his 1931 contract:

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[61] Book 1. Régistres de laboratoiree. AIAPS. Photo: T. Close-Koenig
[62] These surgical units were later renamed Chirurgicale A and Chirurgicale B.

"Professor Pierre Masson will have the responsability and in consequence absolute control, not only of autopsy pieces, but equally of the totality of surgical pieces collected."[63] ;

"Scientific control of all the anatomy and biopsy pieces from hospital and dispensary patients, as well as the operatory pieces from paying patients treated in one of the three hospitals."[64]

This reinforces and confirms what I have deduced that he did in Strasbourg. It illustrates that he actively went after what he needed for his research and teaching. It also illustrates how the situation in Strasbourg influenced this. At the Strasbourg medical school, research and teaching were in scientific institutes and medical clinics located in a number of buildings built closely connected and tied together. The proximity of the pathological anatomy institute with the clinics facilitated exchanges. Georges Weiss, dean of the medical school, contrasted this against the isolated research and clinical facilities at other French medical schools.[65] Their proximity was pronounced advantageous for developing each specialty and in turn facilitating consultation with a neighbouring laboratory, "and consequently, a regular exchange of ideas between clinicians and diverse specialists, physiologists, histologists, chemists, etc."[66] But, laboratories and research were not (only) about ideas, encompassing material needs were also primordial in order to function (amongst innumerous other elements). The lending of surgical specimens to a research laboratory was exemplary of this.

In bringing surgical material from living patients into the institute, Masson brought life into the institute. In the interwar period autopsies continued to be an important activity for the institute and a rich source of specimens. But they were not enough. In 1924, Masson's work was described as "breathing life."[67] He was preoccupied, the description goes on to say, not only with the terminal stage, but with the tranformations of diseases. Masson himself pronounced:

> "Pathological anatomy is not an old and outdated science. It is a productive and mature science, whatever may be said. Those who say otherwise show that they do not understand [...] many pathologists have been content to describe and label lesions, they

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[63] Convention entre l'Hôpital Notre-Dame et le Professeur Pierre Masson. 1 décembre 1927. Cote E38, 90/7/2/1, Pierre Masson, 66. AUM. (My translation.)
[64] Contrat entre l'Université de Montréal et le professeur Pierre Masson. 2 juin 1931. Cote E38, 90/7/2/1, Pierre Masson, 80. AUM. (My translation.)
[65] *Travaux de l'Université de Strasbourg pendant l'année scolaire 1921-1922. Rapports présentés par le conseil de l'université et par MM. les doyens des facultés* (Strasbourg: Imprimerie Alsacienne, 1923), 3.
[66] *Ibid., 2.* (My translation.)
[67] E. G., "Le Professeur P. Masson," 379. (My translation.)

are dried as herbarium plants. We seek to understand lesions, to relate them to their causes, to predict their effects: we study them in motion. In a word, we try to give pathology its rightful place in general biology."[68]

Masson's approach necessited examining and studying lesions from living patients, via surgical specimens. He was recognized as having played a role in the renaissance of French pathological anatomy and in his eight years in Strasbourg, he dominated French pathological anatomy and obtained an international reputation.[69] Amongst his accomplishments were, for example, the founding of the periodic *Annales d'Anatomie pathologique médico-chirurgicales.*[70] This initiated change in the institute, as the univeristy authorities recognized in 1921:

> "In the German period, the essential part of the pathological anatomy was lent to autopsies and macroscopic examinations, its services were organized accordingly. Today, thanks to Mr. Masson, who is in this regard the most famous scientist of France, histology examinations have expanded considerably, workers crowd into the laboratory."[71]

Masson's involvement in multi-disciplinary teams in the early years of his career made collaboration with surgeons natural. Masson claimed that "it was chiefly by surgical material that human histopathology could progress."[72] Further, sending surgical material to pathologists followed a well-travelled path, that of sending cadavers to the morgue in the pathology institute. He also observed that pathologists nearly always (except when opposed by the family) had scientific property of cadavers from hospitals annexed to medical schools, so it was natural to confide them with operating material from surgical services.

This was, in practice, a two-way exchange. The surgeons provided the institute with research and teaching material. The pathologists provided surgeons with information pertainig to the histopathology, the microscopic cellular structure, of the piece they had extirpated. As a medical school institute, they were focused on knowledge production and went forward in this pursuit collaboratively. In the early 1920s collaborative publications were numerous between

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[68] From Masson's inaugural lesson in Montreal, 1927. Cited by Cabanne, "Pierre Masson. Précurseur et rénovateur (1880-1959)," 97. (My translation.)
[69] Le Docteur Pierre Masson (1880-1959) (Doc 24) .Cote P22/N. 247. Dossiers biographiques de médecins et de l'histoire de la médecine au Québec. Pierre Masson. AUM.
[70] He founded the journal in 1924 with Gustave Roussy and three surgeons, B. Cunéo, R. Grégoire, P. Lecène. It later was renamed *Annales de Pathologie*.
[71] p. 60. Rapports présentés par le Conseil de l'Université et par MM. Les Doyens des Facultés. 1921. (My translation.)
[72] "Rapport de M. P. Masson," 1922, p. 4, folder 89, box 9, series 500A, RG 1.1, Rockefeller Foundation Archives, RAC.

Pierre Masson and Strasbourg surgeons Louis Sencert and René Leriche.[73] Masson instilled an exchange with surgeons that introduced a rich influx of raw materials for pathology research and teaching.

3.2.3 Transporting material.

The examination and study of surgical pieces first required getting them to the pathology institute laboratory. Although these were small pieces, they were not easy to transport. Rather than transferring corpses (somewhat simply and directly) from hospital clinics to the morgue via the underground tunnel connecting the building and bringing them up from the morgue to the autopsy theatre on the hydraulic lift, surgical specimens had to be placed in recipients and transported. In the early 1920s, the majority were transported very short distances from the medical school and hospital clinics to the pathological anatomy institute, perhaps through the same underground tunnels used for corpses. But there were others that travelled from further away, from other cities, from other countries.

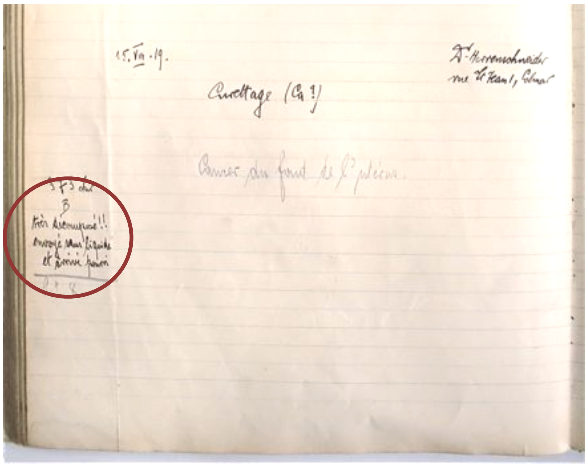

Figure 3.14 Sample page of laboratory logbook exemplary of the transport question, 1919
This sample from Colmar was "*très decomposée!!*"

[73] For example, Pierre Masson and Louis Sencert, "Cancer des cellules interstitielles," *Bulletin de l'Association Française pour l'Etude du Cancer* (Juillet 1923); Pierre Masson and Louis Sencert, "A propos d'un cas d'hypernéphrome métastatique," *Bulletin et Mémoires de la Société des Chirurgiens de Paris* May (1923); Pierre Masson and Rene Leriche, "Recherches sur la physiologie pathologique de l'invagination intestinale chronique," *Lyon Chirurgicale* (Mai-Juin 1920): 325-343. Strasbourg histologist Max Aron also published with surgeons: Max Aron and Louis Sencert, "Sur quelques phénomènes physiologiques mis en évidence par une grossesse ectopique," *Comptes Rendu de la Société de Biologie* LXXXIII (1920): 233-234; Max Aron and René Simon, "Recherches sur la morphogénèse des os longs par la méthode des greffes embryonnaires," *Comptes Rendu de la Société de Biologie* LXXXV (1921): 943-945.

The further the network of exchange extended and Masson's institute's reputation grew, the more important logistics of transport became. They needed to be organized and albeit they did not always arrive in a condition that permitted examination, as with that indicated in the image above which arrived "decayed."

Masson underlined that the value of a histopathology examination depended always on the preliminary manoeuvre: *le prélèvement des pieces.*[74] The sampling of tissue was often in the hands of the practitioners.[75] Laboratory manuals were intended to instruct medical students and laboratory workers on laboratory techniques. There was however another type of manual, that intended for medical practitioners. In 1920, Emile Agasse-Lafont, an advocate of laboratory medicine, encouraged practitioners to take tissue samples.[76] He recommended removing suspicious fragments and sending it off to those who master their cutting, examination, as well as, interpretation of the result. He also published a reference book for practitioners, in which he reviewed the illnesses and symptoms for which one or more laboratory tests or examinations were important complements to clinical exams.[77] Laboratory manuals written for practitioners are testimony of early clinical laboratories. They further indicate that if specimens and samples travelled between two medical school buildings, they also travelled further between clinicians and laboratories.[78]

Transporting or sending tissue specimens was not a simple matter. It was first slipped into a glass jar with a fixative, such as formol or Bouin solution. The glass jar then had to be sent through the postal service. The logistics of this did not only concern tissue samples for histopathology, but all types of human specimens.

Peter Twohig discusses the problems encountered when physicians attempted to send different types of specimens to laboratories via postal services in Canada.[79] Not only were samples often dried out or too small, but they could be dangerous, i.e. germ-laden dust. In

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[74] Pierre Masson, *Diagnostics de laboratoire. II : Tumeurs & Diagnostics histologiques*, Traité de pathologie médicale et de thérapeutique appliquée (Paris: A. Maloine, 1923), 624.
[75] The word *Biopsie* was a term coined by French dermatologist Ernest Henri Besnier in 1895. The same year as the word lab.
[76] Emile Agasse-Lafont, *Les applications pratiques du laboratoire à la clinique*, 3rd ed. (Paris: Vigot Frères, 1920), 60. In this 1920 laboratory manual, Agasse-Lafont addressed four pages on histological diagnosis of tumours. He incites questioning differentiation between inflammatory or neoplastic and of cutaneous nodule, removed by biopsy, whether it was syphilis, tuberculosis, sporotrichosis, leprosy, cancer, etc.
[77] Emile Agasse-Lafont, *Le laboratoire moderne du practicien* (Paris: Vigot Frères, 1932).
[78] This interaction and the founding of clinical laboratories are the focus of some recent historical studies, cited above. For example, in the US, Crenner, *Private practice in the early twentieth-century medical office of Dr. Richard Cabot*. In Canada, Twohig, *Labour in the laboratory*. In Norway, Hammerborg, "The laboratory and the clinic revisited."
[79] Peter L. Twohig, "Organising the bench: Medical laboratory workers in the Maritimes, 1900-1972" (Dalhousie University, 1999), 68-71; Twohig, *Labour in the laboratory*.

Nova Scotia (Canada), diseased tissues were only considered acceptable for the mail when enclosed in specially constricted double tin cases, closely packed with absorbent matter, and with closely fitting screw caps. In the early 1930s, one thousand containers were distributed to Nova Scotia physicians, but samples continued to be sent in inadequate packages.

Not only was there risk of the jar breaking in transit, which would be hazardous to the postal carrier and would be the end of the sample, but there were potential risks of contamination. These were recognized for bacteriology samples in France, as well, and guidelines to prevent contamination were published by the *Ministre de l'Intérieur* as early 1912. These instructed how to pack bacteriological samples:

> "1) The material and liquid must be in a thick glass bottle and sealed with wax.
>
> 2) The bottle is to be wrapped in a thick layer of cotton and set in a solid metal box.
>
> 3) This metal box is to be placed in a second wood box, perfectly closed.
>
> 4) Each parcel must carry the words, beside the address, "*Matières destinées à un examen bactériologique.*"
>
> 5) The parcels of this nature will only be accepted by laboratories responsible for bacteriological examinations."[80]

That such guidelines were created and published indicates that there effectively were specimens in circulation.[81] Not only were samples in circulation, they were numerous and messy enough to warrant guidelines. They were also fearfully dangerous. This fear was captured and described in a short story, *The stolen bacillus*, by H. G. Wells in 1895.[82]

> "Only break such a little tube as this into a supply of drinking water, say to these minute particles of life that one must needs stain and examine with the highest powers of the microscope even to see, and that one can neither smell nor taste ... and death - mysterious, untraceable death, death swift and terrible, death full of pain and indignity - would be released upon this city, and go hither and thither seeking his victims."

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[80] Agasse-Lafont, *Les applications pratiques du laboratoire à la clinique*, 24. cites a *Circulaire du ministère de l'Intérieur du 2 février 1912.* (My translation.)

[81] In addition, to complementing the above search for clinic laboratories, these guidelines witnesses an active bacteriology analysis activity in the first of the century.

[82] H. Wells, *The stolen bacillus and other incidents*, Methuen's Colonial Library (London: Methuen, 1895).

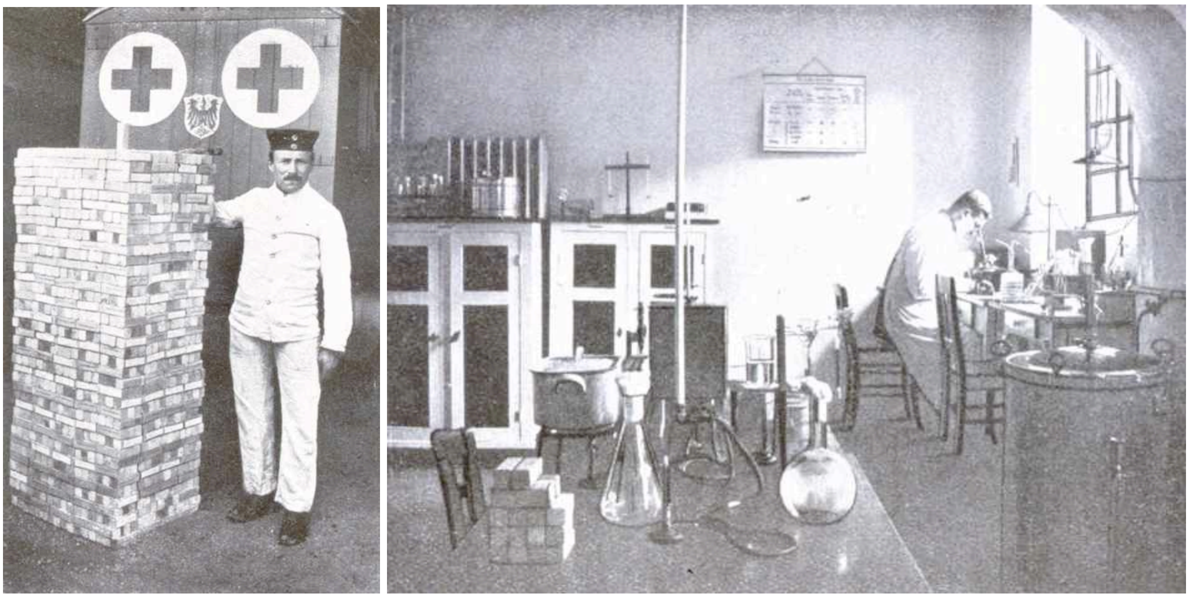

Figure 3.15 Lazaret Military Hospital in Strasbourg, 1916.
These photos show examples of bacteriology specimen boxes: in the first photo, a month's worth of *Hüllen vom Untersuchungsmaterial*; in the second photo, wrapped and addressed on the lab bench.[83]

The Lazaret Military Hospital in Strasbourg, for example, received bacteriology specimens in uniform packages, *Hüllen vom Untersuchsmaterial*. The stock photographed here were those received in one month in 1916. These small boxes were approximately 12cm x 4cm x 4cm in size and wrapped in paper. Biopsy and tissue samples sent to laboratories presumably were similarly packaged in Strasbourg.

Figure 3.16 Crates of small jars. Perhaps from biopsy samples, *Institut d'Anatomie Pathologique*.
These small glass jars and vials may have been used for sending tissue samples.[84]

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[83] Source: "Hôpital, Lazaret, Intérieur" *Das Festungs-Lazarett* (Strassburg im Elsass, 1916).
[84] Photo: T. Close-Koenig

Figure 3.17 Pink cardboard box and glass jars. [85]

The sturdy small pink double-cardboard boxes measuring 10cm x 8cm x 8cm were found in abundance in the pathological anatomy institute, as well as the 9cm x 3cm glass jars pictured above.[86] These handmade cardboard boxes and small glass jars most likely date from about the mid-century. However, those of the interwar period were possibly similar, and may be those stored in wood crates in the institute attice, also pictured above.

A comparative parentheses: Surgery and pathology in North America

Before closing this section on circulating and incoming surgical materials of the pathology institute, a brief comparison can be made with medical schools in North America.

Strasbourg had previously received special approval and extensive coverage in Abraham Flexner's 1912 report on medical education in Europe.[87] Early in 1922 Abraham Flexner of the Rockefeller Foundation visited the French Strasbourg medical school. In the midst of the post-war reorganisation, contacts with Abraham and Simon Flexner had generated hopes for financial support by the Rockefeller Foundation.

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[85] Photo: T. Close-Koenig

[86] The boxes were a large unused and outmoded stock. Such sturdy packaging was not needed when plastic containers were introduced.

[87] Abraham Flexner, *Medical education in Europe: A report to the Carnegie foundation for the advancement of teaching* (New York: Bulletin du Carnegie foundation for the advancement of teaching, 1912).

a. 

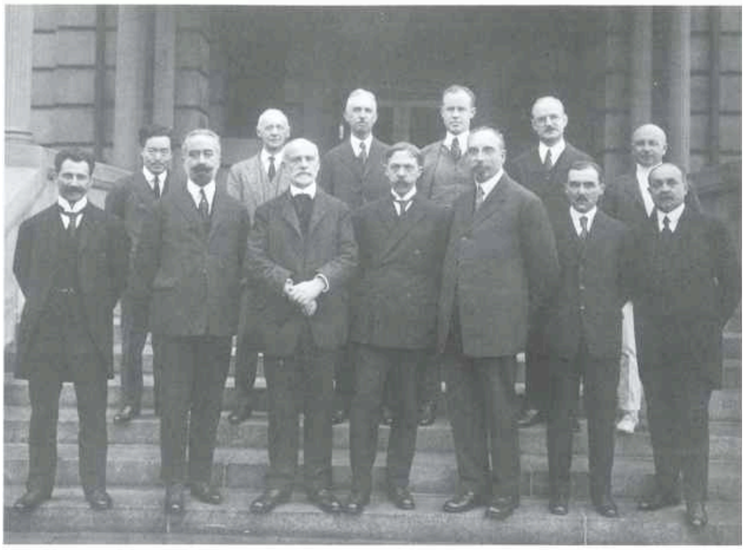
b. 

Figure 3.18 The Strasbourg delegation visiting American medical schools, 1922.
a. On the boat. Masson is the second from the left and Pautrier on the far right.[88]
b. In the front row, left to right, Blum, Pautrier, Weiss, Masson, Nicloux, Duverger, Bouin. [89]

Flexner invited a group of seven Strasbourg medical professors to visit a number of American medical schools. Masson accepted the invitation, on the condition that he could also visit Montréal, which he had heard much about from two Canadian students, Louis-Charles Simard and Joseph-Edouard Morin. The trip was funded by the Rockefeller Foundation. George Weiss (dean of the medical school and professor of biophysics), Léon Blum (professor of clinical medicine), Paul Bouin (professor of histology), Camille Duverger (professor of ophtalmology), Pierre Masson (professor of pathological anatomy), Maurice Nicloux (professor of physiological chemistry) and Lucien Pautrier (professor of dermatology) visited the Rockefeller Institute, Cornell University, Memorial Hospital and

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[88] Reproduced from: Cribier, *Lucien Marie Pautrier*, 137.
[89] Reproduced from: Héran, *L'histoire de la médecine à Strasbourg*, 479. Note that this is incorrectly labelled in Héran's book.

Columbia University in New York, the Military Hospital in Washington, the University of Pennsylvania in Philadelphia, Washington University in St. Louis, Johns Hopkins University and the School of Hygiene in Baltimore, Harvard University in Boston, Bouin visited the University of Michigan in Ann Arbor and Pautrier, Masson, Duverger and Weiss visited the Université de Montreal.[90]

They submitted a report of their impressions to the Rockefeller Institute. Masson commented on the overall lack of surgical matter sent to pathologists; extirpated material was only given to professors of exceptional reputation.[91] At Columbia, he suggested that the omission was due in part to the distance separating the laboratory and the hospital.[92] Otherwise, surgeons had their material examined by histologists in their own employment. The sending or sharing of surgical specimens with pathologists was uncommon in the United States, especially compared to his expereience in Strasbourg.

In Montreal, the situation was different. A pathology laboratory was created at the Hôtel-Dieu hospital in 1903.[93] From 1908, all operatory pieces were sent to the pathological anatomy laboratory for the pathologist to examine and return a report on. From 1921, these examinations were imperatively histological. Eugène Latreille (1879-1928), chair of pathological anatomy at the *Université de Montréal* medical school, performed these examinations as well as autopsies gratuitiously. Granted the American situation described by Masson, the surgeons in Montreal were quite accustomed to sending their surgical material to the pathologist.[94]

Circulating material (procuring raw material), transforming materials, and recirculating them is necessary for histopathology research, and in fact for all laboratory research. This section has emphasized what materials circulated and how. In the next section, material tranformations are described. In these considerations, centre stage lies between scientists, lab workers, and their networks of providers on one side and customers of histopathology information and products on the other. Unlike other accounts of laboratories, the reference model of diffusion of these materials is not limited to the academic model where

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[90] "Report by Dean Weiss of the Observations of the Strasbourg Commission on their visit to the United States," November 10, 1922, folder 89, box 9, series 500A, RG 1.1, Rockefeller Foundation Archives, RAC
[91] "Rapport de M. P. Masson," 1922, folder 89, box 9, series 500A, RG 1.1, Rockefeller Foundation Archives, RAC.
[92] "Report by Dean Weiss of the Observations of the Strasbourg Commission on their visit to the United States," 1922, p. 4, folder 89, box 9, series 500A, RG 1.1, Rockefeller Foundation Archives, RAC.
[93] Marcel Cadotte, "Historique du laboratoire de pathologie de l'Hôtel-Dieu de Montréal : de sa création en 1896, à l'arrivée du professeur Pierre Masson en 1928," *L'Union Médicale du Canada* 108 (n.d.): 479-494.
[94] It would be interesting, although beyond the scope of this project, to further explore surgeons regularly sent material to pathologists in Canada; to examine the situation at the McGill teaching hospital, as well as other Canadian hospitals.

research diffuses through teaching to integrate professional practices. This is an economic model where research diffuses through supply and demand.

3.3 Laboratory production: Transforming material, making slides.

The samples sent to the pathologist were pieces of human tissues. How did this gross anatomy material become sleek microscope slides?

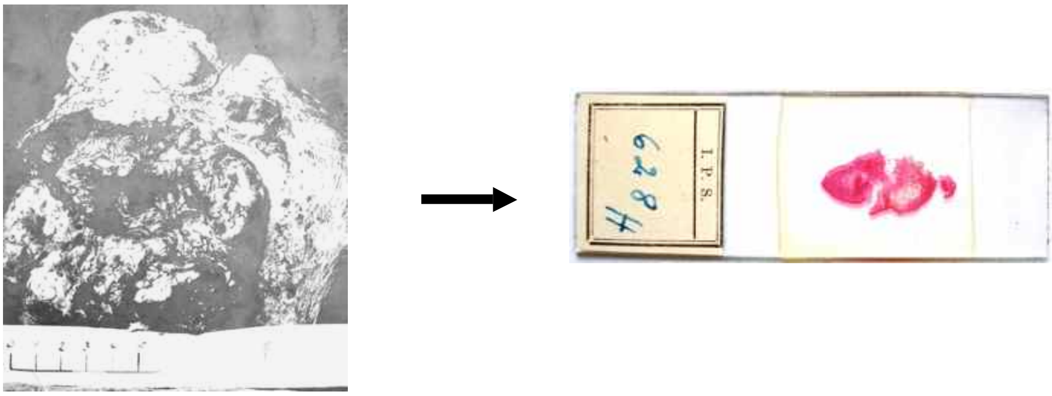

Figure 3.19 From gross anatomy to sleek slide.[95]

This section details the techniques and practices involved in this transformation. In addition to scientists, materials, and their circulation thusfar described in this chapter, practices are prerequisite to understanding laboratory dynamics. Practices have been the focus of history of life sciences work by Hans-Jorg Rheinberger, in his exploration of epistemic objects in the laboratory.[96] John Pickstone has characterized the practices of laboratories in ways of knowing.[97] And Bruno Strasser has compared laboratory and museum practices.[98] Strasser's work on laboratories and museums stems from questions of experimental versus natural

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[95] Photo on the left reproduced from laboratory logbook (Entry 334B). Photo of slide 628H on the right: T. Close-Koenig. Note that this slide does not correspond to this photograph. There are few photos and, unfortunately, I could not access the slide that would correspond to this examination.
[96] H. J Rheinberger, *Toward a history of epistemic things: Synthesizing proteins in the test tube* (Stanford: Stanford University Press, 1997).
[97] Pickstone, *Ways of knowing*.
[98] Bruno Strasser, "Collecting, comparing, and computing sequences: The making of Margaret O. Dayhoff's Atlas of Protein Sequence and Structure, 1954–1965," *Journal of the History of Biology* 43, no. 4 (2009): 623-660; Bruno Strasser, "Laboratories, museums, and the comparative perspective: Alan A. Boyden's serological taxonomy, 1925-1962," *Historical Studies in the Natural Sciences* 40, no. 2 (2010): 149-182; Bruno Strasser, "The experimenter's museum: GenBank, natural history, and the moral economies of biomedicine, 1979-1982," *Isis* 102, no. 1 (2011): 60-95.

history practices in life sciences broached and debated by a number of historians of biology over the last thirty years.[99]

3.3.1 Developments of histological techniques

Extirpated surgical pieces were, in the anatomical sense, gross. They were raw or unprepared for histopathology. They could only be examined macroscopically. Histopathologists re-conditioned these pieces, producing slices on slides. This transformation and the subsequent examination was what they offered surgeons in exchange for the raw material. The production of histopathology slides was an expertise that pathologists held. This required transforming three-dimensional pieces removed in autopsy or in surgery into a (almost) two-dimensional slice on a slide. It further required transforming colourless slices into something visible and differentiable. This was done using histology methods.

The term histology was coined in 1819 for the study of tissue and microanatomy.[100] Techniques and processes were created, modified, and refined, especially once reliable microscopes were available, from 1830 onward.[101] The development of micro-techniques particularly for the identification of cell structure abnormalities and disturbances followed the 1860s and Rudolf Virchow's propagation of the cell theory.[102] However, until the latter decades of the nineteenth century, use of stains was limited to carmine and sectioning instruments to a razor blade.[103]

In Strasbourg, microscopy and histology were taught and applied in research as early as the 1830s and promoted in the 1850s under the name *histologie pathologique* and *anatomie*

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[99] Garland E. Allen, *Life sciences in the twentieth century*, Cambridge history of science series (Cambridge and New York: Wiley, 1975); Garland E. Allen, "Naturalists and experimentalists: The genotype and the phenotype," *Studies in history of biology* 3 (1979): 179-209; Jane Maienschein, Ronald Rainger, and Keith R. Benson, "Introduction: Were American morphologists in revolt?," *Journal of the History of Biology* 14 (1981): 83-87; Ronald Rainger, Keith R. Benson, and Jane Maienschein, *The American development of biology* (New Brunswick: Rutgers University Press, 1991); Kohler, *Landscapes and labscapes. Exploring the lab-field border in biology*, Chapter 2; and recently discussed by Gordon McOuat, "Are the life sciences truly revolting? Classifying, natural kinds, and the birth of modern biology" (presented at the Canadian Society for the History and Philosophy of Science Annual Meeting, Fredericton, May 30, 2011).

[100] Bracegirdle, *A history of microtechnique. The evolution of the microtome and the development of tissue preparation.*, 308 cites A. F. J. K. Mayer, *Ueber Histologie und eine neue Eintheilung der Gewebe des menschlichen Körpers bei Gelegenheit der Eröffnung seiner Vorlesungen über Anatomie* (Bonn: Marcus, 1819). This booklet was translated into French within a year.

[101] Bracegirdle, *A history of microtechnique*, Chapter 7.

[102] Bracegirdle, *A history of microtechnique. The evolution of the microtome and the development of tissue preparation.* Rudolf Virchow, "Cellular-Pathologie," *Virchow, Archiv* 8 (1855): 3-39.

[103] However, in the words of Bracegirdle, the German histological scene in the 1880s and 1890s was characterized by "the preoccupation with dyestuffs and microtomes" albeit "as vehicules for possible prestious publications [rather] than as true contributions to knowledge." Bracegirdle, *A history of microtechnique*, 334.

pathologique microscopique.[104] In 1856 the first course in microscopy [*micrographie*] was offered to medical students in Strasbourg.[105] Histopathology in research was adopted from the mid-century and was even promoted as a diagnostic tool by C. E. Sédillot in his study of 30 cases of cancer published in 1846, by J. Bach in his study of goiters published in 1855, and by E. Michel in his microscopy and pathological anatomy manual of 1856.[106] From 1872 onward, histopathology was used in research undertaken by Recklinghausen, his collaborators and his successors.[107] Recklinghausen, himself however, employed simple techniques in his research, he used neither complicated techniques to prepare histology slides, nor refined techniques to stain them: "his primary instrument for microscopic research remained a razor blade."[108] Freehanded cutting with a razor was usual before the 1870s. Microtomes were developed in the late nineteenth century.[109]

Histology and microscopy techniques co-existed with macroscopy observations of autopsy material in the late nineteenth and early twentieth century. In Strasbourg, a *Institut d'Histologie* and chair of histology were created in 1919. Their research remained distinct from the activity of the *Institut d'Anatomie Pathologique*. At this latter institute, histology and histopathology were brought notably into focus from 1919, with the arrival of Pierre Masson.

3.3.2 Non-stability of histological techniques

Histology was a series of techniques encountered indiscriminately in anatomy, physiology, and pathology research. The use of histology as a common technique across most life sciences

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104 Jacques Héran, "La théorie cellulaire s'impose en France grâce à Strasbourg," in *Histoire de la médecine à Strasbourg* (Strasbourg: La Nuée Bleue, 1997), 225-226. See also anonymous entries in the same volume, p.227 and 229.

105 Héran, *L'histoire de la médecine à Strasbourg*, 226. In addition, microscopy had been introduced in medical training in Paris in 1836; Morel would publish the French histology manual *Précis d'histologie humaine* in 1860; and a number of medical doctors and surgeons at the Faculté de Médecine in Strasbourg promoted the crossing of the clinic and the microscope or the laboratory. Ackerknecht alluded to the intertwining of French and German ideas in Strasbourg, stating "It was no accident that medical microscopy was cultivated officially there earlier than elsewhere in France." Ackernecht, *Medicine at the Paris hospital*, 28. See also: Ann La Berge, "Medical microscopy in Paris, 1830-1855," in *French medical culture in the nineteenth century*, ed. Ann La Berge and Mordechai Feingold (Amsterdam and Atlanta: Rodopi, 1994), 296-326.

106 Charles-Emmanuel Sédillot, *Recherches sur le cancer* (Silbermann, 1846).; J. A. Bach, *De l'anatomie pathologique des différentes espèces de goitres du traitement préservatif et curatif* (Strasbourg, 1855).; M. Michel, *Du microscope, de ses applications à l'anatomie pathologique* (Baillière, 1857).

107 Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 188-199.; Georg Dhom, *Geschichte der Histopathologie* ((Berlin, New York): Springer, 2001).

108 Bonah, "Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXeme siècle," 601. cites Marchand, "Friedrich von Recklinghausen" in *Medizinische Klinik*, N° 39, 1919: 1554.

109 As mentioned earlier, Bracegirdle provides a thorough history of microscope technique.

was noted in the preface to Kingsbury and Johansen's manual, *Histological Technique. A guide for use in a laboratory course in histology*, in 1935.

> "Inasmuch as the methods - for the microscopic examination of animal structure are fundamentally the same, whether the structure is normal or pathological, the approach medical or zoological, it is believed that there has been here produced a book of much broader usefulness, without in any way sacrificing its value in histological work of more specific application … While the aim has been to present methods for the microscopic examination of any animal form, the emphasis is nevertheless placed on the technical needs of the premedical (or medical) student and the student of Entomology."[110]

Methods and techniques spread via education and training programmes; via word of mouth and imitation, but also via manuals. The publication of such manuals may indicate the stabilization of a practice and the apparition of subsequent editions indicative of the adoption of techniques. Histology techniques were outlined notably in handbooks and textbooks on microscopy. Practical books on microscopy and histology technique were published for botany, zoology, protozoology, amateur microscopy, medical microscopy, animal histology, botanical histology, pathological histology, mineralogy.[111] These present details of microscopes, microtomes, section-cutting techniques and mounting procedures, staining, and collecting. The number of histology textbooks for medicine increased in the late nineteenth century; witnessing the rising interest in histology in medical schools.[112] The step-by-step instruction presented in these manuals was used notably for research, and although it would be later applied to medical practice through laboratory diagnosis, the techniques were developed and mastered by medical researchers.

Masson was recruted to Strasbourg in 1919 for his renown as a histologist. He had both science and medical training. At 39 years old, he obtained the chair of pathological anatomy, from laboratory assistant to the highest rank in French universities in one step. From working as an assistant under Borrel in Paris to working on equal standing in Strasbourg. The dean of the medical school recognized him as an elite histologist.[113] And to his credit, he had

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[110] B. F. Kingsbury and O. A. Johannsen, *Histological technique. A guide for use in a laboratory course in histology* (New York: John Wiley and Sons, 1935).

[111] Brian Bracegirdle has published a selective bibliography of books on microscopy specimens and their preparation that appeared in England, Germany, France and the United States between 1830 and 1910. Bracegirdle, *A history of microtechnique*.

[112] Ibid., Chapter 3.

[113] *Travaux de l'Université de Strasbourg pendant l'année scolaire 1919-1920. Rapports présentés par le conseil de l'université et par MM. les doyens des facultés*, 19.

coined what would become one of the most common staining techniques, Masson's trichrome. Masson was described as having a prodigious sense of observation.[114] He was acknowledged as an exceptional scientist.

Maurice Langeron in his *Précis de microscopie* cited and discussed the techniques elaborated by Masson.[115] This volume or manual on laboratory microscopy was received with enthusiasm and went through seven editions between 1913 and 1949. In fact, the references to Masson in the 1921 (3rd) edition of *Précis de microscopie* were numerous. Langeron discussed techniques used by Masson for: cleaning slides; inclusion; gluing sections to slides with gelatine; mounting with Canada balsam; Masson's trichrome staining (perfection and 3 variations of Mallory's stain); Masson's use of saffron stain; Masson's recommendations for Mann's staining with erythrosine and toluidine blue and Ramon y Cajal's trichrome staining; and the list goes on. Pierre Masson, himself, published two editions of a textbook on histology diagnosis.[116] Langeron cited publications of Masson, but also mentioned personal communication and thanked his "excellent friend."[117] The (well worn) copy from the *Institut d'Anatomie Pathologique* library, in fact, bears the following handwritten inscription: "*au Professeur P. Masson. très cordialement M Langeron*."[118]

Despite the numerous manuals of histology techniques, these were not easily appropriated or applied, rather it was mastered through experience and hands-on practice. There was a great deal of fragility in the technique: the delicacy of taking a good sample (in terms of location, orientation, and without crushing) and packing (without deformation) for transport (by clinicians and surgeons); the susceptibility of the cells to autolysis; the importance of temperature and duration of fixation; the variability of fixing fluid action (to be

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[114] R. L. "Joseph-Luc Riopelle: Pathologiste et Homme de Culture" *Le Mum* 3 mars 1972, page 3. P22/N,1299 Dossiers Biographiques de Médecins et de l'Histoire de la Médecine au Québec. Riopelle, Joseph-Luc. AUM.

[115] M. Langeron, *Précis de Microscopie* (Paris: Masson et Cie., 1921). Langeron references Pierre Masson and the techniques he elaborated, as such, this text can be considered a reflection of the techniques used in Strasbourg. And vice versa, Masson cites Langeron in his 1923 volume.

[116] Masson, *Tumeurs & Diagnostics histologiques*; Pierre Masson, *Tumeurs humaines: histologie, diagnostics et techniques* (Paris: Maloine, 1956).

[117] Maurice Langeron and Masson had much in common. They were both from Dijon, and although Langeron was six years elder, they obtained a baccalaureate from the same school (*Collège Saint François de Sales*), a science diploma (PCN) from the same university (*Faculté des sciences de l'Université de Dijon*), and both went to Paris to medical school. Further, Langeron's father was an attorney (*avocat*) at the *Cour d'Appel de Dijon*, where Masson's father was a councillor (*conseiller*) and Masson's older brother was close in age to Langeron. These are, in addition, the likelihood of their being members of the same biology or medical societies/network. "Maurice Langeron," *Mycopathologica* 6, no. 1 (1951): 58-64; "Maurice Langeron (1874-1950) - Fonds d'archives de l'Institut Pasteur", n.d., http://www.pasteur.fr/infosci/archives/lan1.html; Castel, "Pierre Masson (1880-1959)"; as well as Langeron, *Précis de Microscopie*, 468.
In addition to citing on other instances: Pierre Masson, "Le safran en technique histologique," *Comptes Rendu de la Société de la Biologie* LXX (1911): 573; Pierre Masson, "Imprégnation argentique du pigment," *Comptes Rendu de la Société de la Biologie* LXXV (1913): 210.

[118] Note however that Masson did not take this volume with him to Montreal.

considered according to the type of microscopic examination to be performed); the indispensability of rendering the sample solid enough and sufficiently insoluble to not hinder but to favour staining; the importance of sufficient penetration of paraffin (or other); the difficulty of accomplishing thin, regular, intact sections; etc. such that what one should not do, was as important as much as what a one should do.[119] The techniques involved a considerable amount of such *savoir faire.* Masson stressed that the cut was primordial to the final examination. But whereas the instrument was of importance, more determinant was the histologist's technique. For example, Masson provided hints that were not always transmitted in textbooks, such as "blowing hot air with a wide open mouth on the knife and on the slice being cut."[120] Artefacts were to be avoided at all costs and could ensue at any step of the process. Much trial and error was involved; the task of histologists has been said for example, "not to make a stain work, but to figure out how it had worked the first time – that is, to make it work more than once."[121] This may be said of every step in the process. Those using histology techniques in their research were experimenting with it in the first decades of the twentieth century. For example, in 1910, Claudius Regaud also experimented, adding formaldehyde to a dichromate mixture to make a fixative (that continues to be used for cytological studies);[122] Antoine Lacassagne formulated a fixative;[123] and Pol Bouin, chair of histology at Strasbourg between 1919 and 1945, formulated the widely used Bouin's fixative (Picric acid, formalin and acetic acid fixative). [124]

Histology, albeit long used as a technique in the life sciences, was not stable or fully standardized in the beginning of the twentieth century. The complexity of the technical facet of producing histopathology slides places their production in the hands of able specialists and researchers.[125]

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[119] Masson, *Tumeurs & Diagnostics histologiques*.
[120] Ibid., 666. (My translation.)
[121] William R. Everdell, *The first moderns* (Chicago: University of Chicago Press, 1997), 107.
[122] Bracegirdle, *A history of microtechnique*, 61. cites C Regaud, 1910. "Etudes sur la structure des tubes séminifères et sur la spermatogénèse chez les mammifères" Arch. d'Anat. Micr. 11:291-431, see page 293-294.
[123] Bonah, "Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXeme siècle"; Bonah, *Instruire, guerir, servir. Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXe siècle*.
[124] Pol Bouin, "Phénomènes cytologiques anormaux dans l'histogénèse et l'atrophie expérimentale du tube séminifère." (Thèse de médecine, Nancy: Université de Nancy, 1897), 19.
[125] On medical specialization, see Weisz, *Divide and conquer. A comparative history of medical specialization*; Weisz, "Naissance de la spécialisation médicale dans le monde germanophone"; Weisz, "The emergence of medical specialization in the nineteenth century"; George Weisz, "The development of medical specialization in nineteenth-century Paris," in *French medical culture in the nineteenth century*, ed. Ann La Berge and Mordechai Feingold (Amsterdam and Atlanta: Rodopi, 1994), 149-188.

A technical parentheseses: Histology techniques

Once they had arrived at the laboratory, surgical and biopsy specimens had to be reconditioned, in order to be manipulated and interpreted in laboratory terms. Contrary to gross specimens that could be preserved on a table with a few simple instruments (once the chemical solutions were prepared), histology slides were prepared on laboratory benches with a line of bottles of chemicals, basins and recipients, knives and scissors, microtomes and microscopes, etc. Histology techniques were the means for such reconditioning. Via these techniques, the sample was transformed into an object uniform in size and format: from an irregular gross specimen to a sleek slice on a slide.

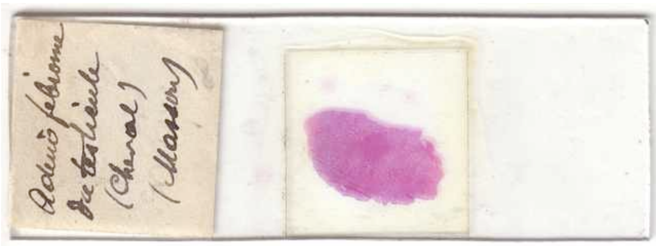

Figure 3.20 Slide prepared by Pierre Masson.
This slide was kept in his own personal collection of slides in Strasbourg. Dated 12 October 1912.[126]

In 1923, Masson published a two part treatise on histology techniques.[127] The first book, titled *Tumeurs* was 620 pages of descriptive text of different tumours. The second, titled *Diagnostics Histologiques,* detailed histology techniques in 100 pages. Here I will present technical sequence of events described by Langeron and by Masson. This is what histopathologists were doing to transform tissue samples for study.

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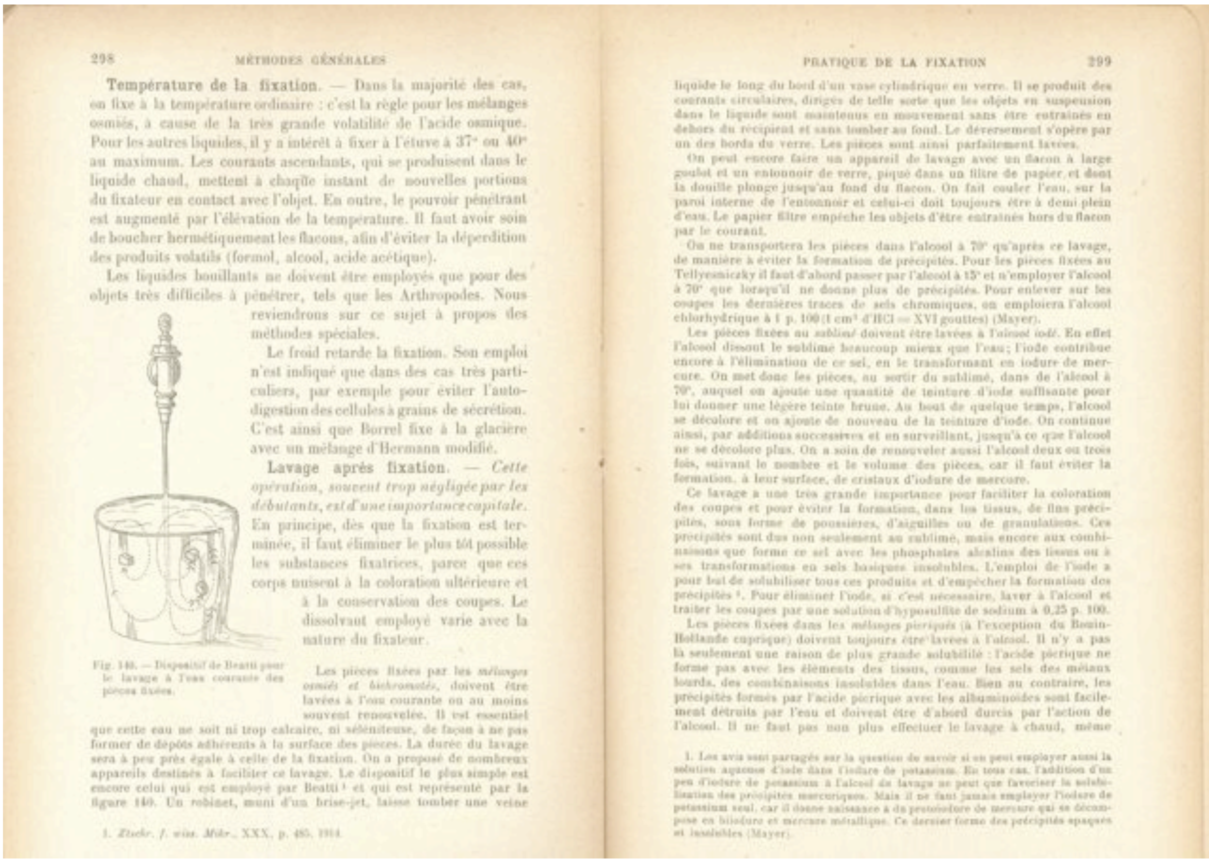
[126] Photo: T. Close-Koenig
[127] Masson, *Tumeurs & Diagnostics histologiques*.



298 MÉTHODES GÉNÉRALES

Température de la fixation. — Dans la majorité des cas, on fixe à la température ordinaire : c'est la règle pour les mélanges osmiés, à cause de la très grande volatilité de l'acide osmique. Pour les autres liquides, il y a intérêt à fixer à l'étuve à 37° ou 40° au maximum. Les courants ascendants, qui se produisent dans le liquide chaud, mettent à chaque instant de nouvelles portions du fixateur en contact avec l'objet. En outre, le pouvoir pénétrant est augmenté par l'élévation de la température. Il faut avoir soin de boucher hermétiquement les flacons, afin d'éviter la déperdition des produits volatils (formol, alcool, acide acétique).

Les liquides bouillants ne doivent être employés que pour des objets très difficiles à pénétrer, tels que les Arthropodes. Nous reviendrons sur ce sujet à propos des méthodes spéciales.

Le froid retarde la fixation. Son emploi n'est indiqué que dans des cas très particuliers, par exemple pour éviter l'autodigestion des cellules à grains de sécrétion. C'est ainsi que Borrel fixe à la glacière avec un mélange d'Hermann modifié.

Lavage après fixation. — *Cette opération, souvent trop négligée par les débutants, est d'une importance capitale.* En principe, dès que la fixation est terminée, il faut éliminer le plus tôt possible les substances fixatrices, parce que ces corps nuisent à la coloration ultérieure et à la conservation des coupes. Le dissolvant employé varie avec la nature du fixateur.

Fig. 140. — Dispositif de Beatti pour le lavage à l'eau courante des pièces fixées.

Les pièces fixées par les *mélanges osmiés et bichromatés*, doivent être lavées à l'eau courante ou au moins souvent renouvelée. Il est essentiel que cette eau ne soit ni trop calcaire, ni séléniteuse, de façon à ne pas former de dépôts adhérents à la surface des pièces. La durée du lavage sera à peu près égale à celle de la fixation. On a proposé de nombreux appareils destinés à faciliter ce lavage. Le dispositif le plus simple est encore celui qui est employé par Beatti[1] et qui est représenté par la figure 140. Un robinet, muni d'un brise-jet, laisse tomber une veine

1. *Ztschr. f. wiss. Mikr.*, XXX, p. 485, 1914.

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liquide le long du bord d'un vase cylindrique en verre. Il se produit des courants circulaires, dirigés de telle sorte que les objets en suspension dans le liquide sont maintenus en mouvement sans être entraînés en dehors du récipient et sans tomber au fond. Le déversement s'opère par un des bords du verre. Les pièces sont ainsi parfaitement lavées.

On peut encore faire un appareil de lavage avec un flacon à large goulot et un entonnoir de verre, piqué dans un filtre de papier et dont la douille plonge jusqu'au fond du flacon. On fait couler l'eau, sur la paroi interne de l'entonnoir et celui-ci doit toujours être à demi plein d'eau. Le papier filtre empêche les objets d'être entraînés hors du flacon par le courant.

On ne transportera les pièces dans l'alcool à 70° qu'après ce lavage, de manière à éviter la formation de précipités. Pour les pièces fixées au Tellyesniczky il faut d'abord passer par l'alcool à 15° et n'employer l'alcool à 70° que lorsqu'il ne donne plus de précipités. Pour enlever sur les coupes les dernières traces de sels chromiques, on emploiera l'alcool chlorhydrique à 1 p. 100 (1 cm³ d'HCl = XVI gouttes) (Mayer).

Les pièces fixées au *sublimé* doivent être lavées à l'*alcool iodé*. En effet l'alcool dissout le sublimé beaucoup mieux que l'eau; l'iode contribue encore à l'élimination de ce sel, en le transformant en iodure de mercure. On met donc les pièces, au sortir du sublimé, dans de l'alcool à 70°, auquel on ajoute une quantité de teinture d'iode suffisante pour lui donner une légère teinte brune. Au bout de quelque temps, l'alcool se décolore et on ajoute de nouveau de la teinture d'iode. On continue ainsi, par additions successives et en surveillant, jusqu'à ce que l'alcool ne se décolore plus. On a soin de renouveler aussi l'alcool deux ou trois fois, suivant le nombre et le volume des pièces, car il faut éviter la formation, à leur surface, de cristaux d'iodure de mercure.

Ce lavage a une très grande importance pour faciliter la coloration des coupes et pour éviter la formation, dans les tissus, de fins précipités, sous forme de poussières, d'aiguilles ou de granulations. Ces précipités sont dus non seulement au sublimé, mais encore aux combinaisons que forme ce sel avec les phosphates alcalins des tissus ou à ses transformations en sels basiques insolubles. L'emploi de l'iode a pour but de solubiliser tous ces produits et d'empêcher la formation des précipités[1]. Pour éliminer l'iode, si c'est nécessaire, laver à l'alcool et traiter les coupes par une solution d'hyposulfite de sodium à 0,25 p. 100.

Les pièces fixées dans les *mélanges picriqués* (à l'exception du Bouin-Hollande cuprique) doivent toujours être lavées à l'alcool. Il n'y a pas là seulement une raison de plus grande solubilité : l'acide picrique ne forme pas avec les éléments des tissus, comme les sels des métaux lourds, des combinaisons insolubles dans l'eau. Bien au contraire, les précipités formés par l'acide picrique avec les albuminoïdes sont facilement détruits par l'eau et doivent être d'abord durcis par l'action de l'alcool. Il ne faut pas non plus effectuer le lavage à chaud, même

1. Les avis sont partagés sur la question de savoir si on peut employer aussi la solution aqueuse d'iode dans l'iodure de potassium. En tous cas, l'addition d'un peu d'iodure de potassium à l'alcool de lavage ne peut que favoriser la solubilisation des précipités mercuriques. Mais il ne faut jamais employer l'iodure de potassium seul, car il donne naissance à du protoiodure de mercure qui se décompose en biiodure et mercure métallique. Ce dernier forme des précipités opaques et insolubles (Mayer).

Figure 3.21 Sample page of histology manual.[128]

First, and before shipping it, the piece was immersed in 10 times its volume of diluted formol or Bouin fluid (or other fixative). The first step, fixation, kills the cells, thereby preventing their alteration or decay. Langeron labelled it "the cornerstone" of all good histology.[129] But tissue shrinks in some fixatives and loses features in others. A well fixed piece would maintain the cells' fine structure and would not present signs of vacuolation, swelling, or atrophy. Diluted formol and Bouin liquid were referred to as universal fixatives, but Langeron mentioned and discussed numerous others.[130] Masson discussed seven most

[128] Langeron, *Précis de Microscopie*, 298-299.
[129] Langeron, *Précis de Microscopie*, 265.
[130] Ibid., 267-289. The 31 he discussed included: *acide chromique, acide osmique, bichromates, bichlorure de mercure, chlorure de platine, acide acétique cristallisable, acide picrique ou trinitrophénol, peroxyde de benzol, alcool méthylique, alcool éthylique, formaldéhyde, acétone, mélange de Flemming ou chromo-acéto-osmique, mélange de Hermann ou platino-acéto-osmique, mélange de Borrel, mélange de Lindsay Johnson, mélange d'Altmann, mélange de Champy, mélande bichromaté de von Tellyesniczky, mélange de Orth ou Müller-formol, sublimé acétique, sublimé alcoolique de Schaudinn, mélange de Mann, mélange de Gilson, mélange de Zenker, mélange de Helly, picroformol de Bouin, mélange de Bouin-Hollande ou picro-formol cuprique, mélange de Duboscq-Brasil, mélange au sublimé et à l'acide picrique de Mann, mélange picronitique de Mayer.* Langeron dated the majority of these combinations to the latter two decades of the nineteenth century, thereby indicating that this was a rich period of fixation research and that a number of solutions from this period were continuing to be used into the twentieth century. This period, expectedly, followed improvements in optical quality of microscopes.

commonly used.[131] In 1935, Kingsbury and Johannsen listed 26 solutions.[132] They went on to add,

> "In the combination of chemicals in fixing solutions such as those mentioned above, they should be chosen to supplement each other's actions as far as possible and correct or counteract each other's defects. The combinations must be chosen always with a view to the result desired, and frequently the components and their relative amounts must be determined empirically, by experiment."[133]

Just as important as the choice of fixative was the removal or washing out of the fluid in order to optimize the cutting quality, the ease with which it could be stained, to avoid precipitates forming in the tissue, giving illusory effects, distortions, or at least a dirty appearance to the preparation. Different fixatives could accentuate, contribute or inhibit different stains. Experimenting with fixing and staining techniques was correlated.

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[131] The seven include: Picroformol ou Liquide de Bouin; Picroformol alcoolique ou liquide de Duboscq-Brasil; Zenker-formol; Liquide de Borrel; Formol; Alcool absolu; Alcool formolé. And in the 1956 edition of the text: Formol ou formaline; Alcool absolu; Alcool formolé; Picroformol ou Liquide de Bouin; Picroformol cuprique de Hollande; Picroformol alcoolique ou liquide de Duboscq-Brasil; Bichromate de potassium-formol (Orth); Zenker-formol (Helly); Sublimé formol de Lacassagne. Masson, *Tumeurs & Diagnostics histologiques*, 632-637.

[132] Their list includes: Chloride and acetic acid; Zenker's fluid (dichromate, sublimate-acetic); Zenker-formol; formol-dichromate (Orth's fluid); copper dichromatc-sublimate-acetic; picro-aceto-formol; osmo-aceto-dichromate (Bensley's); Hermann's fluid (platino-aceto-osmic); Flemming's fluid (chromo-aceto-osrnic); Champy's fluid; Carnoy and LeBrun's fluid; Gilson's fluid (mercuro-nitric); Petrunkevitch's fluid; picro-nitric; picro-aceto-sublimate (v. Rath's). Further, while not balanced fixers, they list the following as serviceable as general fixing fluids or for special purposes: alcohols; alcohol-acetic; chloroforrn-alcohol-acetic; alcohol-acetic-formol; formaldehyde (formalin); osmic acid (osmium tetroxid); Dietrich's fluid; Van Leeuwen's fluid. Obsolete as fixatives, but useful in certain cases, particularly in the technique of the central nervous system they mention: Miller's fluid; Erlicki's fluid; potassium dichromate (in aqueous solution). Kingsbury and Johannsen, *Histological technique. A guide for use in a laboratory course in histology*, 3.

[133] Ibid.

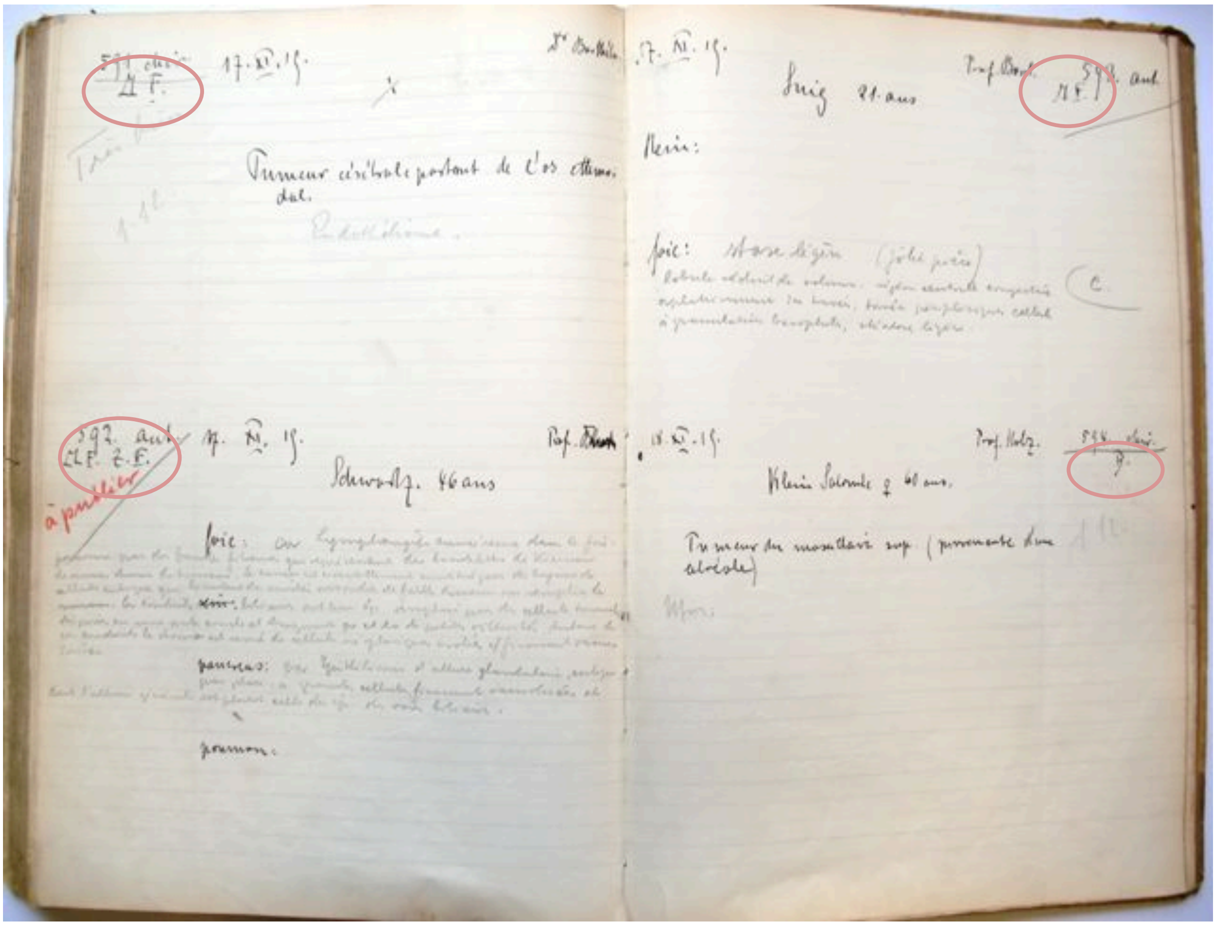

Figure 3.22 Sample of indication of fix in the laboratory logbooks, 1919.
The fix used was indicated in the outer margin and is circled here in pink: M.F., Z.F. (Zenker-Formol), B (Bouin's fluid).[134]

This fixing fluid killed the cells and preserved the morphology that they had when alive. The liquid penetrated at a rate of 1 or 2 millimeters per hour (about 24 hours total). The goal was to harden the piece quickly, without distorting or altering the structure and allowing fine structure to be revealed through coloration. Once fixed, the piece was washed or rinsed thoroughly in water or alcohol (for 24 hours). It was necessary to remove all the fixing fluid as any residue would later interfere with the staining process. The piece was cut into smaller pieces, the goal being to reveal as much structure as possible (yet only as much information as needed) and each piece was prepared for examination. The preservation of the piece was then achieved by embedding it in paraffin. Embedding the pieces involved replacing all water in the (now dead) tissue with paraffin (alternatives included collodion and celloidin[135]). This process began by dehydrating the piece with a series of alcohol baths (the sequence lasting for

[134] Book 1. Régistres de laboratoiree. AIAPS. Photo: T. Close-Koenig
[135] Langeron discussed collodion, which may be mixed with parrafin. Masson discussed celloidin, although stated it useful for research but not practical for diagnosis as it required weeks or even months to penetrate. Masson, *Tumeurs & Diagnostics histologiques*, 644-652.

over 24 hours according to Masson). The alcohol was then drained with a paraffin solvent. This was also performed via a series of baths, on average three baths (again in sequence again lasting over another 24 hours). Paraffin was heated to 55° or 60° and a paraffin bath was performed (three bath sequence taking at least yet another 24 hours). The final embedding was then completed by placing the piece in a mould filled with melted paraffin and cooling it in cool water. The piece could then be preserved indefinitely.

Figure 3.23 Preserved embedded pieces in paraffin in Strasbourg's collection.[136]

The procedure was lengthy – the specimen being ready for sectioning four to six days from fixation, more if it was large. Alternatively, by using much smaller specimens, the process was accelerated because the baths were shorter. For example, a specimen 1 millimetre thin could be ready for sectioning in about two hours, according to the time frame presented by Langeron. The results were less finely featured, but when time was a constraint, they could be sufficient.

Another alternative was freezing a fresh specimen. This required displacing the pathologist instead of the specimen. It was a technique more common in the United States, where surgical pathology was developed.[137] The frozen section technique initially involved freezing or hardening tissue in a saline and ice solution.[138] This has been traced to the early nineteenth century, but tissue diagnosis during operations in surgical pathology using frozen sections began at around the turn of the century and entered routine in the late 1920s or

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[136] Photo: T. Close-Koenig

[137] Rosai, *Guiding the surgeon's hand. The history of Americal surgical pathology*; Löwy, *Preventive strikes*, Chapter 2.

[138] James R. Wright, Jr., "The development of the frozen section technique, the evolution of surgical biopsy, and the origins of surgical pathology," *Bulletin of the History of Medicine* 59, no. 3 (1985): 295-326.

1930s.[139] The preparations permitted rapid examination, within minutes, while the patient was still on the operating table.[140]

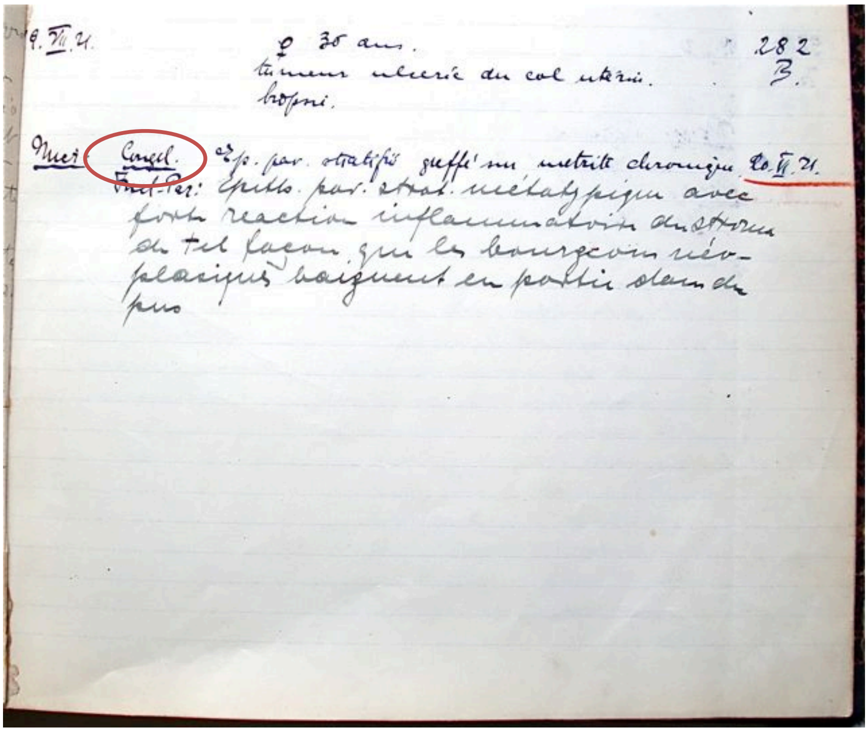

Figure 3.24 Sample page of laboratory logbook with *congel.* indicating frozen technique used, 1921.[141]

This was not a common technique in the pathological anatomy institute laboratory in Strasbourg. There are traces of the technique in entries noted "*congel*", however, the result was only sent the following day. This was herein used as a faster histology technique, but not while the surgeon waited for the examination. No trace has been found of this technique being used by the pathology institute in Strasbourg as an immediate diagnosis for surgeons before 1952.[142]

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[139] Louis B. Wilson, "A method for the rapid preparation of fresh tissues for the microscope," *Journal of American Medical Association* 45 (1905): 1737; Wright, Jr., "The development of the frozen section technique, the evolution of surgical biopsy, and the origins of surgical pathology," 302.

[140] For example, in Baltimore in 1891 William H. Welch made a frozen section of a breast tumor while William S. Halsted operated, but it took Welch so long that the operation was completed before teh microscopic diagnosis was finished. Wright, Jr., "The development of the frozen section technique, the evolution of surgical biopsy, and the origins of surgical pathology," 297 cites Joseph C. Bloodgood, "Biopsy in diagnosis of malignancy," Southern Medical Journal (1927) 20: 18-28, esp. p. 23.

[141] Book 2B. Régistres de laboratoiree. AIAPS. Photo: T. Close-Koenig

[142] In the cabinets of laboratory logbooks, the earliest dedicated to surgical pathology was from 1953: *Régistres d'examens extemporanés*. Equally, Professor Vetter suspected that the institute had really started this activity when Professor LeGal became chair and director in 1962, private communication.

Figure 3.25 Microscope from the *Institut d'Anatomie Pathologique*.[143]

In either case, before the specimen could be observed, it had to be put on a glass slide. This required slicing the piece to a thickness of 5 or 6 micrometers with a microtome, mounting it on a slide, removing the paraffin, rinsing it with a solvent, then rinsing it with alcohol and finally rinsing it with water. A microtome finely sliced biological matter and reduced the gross specimen to micrometre (µm) thin.

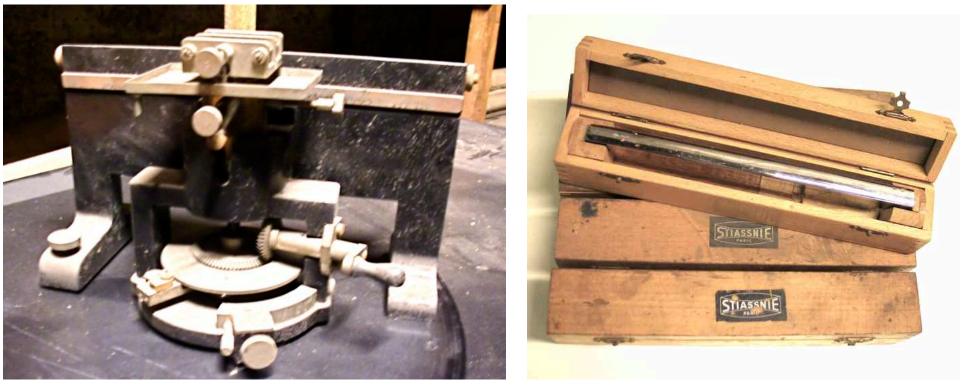

Figure 3.26 Stiassnie Minot Microtome and knives from the *Institut d'Anatomie Pathologique*.[144]

The means of sectioning the sample were numerous. Langeron and Masson both provided lengthy advice and discussion for the sharpening and positioning of blades, also they both recommended the Minot microtome manufactured by Stiassnie.[145]

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[143] Reproduced from: Le Minor et al., *Anatomie(s) et Pathologies*, 165.
[144] Photos: T. Close-Koenig
[145] Masson included a Stiassnie microtome on his list of purchases for the *Université de Montréal* in 1927. Maurice Stiassnie était le beau-fils de Constant Verick, un fabricant de microscope et un apprenti de Edmund Hartnack. Verick et Stiassnie s'associèrent en 1882, et Stiassnie succéda à son beau-père entre 1885 et 1895. Son adresse était 2, rue de la Parcheminerie à Paris durant son association avec Verick et devint M. Stiassnie, 204, boulevard Raspail, Paris après la fin de l'association. Il s'associa avec son frère en 1922 et l'entreprise devint

It was then stained with a series of stains so that the normal and pathological structure was highlighted by a contrast of colour. Coloration of the specimen enhanced differentiation. Colours were used to see. Lastly a balm was spread over it the specimen on the slide as a permanent seal.

Initially the procedures described above were rather unstable and experimental. Small technical improvements and innovations progressively stabilized steps of the process and it became reproducible. As the detailed decription reveals, the process was work intensive and time consuming. Initially a single preparation required several days for production. Performing several examinations in parallel could open significant time and work economies of scale. Improvements were also oriented to produce more rapid procedures. Techniques depended on a significant amount of tacit knowledge and work experience. The analytical utility of a preparation depended highly on the quality and experience of scientists and lab workers implicated in their preparation. Histopathology preparation transformed the tissue of a patient into a histopathological slide. On a slide, microscopic structure could be revealed to allow a morphological differentiation of tissue type. It was through these techniques that what had been invisible, the microscopic stucture of tissue and cells, was rendered visible.[146] But like for gross structure and anatomy, histopathology had to establish bridges between specimen observation and their possible clinical and surgical significance. Following the physical transformation was a process of intellectual transformation.

"Stiassnie Frères Paris". En 1936, l'adresse est 67, boulevard Auguste Blanquin. Après la seconde guerre mondiale, l'entreprise ne pouvait plus concurrencer la production allemande post 1945 et ferma. Une tentative de recréer l'usine en 1970 échoua. Source: Email de F. Lejolivet à Wallace Kelley cited by Pierre Houssin, 3 February 2006. Kingsbury and Johannsen, Histological Technique. A Guide for Use in a Laboratory Course in Histology, 3. http://forum.mikroscopia.com/index.php?showtopic=3654 consulted 15 January 2009.

[146] In a manner similar to the seventeenth century Boyle's pump experiments which manifested the 'spring of the air' and telescopes which showed the moons of Jupiter, microscopes showed cells. However, showing a diagnosis or prognosis was a more complex undertaking, requiring slide preparation and visual interpretation.

3.4 Laboratory production: Informing material

3.4.1 Informing/research via histology and staining

In histopathology, tissue samples are tranformed into histopathology slides, this transformation can be broken down into techniques and practical steps as described above. Once produced, pathologists looked at the slides through microscopes.

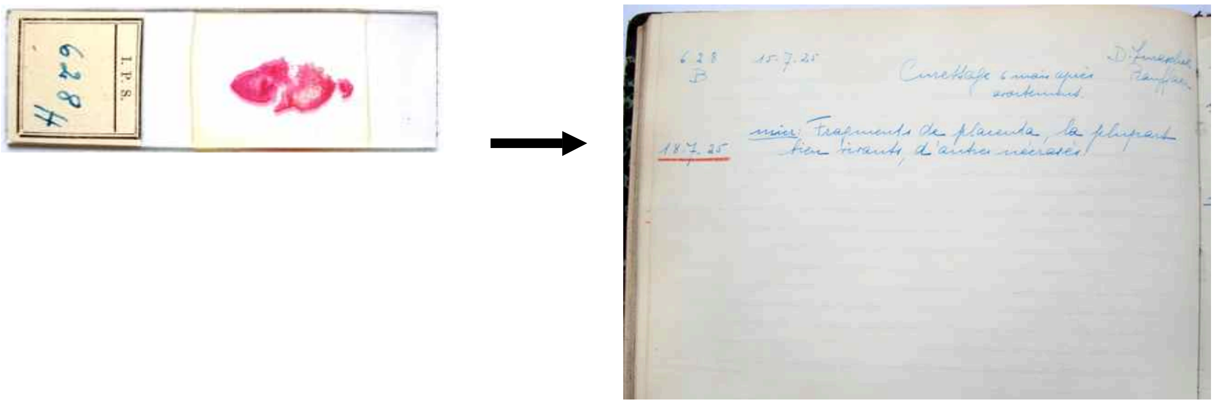

Figure 3.27 Histopathological slide and Histopathology report

From the above slide, the report on the right was produced. What does this translation process entail or how does a slide get transformed into words?

Before being articulated into words, the stained tissue is observed through the objective lens of a microscope. This is very different from an encounter with a messy gross specimen.

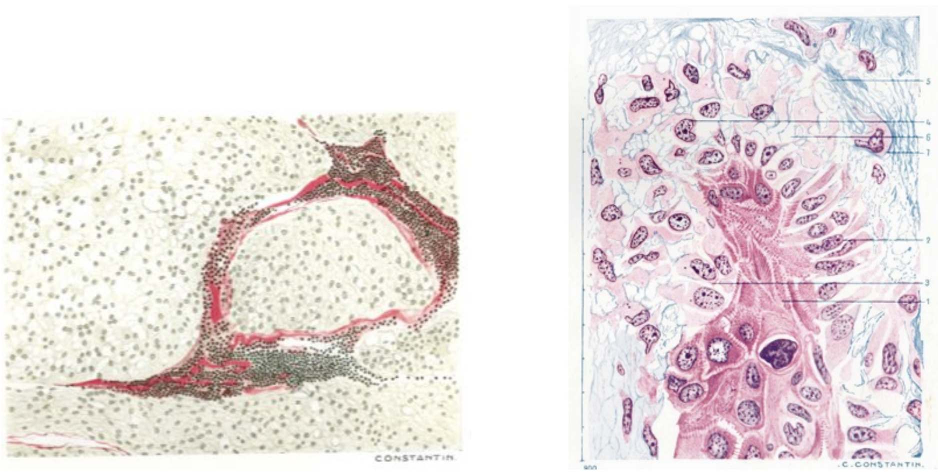

Figure 3.28 Histopathological slide illustrations.[147]

[147] On the left: Bazy et Peyron, *Atlas du Cancer*, XVeme série. Pl. I Fig. A.
On the right: Masson, *Atlas du Cancer*, VIIeme série A - Pl. IV Fig. D.

A histopathology slide viewed through a microscope lens reveals a pretty picture.[148] What was observed? Histo-pathologists saw more than the pretty picture that an untrained eye would see. Pathologists constructed knowledge by systematically correlating clinical information, autopsy findings, and histopathology observations. In constructing knowledge, histopathology images contributed to distinguishing between diseases and disease groups. Once knowledge was established pathologists reversed the knowledge production process: to recognize disease in viewing a slide prepared from a tissue sample provided by clinicians and surgeons. Knowing what to look for or how to see "something" when looking through the microscope eyepiece involved knowing and seeing cell and tissue structure morphology in the stained tissue.[149] Histo-pathologists reconstruct the presence or absence of specific diseases from the shapes and lines. Similarly, cartographers (or geographers and explorers) know the lay of the land, in all its dips and peaks, and can identify an unlabelled map.[150]

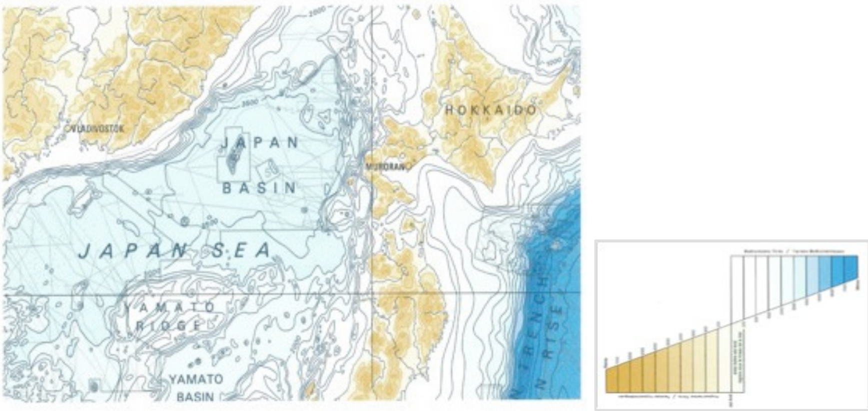

Figure 3.29 Topographical map
This map of the Japan Sea is a chart depicting depth (blue bathymetric tints) and altitude (tan hypsometric tints) with 21 colour gradations.[151]

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[148] Alberto Cambrosio, Daniel Jacobi, and Peter Keating, "Ehrlich's 'beautiful pictures' and the controversial beginnings of immunological imagery," *Isis* 84, no. 4 (1993): 662-699.
[149] See Ludwik Fleck, "Scientific observation and perception in general (1935)," in *Cognition and fact - materials on Ludwik Fleck*, ed. R. S. Cohen and T. Schnelle (Dordrecht: D. Reidel Publishing Company, 1986), 59-78; Ludwik Fleck, "To look, to see, to know (1947)," in *Cognition and fact - Materials on Ludwik Fleck*, ed. R. S. Cohen and T. Schnelle (D. Reidel Publishing Company, 1986), 129-151; Ian Hacking, "Do we see through a microscope?," *Pacific Philosophical Quarterly* 62 (1981): 305-322.
On the prodution and function of images in science, see Catherine Allamel-Raffin, "La production et les fonctions des images en physique des matériaux et en astrophysique" (Thèse de doctorat de sciences, technologies et sociétés, Strasbourg: Université Louis Pasteur, 2004); Catherine Allamel-Raffin, "La complexité des images scientifiques," *Communications & Langage* 149 (2006): 97-111.
[150] That is, topography in the North American sense meaning the study of relief maps.
[151] Reproduced from: Tufte, *Visual Explanations*, 76. Tufte reproduced it from *General Bathymetric Chart of the Ocean*. International Hydrographic Organization (Ottaway, Canada, 5th edition, 1984). 5.06.

Coincidentally, pathologists referred to the texture of tissue revealed by staining as topography. Both Langeron and Masson used the word topographies to speak of microscopy imagery. For example, when looking through the microscope objective, "we get a full view of the topography of the object and can then centre on the most interesting points"[152]; and in discussing types of tissue samples being "of notable topographical value."[153] But what underlied the use of this term?

In topography, terrain is mapped with elevation contour lines, hypometric limits and relief shading. In topographical images, and generally in cartography, colour is a code. The legend of a map acting as a primer, indicating what each colour zone represents and makes a link between maps and landscapes. The colour coding adds additional information as a natural quantifier. Colour associates value with saturation levels that span a fineness of distinction and is comparable to measurement. Further, every colour marks another variable. Topographies illustrate interplay of colour and contour. Because natural quantifiers associate numerals with colour saturation, colours add information to what would otherwise be just an image or another pretty picture.

Edward Tufte analyses cartography and graphic design in terms of theories of vision, which have shown that cognitive processing attributes considerable, even decisive, weight to contour information.[154] However, rather than an artists (or cartographers) choice of colours for indicating contrast and visual distinctions clearly and effectively, the slide imagery reproduced or replicated the colours used in staining. Stains give different tones through chemical reactions to different elements of cells and tissues. Masson, accordingly, compared the microscope image to a demonstrative polychrome diagram where each coulour corresponds to a determined object.[155]

[152] Langeron, *Précis de Microscopie*, 138.
[153] Masson, *Tumeurs & Diagnostics histologiques*, 623.
[154] Josef Albers, *Interaction of color* (New Haven: Yale University Press, 1963); Johannes Itten, *The art of color* (John Wiley and Sons, 1974). Also, for a demonstration of this principle see: http://www.rotorbrain.com/foote/interactive/hacks/colorinteraction1
[155] "*figures de démonstrations polychromes.*" Masson, *Tumeurs & Diagnostics histologiques*, 624.

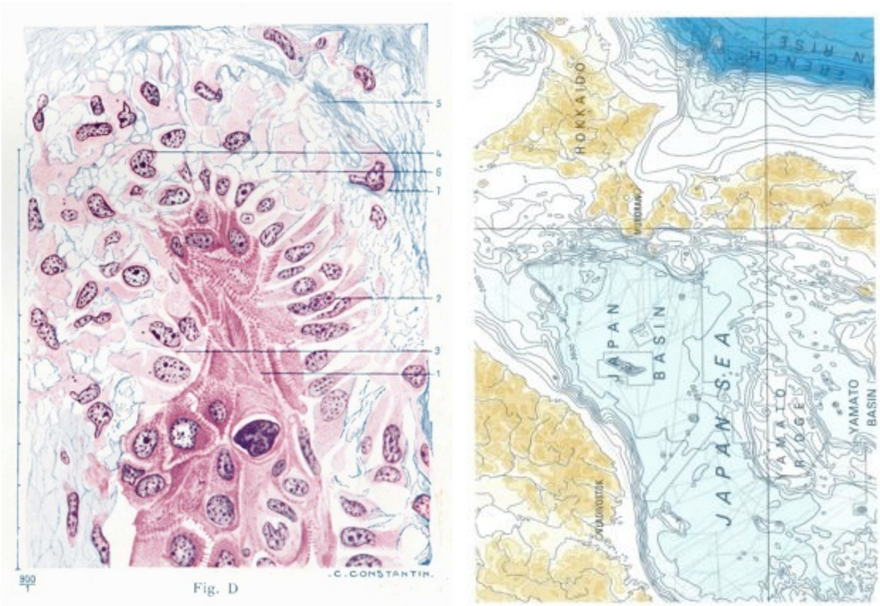

Figure 3.30 Stained tissue and topographic maps, side by side.

It is with contours and colours that a pathologist recognizes the modification of the stained epithelial cells of a mixed tumour of the parotide in the left image above and that a geographer recognizes the bathymetric and hypsomentric units the Japan Sea in the image on the right. How does colour add information in histopathology? In histopathology, colouring is not just the codification information in a reproduced image, it is the result of chemical reactions between stain and cell. In this sense, it is chemical reactions that indicate the presence or absence of certain cell structures or components. Consider Masson's trichrome stain used for the above histology preparation.[156] It involved staining with three colours: one base that fixes on the nucleus and two acids, one staining cytoplasms and the other collagens. By differentiating collagen fibres, tumours developed at the expense of connective tissue, sarcomas, could be identified. This was a focus of Masson's work in Paris, where he published on *Sarcome épithéliode sous cutanée de la cuisse, Sarcome de la clavicule, Sarcome du sein*, etc.[157]

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[156] He was not the first to use a trichrome process. For example, the oldest and most used were those of Van Gieson.

[157] Pierre Masson and Rouget, "Sarcome épithéliode sous-cutané de la cuisse," *Bulletin et Mémoires de la Société d'Anatomie de Paris* (January 1909); Pierre Masson and Gauducheau, "Sarcome de la clavicule," *Bulletin et Mémoires de la Société d'Anatomie de Paris* (Février 1909); Pierre Masson and Nornard, "Sarcome du sein," *Bulletin et Mémoires de la Société d'Anatomie de Paris* (Février 1909); Pierre Masson, "Sarcome des parties molles de la cuisse," *Bulletin et Mémoires de la Société d'Anatomie* (March 1909); Pierre Masson and Chifoliau, "Epithélio-sarcome du corps thyroide," *Bulletin et Mémoires de la Société d'Anatomie* (Juin 1909); Pierre Masson, "Myxosarcome de l'avant-bras d'origine musculaire," *Bulletin de la Société d'Anatomie* (1923); Pierre Masson, "Rhabdomyosarcome du front," *Bulletin de la Société Française de Dermatologie et Syphligraphie* (1924).

This opens the question of how and what stains are chosen to highlight tissue structures without losing certain data and highlighting other data. This dilemma was acknowledged by early twentieth century histologists and was discussed in laboratory manuals. In his 1923 book, Masson surveyed histology stains. He described the different stains, detailing their chemical composition and preparation, directions for their use, anticipated results, advice on what to do and what not to do. Elective stains, which colour only certain tissue constituents, were of particular interest. However, no staining procedure permitted one to see all tissue or all structure simultaneoulsy. Some stains were used notably for diagnosis. Others were adapted for illustrating or identifying one structure more than another. The various methods each had advantages and disadvantages. Some stains would be used to produce practical knowledge and others to produce scientific knowledge. Masson advised familiarity with these and advised against sticking to one method. This suggests the complexity of choosing stains to highlight tissue structure: different stains colour different constituents. Stains could be chosen in accordance to what was being sought. As such, histologists had to know how to colour relevant tissues to reinforce signs of specifics sought without losing relevant data.[158]

Via rigid and exact technical application, the presence of specific structures and degrees of cellular differentiation became criteria for knowing, and classifying, tumours. The stains embedded and revealed information in the slice of tissue.

In their book *History of Chemistry*, Bernadette Bensaude-Vincent and Isabelle Stengers, discuss the approach to chemical industry research in the twentieth century, in which the definition of the product preceded the conception of the materials.[159] They notably discuss one aspect of industrial expansion, the race for new materials. This coincided with a new logic in industrial production: with a given function to be performed, a material with the corresponding properties, such as weight, resistance to pressure and temperature, electric or magnetic conductibility, was sought. As more functions were integrated into a material it became more complex. An "informed material," in the sense that it became information-rich, was elaborated.[160] A study of the relationship between a material and information it is

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[158] This may be worth exploring in terms of what Harry Collin's calls experimenter's regression. Harry M. Collins, "Son of seven sexes: The social destruction of a physical phenomenon," *Social Studies of Science* 11, no. 1 (1981): 33 -62.

[159] Bernadette Bensaude-Vincent and Isabelle Stengers, *Histoire de la chimie* (Paris: Editions la Découverte, 1995), 241.

[160] Andrew Barry, in an article on pharmaceutical research, is the only I have found to use the idea of informed material. He argues: "Although the materials produced by chemists have always been informed, the development of contemporary pharmaceutical research has fostered new forms and levels of informational enrichment."

considered to be enriched with is revealing of the definition of the material.[161] The idea of informed materials is interesting as a base from which such a relationship may be developed.

The microscope revelation of tumour tissue and the pathologists' recognition of different types of tissue were fundamental to histopathology identification of disease. In research, specimens are endowed with information and become scripts from which disease histories can be elaborated. As new information came to be identified with tissue structures, tissues effectively became information-rich. Once the language was written, it could be read; tissues became informed and informative material. Further a set language was not written and kept forever, it was continuously changing. Reading it required constant adaptation. The informed and informative were circular and jointly evolving in a continuous process of medical knowledge production. The images of microscopic tissue structure became a means of defining and classifying diseases. As such, histopathology slides transmuted into inscription devices providing information on the state and evolution of disease.

3.4.2 Informing via morphological classification

Classifying according to morphological stucture was another way to inform histopathologically. In his 1923 volume on tumours, Masson wrote on their description and classification. The tumours were defined or classed by their cellular type and their degree of differentiation. This systematic approach presupposed that for any given cellular type, the existence of a tumoral entity and the distinction of its benign or malignant character.

Masson described cancer cells as "edifying the tumour by its fecondity and by the reaction that it provokes. It is this, by its differentiation, that cancer had a particular distinctive form. It is this that must be the base of morphological classification."[162] Masson performed a systematic study of human tumours based on histological technique and on the cell line from which each tumour was issued. He defined the malignity of tumours as a function of cellular differentiation. In practice Masson preferred to attentively study a small number of cases in the most ideal conditions, that is, with his histological techniques, than to examine long series of cases or statistics.

Andrew Barry, "Pharmaceutical matters. The invention of informed materials," *Theory, Culture & Society* 22 (2005): 52.

[161] The idea of "informed materials" also evokes other ideas of how materials are used in scientific research (for instance, K. E Kasza et al., "The cell as a material," *Current opinion in cell biology* 19, no. 1 (2007): 101–107.)

[162] Masson, *Tumeurs & Diagnostics histologiques*, 113.

Here the knowledge production process was one of collecting and subsequent defining and classifying and redefining.[163] This was an analytical way of knowing similar to a traditional approach in pathological anatomy, as seen in Chapter 2.

Depiction of the microscopic images described above is like the natural history reliance on visuals.[164] In fact, natural history is relevant on different levels here. The underlying emphasis on chemistry investigations in the Oxford definition of laboratories cited above underlines what might be considered a distinction from the natural history approach that was prominent in life sciences and medicine between the seventeenth and nineteenth centuries.[165] That is, a distinction has been traced between experimental and natural history approaches. The anatomy and pathological anatomy practices described in the previous chapter were natural history practices; collecting, describing, comparing and naming natural objects.[166] Such natural history practices revolved around collections and were associated with museums, as was the case in nineteenth century anatomy and pathological anatomy in Strasbourg analyzed in the previous chapter. The anatomy preparations were tools for display, tools for producing knowledge, and tools for communicating knowledge. The *Pathologisches Institut* built in the 1870s, however, incorporated laboratories alongside collection displays and museum.

In the weft of this study, the first chapter considered the anatomy activity and collection, identified with the museum. In the present chapter, the activity branched off to laboratories. Albeit, there was a time lapse over which they were co-existent and it is arguable that pathology laboratory practices were comparable to those of museum practices: procuration, preparation and preservation, and collection of specimens, in addition to examination, description and publication. In the upcoming chapter, the laboratory activity bissects. From a research and teaching laboratory to one that is nearly solely occupied with service examinations. Again, there is a time lapse over which they co-existed and the practices were comparable: procuration, preparation and collection of specimens, examination, description and publication.

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[163] On defining disease entities: Fabrice Gzil, "Alzheimer a-t-il découvert ou crée la maladie d'Alzheimer?," *Histoire des Sciences Médicales* 41, no. 4 (2007): 359-370; Robert A. Aronowitz, *Making sense of illness: Science, society, and disease* (Cambridge: Cambridge University Press, 1999), Conclusion; Andrew Cunningham, "Transforming plague: The laboratory and the identitiy of infectious disease," in *The laboratory revolution in medicine*, ed. Andrew Cunningham and Perry Williams (Cambridge and New York: Cambridge University Press, 1992), 209-244.
[164] Pickstone, *Ways of knowing*, 64-68.
[165] Ibid., Chapter 3.
[166] Cf. Farber, *Finding order in nature*; Nicholas Jardine, James A. Secord, and Emma C. Spary, eds., *Cultures of natural history* (London and New York: Cambridge University Press, 1996).

In addition, to their examination for confirming cause of death, autopsy pieces were (or continued to be) appropriated for teaching and research. In teaching and research, the post-mortem pieces could contribute to training practitioners and to knowledge production. In an anatomo-clinic approach, their examinations could help future patients, but could not help the patients from whom they were extracted. As a medical school institution, this aligned with a teaching and research mandate. A widening of the perception of disease and lesions was achieved by examining surgical pieces. That is, from pieces extripated from living patients pathologists could examine lesions at a potentially earlier state of evolution. Further, as medical school colleagues, they could interact and collaborate with surgeons to understand disease and disease evolution.

The original surgical piece became a histopathological slide, and through the microscope lens histopathologically identifiable structure.[167] Histo-pathologists were experts in histology techniques and in morphological classification and recognition of pathologies. This expertise was no small matter: "Expertise is not a fact, but a product and a process. Expertise has a texture and, in the end, it could produce a shift in the boundaries of sciences and disciplines themselves."[168] Medical science boundaries fronted on medical practice, and in as I will argue in the next two chapters, pathologists' expertise did shift boundaries between medical science and medical practice, amongst others.

This was issue of research in pathology laboratories, which like other science laboratories characterized by Karin Knorr-Cetina could bring objects "together in new numbers, renegotiate their sizes, and redefine their internal makeup" so that they "match with an appropriately altered social order."[169] The objects brought together were growths and lesions, notably those relating to cancers. The altered social order was that of the fight against cancer, the focus of the next chapter. To borrow Knorr-Cetina words, the pathology laboratory recasts tissue samples "by inserting them into new temporal and territorial regimes."[170] The new temporal regime was one in which, rather than studying post-mortems

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[167] They may be described as reinvented. The process of reinvention not only coincided with, but was an integral part of a renewal of practices medical research, teaching and practice, and ultimately led to disease identification in pathological anatomy. The process of reinvention ties well with Karin Knorr-Cetina description of laboratories. Karin Knorr-Cetina, *Epistemic cultures: how the sciences make knowledge* (Cambridge: Harvard University Press, 1999), 44.
[168] Stéphane Van Damme, "Foreward: Expertise in capital cities," in *Fields of expertise. A comparative history of expert procedures in Paris and London, 1600 to present*, ed. Christelle Rabier (Newcastle-upon-Tyne: Cambridge Scholars Publishing, 2007), xv.
[169] Knorr-Cetina, *Epistemic cultures*, 44.
[170] Ibid.

and looking back into the past of patients, samples of living patients were studied and thereby looking forward into the future of patients.

PART II. ON COMMODIFICATION. EMERGING DEMAND AND COMMERCE.

Chapter 4

Diagnosing cancers & codifying examinations

The creation of demand for histopathology expertise in France and its implementation in Strasbourg

Introductory material. The laboratory logbooks.

The hundreds of *Institut d'Anatomie Pathologique* laboratory and autopsy logbooks are illustrative of the paperwork behind and issuing of pathological anatomy collecting and its adjacent recordkeeping processes. From 1919, laboratory logbooks recorded histopathology examinations. Of the recurring pathologies identified in the laboratory examinations are cancer(s).

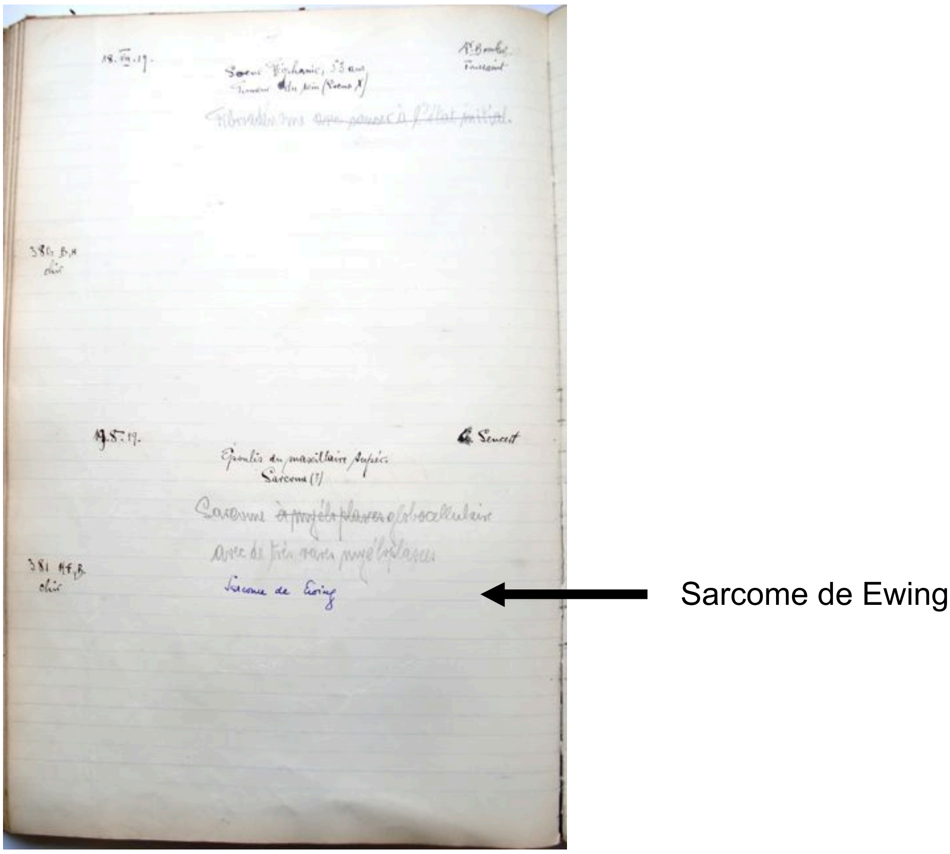
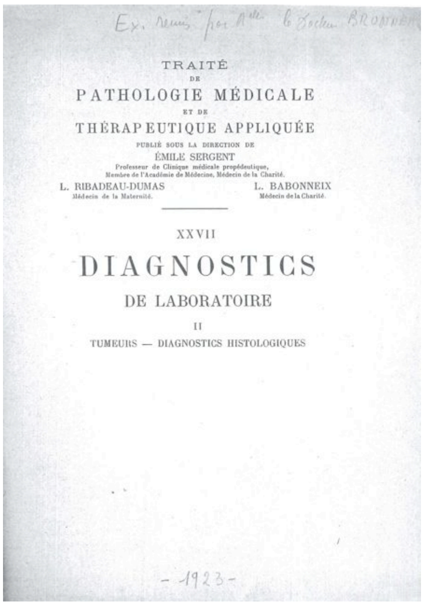


Figure 4.1 Laboratory logbook, identifying cancer, 1919.

Cancers were something that histologists knew well, as Pierre Masson stated: "The competent histologist recognizes at once tumours, inflammations and healthy tissue. They know to distinguish cancers from each other, but in the presence of inflammatory lesions, they often hesitate to designate the pathogen."[1] Cancers were the focus of Masson's expertise. In the logbook entry pictured above, a first entry indicated that the tissue provided evidence of a "*sarcome globacellulaire*." Masson intervened and corrected this, writing in mauve ink "*sarcome d'Ewing*." Before his arrival in Strasbourg in 1919, Masson had undertaken a number of studies on tumours and cancers: his doctoral thesis had been on a tumour, he worked with Borrel on cancers, and he published on malignant and benign tumours. Between 1908 and 1914, Masson published 37 articles. Of these, 23 or 62% were on tumours or cancers and 4 were on histology techniques.[2] He pursued this research in Strasbourg. Between 1919 and 1927, Masson published 36 articles. Of these, 27 or 75% concerned tumours or cancers. In addition to these articles, he prepared and published a massive volume titled *Les Tumeurs*.



TRAITÉ
DE
PATHOLOGIE MÉDICALE
ET DE
THÉRAPEUTIQUE APPLIQUÉE
PUBLIÉ SOUS LA DIRECTION DE
ÉMILE SERGENT
Professeur de Clinique médicale propédeutique,
Membre de l'Académie de Médecine, Médecin de la Charité.
L. RIBADEAU-DUMAS — Médecin de la Maternité.
L. BABONNEIX — Médecin de la Charité.

XXVII
DIAGNOSTICS
DE LABORATOIRE
II
TUMEURS — DIAGNOSTICS HISTOLOGIQUES

- 1923 -

Figure 4.2 Front page of Masson's 1923 *Tumeurs - Diagnostics Histologiques*.

The published volume, pictured above, associated two books by Masson: *Les Tumeurs* and *Diagnostics Histologiques*. The first book was divided into two parts: the theoretical

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[1] Masson, *Tumeurs & Diagnostics histologiques*, 715. (My translation.)
[2] This calculation was based on the titles of the publications from "Travaux scientifiques de M. P. Masson et ses collègues."

study of tumours (145 pages) and the practical study of tumours (460 pages). The second book, mentioned and cited in the previous chapter, detailed techniques for diagnosis of tumours. The volume was the second tome of *Diagnostics de laboratoire* and the 27th volume of a series titled *Traité de Pathologie Médicale et de Thérapeutique Appliquée*. The first tome, *Introduction. Méthodes usuelles de laboratoire appliquées au diagnostic des malades* by Maurice Letulle and Pierre Pruvost, was published in 1924. All together there were 33 volumes in this series published between 1920 and 1925.[3] This series was published for medical students and practitioners and establishes practical and theoretical understanding of a number of subjects relevant to medical science and medical practice in the 1920s. The majority were collaborative efforts written by numerous authors. That on tumours and histology, by Masson, was one of the few by one author. This may be taken as (further) indication that he was truly the expert in the field in France.

Masson studied tumours and cancers in his research. Histo-pathologists had been interested in cancer since the coining of the cellular theory. Rudolf Virchow and Julius Cohnheim defined cancer as specific changes in tissues. Cancer was considered a "pathologist's disease."[4] For example, in nineteenth century Strasbourg, anatomist Ehrmann was extirpating and studying cancers macroscopically.[5] But this remained on a level of fundamental research. Virchow had emphasized the principles of biopsy and its value in the diagnosis of malignant tumours, but he himself did not promote it for diagnosis of patients.[6] In the nineteenth century, it was a pathologists' disease in research only. The diagnosis of

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[3] For example: I. Déontologie et Jurisprudence médicale 1920; II-III. Appareil respiratoire 1922; IV. Appareil circulatoire 1922; V-VI. Neurologie 1921; VII-VIII. Psychaitrie 1921; X. Sang, organes hématopoiétiques, rate, os 1922; XI. Appareil digestif 1921; XII. Foie et pancréas; XIII. Reins et organes génitaux urinaires 1923; XIV. Infections parasitaires 1921; XV. Infections à germe connu 1921; XVI. Infections à germe inconnu 1921; XXI. Dermatologie 1923; XXII. Intoxications, maladies par carence, maladies par agents physiques, affections médicales et traumatismes 1922; XXIII. Maladies de la nutrition, rhumatisme chronique 1922; XXIV-XXV. Pédiatrie 1923; XXVII. 1. Diagnostic de laboratoire. Introduction. Méthodes usuelles de laboratoire appliquées au diagnostic des maladies, 2. Tumeurs. Diagnostics histologiques, 1923-1924; XXIX-XXX. Thérapeutique. 1. Crynothérapie ; Climatothérapie ; héliothérapie ; thalassothérapie ; thermothérapie ; cryothérapie ; cinésithérapie ; massothérapie ; photothérapie. 2. Bactériothérapie ; vaccinothérapie ; sérothérapie ; formulaire de thérapeutique. 1921-1922; XXXII. Radiologie et radiumthérapie 1921; XXXIII. Médecine sociale 1925. This list is from the SUDOC entry (www.sudoc.abes.fr) for Émile Sergent, Louis Ribadeau-Dumas, and Léon Babonneix, *Traité de pathologie médicale et de thérapeutique appliquée* (Paris: Maloine, 1920).

[4] Löwy, *Preventive strikes*, Chapter 2.

[5] Ehrmann, *Compte rendu à la Faculté de médecine de Strasbourg des travaux anatomiques exécutés à l'amphithéatre de cette faculté pendant les années 1824 et 1825*. 47.

[6] Virchow's first diagnostic attempt was in 1887 of samples of a laryngeal mass from Emperor Frederik III. He made a benign diagnosis and the Emperor died the following year of laryngeal carcinoma. Cf. J. M. Byers 3rd, "Rudolf Virchow–Father of cellular pathology," *American Journal of Clinical Pathology* 92, no. 4 Suppl 1 (1989): S2-S8; L. J. Rather, "Rudolf Virchow's views on pathology, pathological anatomy, and cellular pathology," *Archives of Pathology* 82, no. 3 (1966): 197-204; J. I Lin, "Virchow's pathological reports on Frederick III's cancer.," *The New England Journal of Medicine* 311, no. 19 (1984): 1261-1264.

malignant tumours was based on clinical signs and gross anatomy; it belonged to the surgeon's jurisdiction.

However, Masson argued for the recognition and use of histo-pathologists expertise in diagnosing cancers: "Histology is the surest method of medical diagnosis. Regarding cancer in particular, it is like no other."[7] In 1923, this expertise was something that Masson could offer as an available supply of knowledge. But when and how did Masson convince surgeons that they should submit their clinical judgement to a histo-pathological laboratory examination for establishing or confirming a diagnosis? When was a demand for this expertise articulated? Why would cancer therapists become interested in pathology? Could pathologists contribute to medical practices, via diagnosis or treatment of cancers, and not just through basic research of disease classification and causation?

Following World War I, cancer treatment was dominated by surgeons and increasingly entered the realm of radiotherapists, not just as a last resort, but as a therapeutic alternative, notably with the creation of specialized cancer treatment centres. The first section of this chapter will first set the international scene, and then will describe the local scene. On the international horizon cancer institutions were led by the French *Centres Anti-Cancéreux* (CAC). This is not only repeated from secondary sources, but a survey of international centres asserts this observation.[8] Despite the reputed French cancer specialist Claudius Regaud's regrets that financial aspects of the French system did not function as well as initially expected, Strasbourg opened and ran a cancer centre as imagined and planned.[9] The CACs were organized according to guidelines defined by a commission of medical researchers and practitioners in 1923 and nationally had state support (not financially). No cancer centres on other national fronts benefitted from such organisational *tour de force*.[10] In Strasbourg, the CAC was headed by Auguste Gunsett, who had aligned the same organisational elements for treating cancer in Strasbourg from 1921. This organisational framework equally placed histo-pathologists on the stage, alongside surgeons and radiotherapists. A specialisation that has remained in the shadows of cancer historiography.

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[7] Masson, *Tumeurs & Diagnostics histologiques*, 621. (My translation.)

[8] Tricia Close-Koenig, "A detour or a shortcut? The implementation of laboratory techniques in cancer treatment centres," in *Transferring Medico-Political Knowledge in 19th and 20th Century Europe.*, ed. Astri Andresen and Tori Gronlie (Bergen: Stein Rokkan Centre for Social Studies, 2007), 47-65.

[9] Patrice Pinell, "Cancer policy and the health system in France: 'Big medicine' challenges the conception and organization of medical practice," *Social History of Medicine* 4, no. 1 (1991): 75 -101.

[10] In considering organisational *tour de force*s in medicine, the Rockefeller Foundation comes to mind. Although time has not permitted further reflexion on a comparison of the two. They were working on different scopes, but what and how Rockefeller fought tuberculosis in France might be comparable in scale.

The second section will delve into minuatae and serial and statistical analysis of the histopathology laboratory logbooks. These books, mentioned in Chapter 2 and as will be demonstrated below, recorded an activity that was increasingly diagnosing cancers and directing therapeutic paths. The rise and the evolution of laboratory examinations corresponds to the implementation of cancer centres and specifically the cancer centre in Strasbourg. This reflects guidelines followed in Strasbourg and the adoption of pathologists in the "team." This also illustrates the creation of a demand for histopathology expertise beyond fundamental research and medical school teaching. The demand for medical school and laboratory expertise was initiated by medical specialists requesting it and by legislative measures via commission guidelines establishing it.

The third section addresses how histopathology knowledge moved from fundamental research to applied diagnostics (non-linearly). The movement involved a shift in communication. Firstly, the different cancers and morphological categories had to be established between researchers. Then this had to be translated into information for practitioners. This was a process of classification and then knowledge codification. This was, in part, issue of a pre-existing dialogue between "team" members in a research context. Classification systems standardize biomedical entities by encoding knowledge and coordinating practice. Geoffrey C. Bowker and Susan Leigh Star have emphasized the invisibility of classification systems once they are instilled, as they are naturalized into routines.[11] As such, it is by historically tracing the design of classification schemes that the knowledge, practices, along with other semantic or political influences, become visible.

Cancer, on the forefront of medical *and* political agendas, was the "blade" behind the creation of a distinct laboratory activity in the pathological anatomy institute. The laboratory was dissected, bissected, into two: a medical school laboratory for teaching and research and a service laboratory for diagnoses.

[11] G. C Bowker and S. L Star, *Sorting things out: Classification and its consequences* (Cambridge, MA: The MIT Press, 2000).

4.1 Cancer

4.1.1 Cancer in the early twentieth century

Prevalence and perception

At the beginning of the twentieth century cancer was a disease of incredible impact and repercussions, not in terms of statistics and mortality rates, but in response to statistics death rates, which claimed that the mortality by cancer had doubled between 1881 and 1912.[12] In the first half of the twentieth century, cancer became a medical, social, economical and political issue with new institutions, specialists, activists and public policies. Cancer was everywhere. Cancer received much attention and the fight against it became a national priority, but it was not always on the national level that cancer treatment and research were structured.[13]

As statistics were collected and demographical dynamics percieved, e.g. increased life-expectancy, decreased birth-rate, etc., political discourse honed in on cancer as it appeared to be on the rise.[14] Cancer, a scourge at the turn of the century alongside tuberculosis, syphilis, diphtheria and alcoholism, mobilized both medical and political actors following World War I. The war on cancer in France began when the great war ended.[15] The delegation of military health services to civil institutions during the war, the structures mobilized against tuberculosis and venereal diseases, the recognition of cancer within armed forces, the networks established and the social change brought on by the war all favoured the

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[12] Henri Hartmann, “Le péril cancéreux,” *Paris médical* 7 (Février 1923): 141.

[13] Cf. David Cantor, ed., *Cancer in the twentieth century*, vol. 81 (1), Bulletin of the History of Medicine, 2007; David Cantor, “Cancer,” in *Companion encyclopedia of the history of medicine*, ed. W. F. Bynum and Roy Porter, vol. 1 (London and New York: Routledge, 1993), 537-561; Robert Bud, “Strategy in American cancer research after World War II: A case study,” *Social Studies of Science* 8 (1978): 425-459; Russell C. Maulitz, “Rudolf Virchow, Julius Cohnheim and the program of pathology,” *Bulletin of the History of Medicine* 52 (1978): 162-182; Evelleen Richards, *Vitamin C and cancer: Medicine or politics?* (Basingstoke and London: Macmillan, 1991).

[14] For example, in an article directed to medical practitioners, Henri Hartmann (surgeon, medical professor and co-founder of the *Ligue contre le cancer*) stated in 1923 "The statistics show that the number of people with cancer is much higher that we believed and the number is increasing." Hartmann, “Le péril cancéreux.”(My translation.); See alsoF. L Hoffman, *The mortality from cancer throughout the world* (Newark, NJ: The Prudential Press, 1916). Statistics in the USA have been discussed by J. T. Patterson, *The dread disease: Cancer and modern American culture* (Cambridge, MA: Harvard University Press, 1989). On numbers and statistics in medicine, see Gérard Jorland, Annick Opinel, and George Weisz, eds., *Body counts. Medical quantification in historical and sociological perspective/La quantification médicale, perspectives historiques et sociologiques* (Montreal and Kingston: McGill-Queen’s University Press, 2005).

[15] The military language used in discourse on cancer is discussed by Patrice Pinell, “Fléau moderne et médecine d’avenir: La cancérologie française entre les deux guerres,” *Actes de la recherche en sciences sociales* 68, no. juin (1987): 75-76.

movement.[16] It also corresponded to when, and because, medical specialists had new reason to study cancer. The study of the cell and cell structures by histopathologists gave rise to a refined cellular theory and identification and redefinition of cancers. Bacteriologists also explored an infectious theory of cancer.[17] In fact, many disciplines established cancer theories based on their paradigms.[18] But more importantly, there were rising hopes of defeating cancer. This was part of a simultaneously cognitive, institutional, and cultural shift in the perception of cancers.

Treatment

Aside from asylums for incurables, practitioners and medical institutions had long expressed little interest in cancer: it was incurable.[19] This changed from about the turn of the century when it attained interest. From the late nineteenth century, when surgical procedures were increasing performed, cancer was increasing treated with surgery. Surgeons excised malignant (and benign) tumors and growths. If it was unremovable or it recurred, terminal phase care was provided by family members or in charitable institutions (i.e. poorhouses or hospices).

Surgery wards and surgeons had long been all-powerful in this domaine. But from about 1910, cancer treatments began to include roentgen-ray therapy and radium therapy.[20] In 1923, Claudius Regaud, director of the *Fondation Curie* in Paris, stated: “Confronted with a case of cancer, today, the first question is no longer: Is this cancer operable? but: Should we operate, treat with radium, treat with roentgen radiation, or a combination thereof?”[21] Cancer therapeutics had become complex. The turning point may be, in part, associated with the perception of cancer as a treatable disease. In 1923, surgeon and active member of the *Ligue*

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[16] Patrice Pinell and Sylvia Brossat, “The birth of cancer policies in France,” *Sociology of Health and Illness* 10, no. 4 (1988): 587-590.
[17] Angela N. H. Creager and Jean-Paul Gaudillière, “Experimental arrangements and technologies of visualization: Cancer as a viral epidemic, 1930–1960,” in *Heredity and infection. The history of disease transmission*, ed. Jean-Paul Gaudillière and Ilana Löwy (London and New York: Routledge, 2001), 203-242; Ton van Helvoort, “The start of a cancer research tradition: Peyton Rous, James Ewing, and viruses as a cause of cancer,” in *Creating a tradition of biomedical research. Contributions to the history of the Rockefeller University*, ed. Darwin H. Stapleton (New York: The Rockefeller University Press, 2004), 191-209.
[18] This dynamic was partly fed by the fact that studying cancer could be a valuable source of funding. Patrice Pinell, “Cancer,” in *Companion to Medicine in the Twentieth Century*, ed. Roger Cooter and John Pickstone (London and New York: Routledge, 2003), 676-677.
[19] Jason Szabo, *Incurable and intolerable: Chronic disease and slow death in nineteenth-century France* (New Brunswick: Rutgers University Press, 2009).
[20] Roentgen-ray is the same as X-ray therapy or radiotherapy. Radium therapy or brachytherapy designates treatment by gamma radiation. Radiotherapy is often used to mean both X-ray and gamma-ray therapy, however, to avoid confusion, I will refer to each individually when needed. Otherwise, I will use the term "radiation therapy" to refer to radiation therapy in general.
[21] Claudius Regaud, “Les idées directrices de la lutte contre le Cancer,” *La lutte contre le cancer* 2 (1923): 98. (My translation.)

Contre le Cancer, Professor Henri Hartmann stated: "cancer is a curable disease; locally situated in its early stage, its generalization is but a secondary phase: when it recidivates too often, that frequently means that it is treated too late, i.e., when the cancerous cells have already swarmed off, away from the initial seat."[22]

Roentgen-radiation therapy was first developed and experimented with around 1900-1901 in Germany, England and the United States, and a year or two later in France.[23] Initially roentgen radiation was used to treat dermatological pathologies. In 1903-1904, investigations into the cutaneous effects of radium were undertaken and in 1906, the first laboratory dedicated to the study of medical and biological applications of radium opened in Paris. This opened a new field of research and for medical specialists, radiation therapy. In 1913, the *Institut de Radium* opened in Paris under the direction of Marie Curie and Claudius Regaud. Radiation was not only used for diagnosis, but equally for therapy.[24] Apparatus were developed and used to research treatment of cancers of the face, nose, mouth, gums, breast and uterus, as well as numerous non-cancerous dermatological pathologies. The therapeutic applications of radiation were developed in parallel to anti-cancer campaigns that sought to educate practitioners and public on recognizing cancers earlier and others that sought to raise money for research and radium purchases for treatment.[25]

Against the background of collaborative efforts to fight cancer, the question of treatment can be perceived as a power struggle between medical specialities.[26] In her study of radiologists and gynaecologists Ornella Moscucci asks: "Who was to have jurisdiction over the cancer patient?"[27] John Pickstone also considers labor divisions between medical and

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[22] Hartmann, "Le péril cancéreux." (My translation.)
[23] On developments in radiation therapy in France, see Bénédicte Vincent, "Naissance et développement de la pratique thérapeutique du radium en France, 1901-1914 : une substance entre médecine, physique et industrie" (Thèse de doctorat d'histoire des sciences, Paris: Université Paris VII, 1999); Boudia, *Marie Curie et son laboratoire*; Christophe Voineau, "Science, technique et médecine: une histoire de la radiothérapie en Alsace (1913-1940)" (Mémoire de DEA, Strasbourg: Université Louis Pasteur, 2003).
[24] Charles Hayter, "The clinic as laboratory: The case of radiation therapy 1896-1920," *Bulletin of the History of Medicine* 72 (1998): 663-688; Jean-Pierre Camilleri and Jean Coursaget, *Pionniers de la radiothérapie* (EDP Sciences Editions, 2005).
[25] Cf. Claudius Regaud, "Le rôle du médecin sans spécialité dans le diagnostic du cancer," *La lutte contre le cancer* 10 (1925): 111-121; "Principes d'organisation pratique de la semaine de défense contre le cancer," *Lutte Contre le Cancer* 29 (1930): 702-720; Pinell, *Naissance d'un fléau*, 253-288.
[26] This has been highlighted in a number of studies: Ornella Moscucci, "The 'Ineffable freemasonry of sex': Feminist surgeons and the establishment of radiotherapy in early twentieth-century Britain," *Bulletin of the History of Medicine* 81 (2007): 139-163; John Pickstone, "Contested cumulations: Configurations of cancer treatments through the twentieth century," *Bulletin of the History of Medicine* 81 (2007): 164-196; Pinell, *Naissance d'un fléau*.
[27] Moscucci, "The 'Ineffable freemasonry of sex': Feminist surgeons and the establishment of radiotherapy in early twentieth-century Britain," 150.

clinical oncologists and surgeons.[28] Pickstone emphasizes that surgery had a historical priority when it came to diagnosing and treating cancers; it had long been their domaine.

The recourse in treating cancers was related to the weight of certain institutions and of certain actors, as well as to theoretical understanding and technological possibilities. Infrastructures reflected and reconciled varying degrees of interdisciplinarity, as well as costs and access.[29] The introduction of radiation therapies in hospital structures presented not only a competitive force, but required heavy material, administrative and economic organisation. Radium was an onerous substance - rare, dangerous and exorbitantly expensive - that required significant investment, therein conditioning institutional politics and technnological evolution. In the interwar period, radium was one of the most expensive goods ever. To obtain one gram of radium bromide, 400 to 500 tonnes of radioactive material, 150 to 200 tonnes of diverse reactants, 150 to 200 tonnes of carbon, 800 to 1200 tonnes of water, plus the human capital in the mines and factories were required.[30] This therapeutic dispositive brought medicine into Big Science with heavy costs and underlying framework.[31]

Cancer entered and created new medical spheres, in addition to surgeons and gynecologists, implicating pathologists, bacteriologists, medical physicists, radiologists, radiotherapists, radium therapists, and industrialists manufacturing therapeutic apparatus, other practitioners and specialists who were increasingly detecting cancers (sometimes these professions worked in collaboration, sometimes in isolation).[32] National and international non-profit organizations, such as the *Association Française pour l'Etude du Cancer*, aiming to attack cancer on the science front and the social front were also founded involving professional, political as well as lay representatives.[33] The fight against cancer was organized as ties were established between scientific, medical, social and political spheres in the interwar period.

Pathologists would have an important role to play in this fight, not only in cancer research but in cancer therapeutics. First, however, it must be clarified if (and to what extent) pathologists were present in early cancer treatment and if diagnosis involved histopathology

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[28] Pickstone, "Contested cumulations."
[29] Pinell, "Cancer policy and the health system in France."
[30] Houllevigne, M. L. "L'industrie du radium," *Le temps* 26 juin 1927 reproduced in *Lutte contre le cancer,* 17, 1927: 13-18.
[31] For example, Pinell calls this "Big Medicine." Pinell, "Cancer policy and the health system in France."
[32] "It may be said that an accessible cancer, diagnosed right at the start, is a disease which medicine can most certainly cure." Regaud, "Le rôle du médecin sans spécialité dans le diagnostic du cancer."
[33] In France, these included: *Ligue Franco-Anglo-Américaine de Lutte contre le Cancer* formed in 1918; as well as on the international front: a Cancer Commission within the League of Nations (1925); the *Union International Contre le Cancer* (1933).

laboratories. Before describing the French cancer centres, which were emblematic in the 1920s as nationally organised pluri-disciplinary institutions, a survey of cancer institutions, for treatment and/or research, in a number of European countries will provide a description of the international landscape.

4.1.2 Were pathologists in Cancer Centres?

Stephen Jacyna has shown that between 1875 and 1910 clinicians rarely consulted pathologists in the diagnosis of breast cancer at the Glasgow Royal Infirmary.[34] This was because they ascribed pathology only a limited role in practical medicine; a *post facto* confirmation or correction.[35] Did this shift in the years after 1910 and as cancer centres were founded?

Who founded and directed early cancer centres?

Cancer has been of interest for many historians of medicine.[36] The history of the war on cancer is a history of public health propaganda,[37] of clinical trials,[38] of screening and prevention,[39] but also of hospital reorganisation[40] and of remuneration within medical

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[34] Jacyna, "The laboratory and the clinic: The impact of pathology on surgical diagnosis in the Glasgow Western Infirmary, 1875-1910."
[35] Löwy cites 2 cases of rare microscopic diagnosis of breast cancer that was to validate or invalidate the surgeon's diagnosis. Löwy, *Preventive strikes*, 28.
[36] See for the example the recent special issue titled "Cancer in the Twentieth Century" of *Bulletin of the History of Medicine* 81 (2007) which includes 12 articles on the themes of education, marketing, therapeutics, prevention and risk.
[37] Cf. David Cantor, "Uncertain enthusiasm: The American cancer society, public education and the problems of the movie, 1921-1960," *Bulletin of the History of Medicine* 81 (2007): 36-69; Gretchen Marie Krueger, "'For Jimmy and the Boys and Girls of America': Publicizing childhood cancers in twentieth century Europe," *Bulletin of the History of Medicine* 81 (2007): 70-93; Elizabeth Toon, "'Cancer as the general population knows it': Knowledge, fear, and lay education in 1950s Britain," *Bulletin of the History of Medicine* 81 (2007): 116-138; Pinell, *Naissance d'un fléau*, esp. Chapter 9.
[38] Cf. Peter Keating and Alberto Cambrosio, "Cancer clinical trials: The emergence and development of a new style of practice," *Bulletin of the History of Medicine* 81 (2007): 197-223; Carsten Timmermann, "As depressing as it was predictable? Lung cancer, clinical trials, and the Medical Research Council in postwar Britain," *Bulletin of the History of Medicine* 81 (2007): 312-334; Gerald Kutcher, "Cancer clinical trials and the transfer of medical knowledge: Metrology, contestation and local practice," in *Devices and designs. Medical technologies in historical perspective*, ed. Carsten Timmermann and Julie Anderson (Basingstoke and New York: Palgrave Macmillan, 2006), 212-230; Ilana Löwy, *Between bench and bedside. Science, healing, and Interleukin-2 in a cancer ward.* (Cambridge, MA: Harvard University Press, 1996).
[39] Cf. A. E Clarke and M. J Casper, "From simple technology to complex arena: Classification of pap smears, 1917-90," *Medical Anthropology Quarterly* (1996): 601–623; Ilana Löwy, "Breast cancer and the 'materiality of risk': The rise of morphological prediction," *Bulletin of the History of Medicine* 81 (2007): 241-266.
[40] Cf. Caroline C. S. Murphy, "From Friedenheim to hospice: A century of cancer hospitals," in *The Hospital in History*, ed. Lindsay Granshaw and Roy Porter (London and New York: Routledge, 1989), 221-241; Keating and Cambrosio, *Biomedical platforms*.

hierarchies.[41] However, the historical landscape has been largely limited to the American,[42] Canadian,[43] British,[44] and French scenes.[45] Other countries have received less attention.[46] This survey aims to contribute to achieving a better understanding of the wider picture.[47] The focus of the survey is professional representation, by asking who were founding the first cancer centres. In considering cancer research and treatment, there were essentially three settings encountered: research centres and laboratories, cancer treatment centres, and specific places for (costly) radium treatment, such as radium institutes.

Cancer research and treatment in the United Kingdom have been explored by historians of medicine.[48] The numerous hospitals and centres were organised independently. Cancer research laboratories were founded across the United Kingdom from the turn of the century.[49] Most of these were located within hospitals, although one was within a university. In addition, two Radium Institutes provided therapy, but housed no diagnostic services. Patients were diagnosed by their consulting physicians and went to the institutes uniquely for the recommended treatments.[50] There was at least one private laboratory in London offering histology diagnostic services to practitioners who were interested in laboratory diagnosis, otherwise diagnosis would have been on a clinical basis.[51]

Cancer treatment centres in the interwar period were often directed by pathologists or radiotherapists. Surgery and surgeons remained within hospital surgery wards.[52] Roentgen-ray

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[41] Barbara Clow, *Negociating disease: Power and cancer care, 1900-1950* (Montreal and Kingston: McGill-Queen's University Press, 2001); Pickstone, "Contested cumulations."
[42] (USA) Cantor, "Uncertain enthusiasm: The American cancer society, public education and the problems of the movie, 1921-1960"; Patterson, *The dread disease*; Barron H Lerner, *The breast cancer wars: Hope, fear, and the pursuit of a cure in twentieth-century America* (Oxford: Oxford University Press, 2001).
[43] Cf. Clow, *Negociating disease*; Charles Hayter, *An element of hope. Radium and the response to cancer in Canada, 1900-1940* (Montreal and Kingston: McGill-Queen's University Press, 2005).
[44] Cf. Joan Austoker, *A history of the Imperial Cancer Research Fund. 1902-1986* (Oxford: Oxford University Press, 1988); Moscucci, "The 'Ineffable freemasonry of sex': Feminist surgeons and the establishment of radiotherapy in early twentieth-century Britain."
[45] Cf. Pinell, *Naissance d'un fléau*; Pinell, "Cancer policy and the health system in France"; Pinell and Brossat, "The birth of cancer policies in France."
[46] For example, a footnote in two of Pinell's publications. Pinell, *Naissance d'un fléau*; Pinell, "Cancer policy and the health system in France."
[47] This survey remains, albeit, somewhat superficial and this would be an interesting project to pursue.
[48] Austoker, *A history of the Imperial Cancer Research Fund. 1902-1986*; Murphy, "From Friedenheim to hospice: A century of cancer hospitals"; Pickstone, "Contested cumulations."
[49] Middlesex Hospital Cancer Research laboratories in 1900, Imperial Cancer Research Fund in 1902, Manchester University Cancer Research Lab in 1903, Cancer Hospital Research Institute in 1909, Glasgow Cancer Hospital Research Department in 1910, the Radium Institute in London in 1911, the Radium Institute in Manchester in 1914.
[50] Pickstone, "Contested cumulations," 176.
[51] Michael Worboys, "Private clinical laboratories in Britain: The clinical research association, 1894-1914," Manuscript, 2004.
[52] Pickstone, "Contested cumulations," 169.

therapy was equally an annex to diagnostic radiology, but radiologists did not have any authority or say in attributing patient beds.[53]

In the United Kingdom, pathologists were present in cancer research and specialist treatment centres. The Christie Cancer Hospital, established in the late 1930s, was an example.[54] The Marie Curie Hospital, established in 1929, also had a pathology laboratory and an on-staff pathologist.[55] There were teams of specialists working together in some establishments.[56] There were examples of pluri-disciplinary approaches taken, but there was no common model.

Not unlike the United Kingdom, cancer research centres in Germany outnumbered specialised treatment centres in the first decades of the twentieth century.[57] Additionally, by the turn of the century, every German university had a pathology institute, but it was institutionally distinct from clinical practice.[58] Even more than in the United Kingdom, these institutions concentrated on research. There was, however, terminal phase treatment offered at the Charité in Berlin from 1918. This was also the only centre associated with a medical school. The pathological institute was considered too far away for advice and control of therapeutical results.[59] It has been suggested that treatment, surgical or other, took place in

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[53] Nevertheless, special cancer hospitals in London, such as the Marsden, St. Bartholomew's, the Middlesex and the Westminster, were reputed for both cancer surgery and radiation therapy. Radiation therapies, and other alternatives, were initially introduced in inoperable cases. For example, the Manchester Radium Institute was promoted by a surgeon in order to avoid "chopping out the tongue and other parts." At the Middlesex Hospital in London, radium therapy for uterine and breast cancers was developed for the inoperable, but later came to be offered as an alternative to surgery. By the 1920s, it was crouching on par with surgery and specialist institutions offered both surgery and radiation therapy equally. Ibid., 172.
Radiation therapy was similarly first offered through the central radiology service in Strasbourg.

[54] Ibid., 177.

[55] Moscucci, "The 'Ineffable freemasonry of sex': Feminist surgeons and the establishment of radiotherapy in early twentieth-century Britain," 160.

[56] Moscucci and Pickstone both stress the general advocacy of teamwork in the interwar period. Pickstone, "Contested cumulations," 168; 174; Moscucci, "The 'Ineffable freemasonry of sex': Feminist surgeons and the establishment of radiotherapy in early twentieth-century Britain," 153-154.

[57] First with the founding of the Deutsches Komitee für Krebsforschung in 1900 and followed by a number of research centres: Abteilung für Krebsforschung am Königlichen Institut für experimentelle Therapie in Frankfurt-am-Main from 1901, Institut für Krebsforschung der Charité in Berlin from 1903, Institut für Krebsforschung in Heidelberg from 1906, Forschungsinstitut für Krebs und Tuberkulose in Hamburg from 1912. Wolfgang U. Eckart, ed., 100 years of organized cancer research - 100 Jahre organisierte Krebsforschung (Stuttgart and New York: Georg Thieme Verlag, 2000).

[58] Cay-Rüdiger Prüll, "Disease of cells or disease of patients? The cultural impact on cancer research in German and British pathology, 1900-1945," in *100 Years of Organized Cancer Research - 100 Jahre organisierte Krebsforschung*, ed. Wolfgang U. Eckart (Stuttgart and New York: Georg Thieme Verlag, 2000), 17.

[59] Prüll relates the director of the surgical clinic's wish to hire a pathologist and the pathological institute's chairs preventing the execution of this, on numerous counts. Prüll does not state whether the pathological institute was performing diagnoses and if so, what the conditions of this were.

hospitals, and many university hospitals built their own histological laboratories. There were also pathologists employed at the city hospitals in Berlin.[60]

This is a distinct contrast to Sweden where pathologists were central to both cancer research and treatment. In Sweden, from as early as 1899, providing therapy was a priority for those who undertook cancer research.[61] The *Radiumhemmet* was exemplary as a regional research *and* treatment centre.[62] Richard Pearce, a representative of the Rockefeller Foundation, claimed that the *Radiumhemmet* (as well as the Radium Institute in Paris) was different from other cancer centres not least because they hosted the "few competent groups of scientists devoting themselves exclusively to cancer."[63] The *Radiumhemmet* was founded by radiologist Gösta Forssell and surgeon John Berg, but they considered radiation physics, biology and pathology to be as important as radiology and surgery. The team came to include radiotherapist Elis Berven, gynecologist James Heyman and pathologist Olle Reuterwall. Reuterwall was initially a part-time consultant. Pathology laboratories for research and for diagnosis were integrated into the *Radiumhemmet* in 1921 and a Department of Radiopathology was founded in 1923, of which Reuterwall became the full time director and in 1931, assistant director, Lars Santesson, was hired.

The Netherlands Cancer Institute, opened in 1916, was co-founded by Prof J. Rotgans, a surgeon, Prof W. M. de Vries, a pathologist, and Mr J. H. de Bussy, a publisher.[64] Cooperation between laboratory research and clinic was given a high priority right from the start: the heads of both departments received written instructions to work together as closely as possible.

In 1934, the Japanese Foundation for Cancer Research opened Japan's first Cancer Institute and Hospital in Tokyo.[65] This was founded largely by Mataro Nagayo, pathologist,

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[60] Prüll, "Disease of cells or disease of patients?," 19.
[61] The first institutions included the Roentgen Institute in Stockholm from 1899, the Serafimer Hospital in Stockholm and the hospital in Lund from 1908, the Radiumhemmet at Schéelegatan in Stockholm from 1910, the hospital in Gothenburg from 1910, and the Radiumhemmet at Fjällgatan in Stockholm from 1916. Lars-Gunnar Larsson, "Organization of radiotherapy and clinical oncology in Sweden," *Acta Oncologica* 34 (1995): 1011-1015; Elis Berven, "The development and organization of therapeutic radiology in Sweden," *Radiology* 79 (1962): 829-841; Pickstone, "Contested cumulations."
[62] It was funded privately (by the Cancer Society in Stockholm) until the end of 1918, but the government contributed by covering patients' transportation costs until it became publicly funded in the early 1920s.
[63] "Richard M. Pearce to Alan Gregg, 23/07/1929." RF, 1.1, 500A Université Paris Radium Institute, Rockefeller Archive Centre.
[64] "The Netherlands Cancer Institute", n.d., http://www.nki.nl/Research/About+the+Netherlands+Cancer+Institute/The+history+of+The+Netherlands+Cancer+Institute/History+NKI.htm.
[65] Waro Nakahara, "A pilgrim's progress in cancer research, 1918 to 1974: Autobiographical essay," *Cancer Research* 34, no. 8 (1974): 1767 -1774.

whose initial pathology training had been in Germany. The institute had a Division of Pathology, directed by Waro Nakahara, pathologist, trained at the Rockefeller Institute.[66]

Dr. Manninger in Hungary, visited and retained the *Radiumhemmet* as a model for the Eötvös Loránd Radium and Roentgen Institute which he founded in Hungary.[67] This centre, opened in 1936, however only treated cancer patients beyond the operable stage.[68]

It is interesting that the Netherlands institute, like Manninger in Hungary and Nagayo in Japan, were professors and thereby situated closer to the forefront of research and teaching than most clinicians. The connection to a medical faculty was also present in Iceland, where all suspected cancers even before World War I were diagnosed by histo-pathological techniques at the medical school's pathology laboratory in Reykjavik.[69] Samples or excised tumours were sent to Reykjavik from all over Iceland, while radiation therapy was offered at the *Landspitalinn* in Reykjavik and cancer surgery at the general hospitals in Reykjavik and Akureyri.

Expectedly, a multi-national historical survey on cancer centres and cancer treatment, such as this, is met with linguistic challenges. The articles which were consulted here were published largely in English. Nothing was found in English on Switzerland, Spain, Italy, Greece or other countries.[70] This does not indicate that they were not active on this front.[71] They, for example, were present at the first meeting of the *Union International Contre le Cancer* in Paris in 1935.[72]

The outlines of these various institutions illustrate a disciplinary divide in cancer treatment: surgeons had long been extirpating tumours and growths and radiation therapy was being developed by physicists collaborating with other specialists. There was also an organisational divide: surgery facilities were existing and technologically and structurally

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[66] Waro Nakahara, "Mataro Nagayo," *Science* 94, no. 2447 (November 21, 1941): 479 -480.
[67] J. Vikol and C. Sellei, *Twenty-five years in the fight against cancer. Reports of the State Oncological Institute* (Budapest: State Oncological Institute Budapest, 1966). I did not find Manninger's professional identity. His predecessor Dr. Gyula Dollinger, who had collected cancer statistics in Hungary, was a surgeon.
[68] In Hungary, there was equally a Cancer Department at Central Hospital of the National Social Security Institute from 1930, that had 300mg of radium.
[69] Olafur Bjarnason and Hrafn Tulinius, "Cancer registration in Iceland 1955-1974," Acta Pathologica et Microbiologica Scandinavica. Supplement 281 91 (1983).
[70] That said, for the purpose of this thesis, the survey stopped here. It would be interesting to pursue it.
[71] There are other historical studies in other languages, such as: Rosa M. Medina-Domenech, *Curar el cancer? Los origenes de la Radioterapia espanola en el primer tercio del siglo XX* (Granada: Servicio de Publicaciones de la Universidad de Granada, 1996).
[72] Countries represented were: Argentina, Australia, Austria, Belgium, Bulgaria, Canada, Chili, Cuba, Denmark, Estonia, France, Germany, Great Britain, Greece, Haïti, Honduras, Hungary, Iran, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Mexico, Monaco, Netherlands, New Zealand, Norway, Paraguay, Persia, Peru, Poland, Portugal, Romania, South Africa, Spain, Sweden, Switzerland, United States of America, Uruguay, USSR, Vatican, Yugoslavia. J. H. Maisin, *L'Union Internationale Contre le Cancer. De sa fondation à nos jours* (Genève: UICC, 1966), 69-70.

much simpler than emerging radiation therapy facilities. In therapy, surgeons had been on the forefront. In research, pathologists and bacteriologists had been prominent. Therapeutic centres were developed by surgeons. However, if the surgeons did not see the need for alternative therapies to surgery, the facilities did not offer radiation therapy. Radiotherapists, pathologists or other specialists recognising this pushed for therapeutic centres that offered radiation therapy. This is how pathologists became active beyond the research laboratory in the fight against cancer. They participated in opening and organising cancer centres. From their involvement, it can be deduced that the use of histopathology techniques and expertise was used in these centres. And where pathologists have not been identified per se, no conclusions can be made. For example, the American scene was dominated by surgeons and pathologists were not founding actors, but there might have been pathologists doing diagnoses and were, at times, alongside surgeons performing frozen section diagnoses.[73] Conversely, at the Curie Foundation in Paris, histopathology diagnoses were performed prior to treatment for 98 % of cervical cancers between 1919 and 1922 and all cases after 1925. However, before the 1930s, surgeons conducted surgery without a histopathology examination in a majority of breast cancer cases and only about half of people treated with roentgen-radiation had biopsy tissue examined before treatment.[74]

Historians and contemporaries have equally voiced that France's cancer centres stood out from the rest in the 1920s. Charles Hayter, in a recent historical study of radiation therapy in Canada, states: "The French system became an influential model for other countries."[75] And Pickstone acknowledges that although pluri-disciplinarity approaches were witnessed in Britian, the "nearest approach on paper was the plan in France."[76] Was pluri-disciplinary cancer treatment in France a national model or was it limited to a few exceptional centres?

What was this teamwork approach adopted by the French?

Cancer treatment in hospitals and specialized centres was not a uniform or internationally regulated practice in the interwar period. At the end of World War I, like many other

[73] On the New York Hospital: Löwy, *Preventive strikes*, 32-35.
[74] Löwy states, however, that these were often advanced cases of breast cancer. There was also suspicion that taking a tissue sample of breast tumour might increase dissemination of cancer. Ibid., 35-39. Although she does not make the connection, she later states that "While all the experts agreed that the optimal treatment for breast cancer was radical surgery, opinions on the best way to treat cervical tumors varied." (p. 47) This provides further support to my own argument, that diagnoses were only demanded when it was considered necessary before choosing treatment.
[75] Hayter, *An element of hope*, 83.
[76] Pickstone, "Contested cumulations," 174.

European countries, most French hospitals did not have other cancer treatment facilities than surgery, aside from some rudimentary equipment in Paris and Strasbourg and radiation therapy units installed in Lyon and Montpellier during World War I.[77] In many cases, surgery and radiation therapy were conflicting practices, or, more precisely, surgeons and radiotherapists, and other medical specialists, were in conflict over which treatment was best. In 1923, France became one of the first countries to implement organisational standards and guidelines for treatment and research. There was effectively a relatively early legislation addressing the creation of cancer centres in France, compared to the other national situations described above.

Paul Strauss, French Minister of Hygiene, Social Assistance and Welfare between 1922 and 1924, decreed regional cancer treatment centres a priority in public health measures.[78] He published a ministerial circular to enlist prefects [*préfets*] in the organization of centres against cancer in their county [*département*] on 25 November 1922. The cancer centres were to be regional and to embrace treatment, teaching, *and* research.[79] A centre could not be opened just anywhere or by just anyone and stringent conditions were to be met in order to carry the label *Centre Anti-cancéreux*.

These requirements were set by a specialised commission. The *Commission du Cancer* was dedicated to coordinating the measures of aetiology, pathology, clinical study, therapeutics, and prophylaxis of cancer and defining the regulations for treatment at regional *Centres Anti-cancéreux.*[80] The commission consisted of 84 medical doctors, administrators of health services, members of the *Académie de médecine* and one physicist, Marie Curie.[81] The majority were Parisian. Three were from Strasbourg: two bacteriologists and one pathologist. Dr. Berthelot from the *Institut d'Hygiène et de Bactériologie*, Professor Pierre Masson, director of the *Institut d'Anatomie Pathologique*, and Professor Auguste Sartory, who held the chair of bacteriology at the *Faculté de pharmacie*.

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[77] Patrice Pinell has argued that France initially lagged behind the United States, England and Germany in this respect but that the situation was quickly reversed in the post-war years. Pinell, *Naissance d'un fléau*, 164.

[78] He was *Ministre de l'Hygiène, de l'Assistance et de la Prévoyance sociales* from 15 January 1922 to 28 March 1924. This ministry was founded on 13 July 1920 from the *direction de l'Assistance et de l'Hygiène publique* under the *ministère de l'Intérieur* and the *direction de la Prévoyance sociale* under the *ministère du Travail.* On 4 April 1930, it was transformed into the *ministère de la Santé publique*.
For more on this political decision and the contributions of others, such as the *Ligue Contre le Cancer*, see: Pinell, "Cancer policy and the health system in France"; Pinell and Brossat, "The birth of cancer policies in France."

[79] "Commission du cancer. Principes d'après lesquels doit être organisé un centre régional de lutte anticancéreuse," *La lutte contre le cancer* 2 (1923): 101.

[80] Arrêté ministeriel de 31 mai 1922.

[81] "Commission du cancer. Principes d'après lesquels doit être organisé un centre régional de lutte anticancéreuse."

In order for a cancer treatment centre to be recognized as a *Centre régional de lutte anticancéreuse* (commonly referred to as a *Centre Anti-cancereux*), it had to align with certain pre-requisites:

> "Headquarters: The major city in which a regional cancer centre is to be organized must be the headquarters for a medical faculty or medical school.
>
> Site: In order to open as quickly as possible, the regional cancer centre can not wait for the organisation and construction of new independent buildings.
>
> Hospitalisation: Hospitalisation is of least importance.
>
> Radium. Deep radiation therapy. Surgery: The regional cancer centre must be equipped with the latest instruments for short wavelength therapies.
>
> Personnel: The regional cancer centre personnel must be easily recruted from the teaching staff of the medical faculty or medical school in the city where it is being organized."[82]

Further the centre was required to possess two deep roentgen therapy apparatus (200 000 Volts minimum) and a minimum of 200 mg of radium. Apparatus and radium were costly investments.[83] The State contributed some funding toward the purchase of radium and apparaus, but not for setting up new centres.[84] The guidelines outlined the infrastructure to be adopted by existing facilities and, once approved, allowed them to take on the national label.[85] The centres were not to be incurable hospices. In fact, the centre was to be like a dispensary, with ambulant patients, hospitalized in other hospital wards or clinics if necessary.

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[82] Ibid., 104-106.

[83] Ibid., 107.

[84] These included: funds of the Pari Mutuel, benefits from taxes on gambling clubs, and in 1924 and 1925, subsidies of 5 million francs were voted. Pinell, "Cancer policy and the health system in France," 79.

[85] There was effectively a two-tiered evolution of French cancer centres: those that were attributed the label and those that did not. In 1928, the cancer centres in Besançon, Dijon, Le Havre, Montargis, Nice, Nîmes, Orléans, Rodez, Rouen, and Tarbes were not recognized as official Regional Centres and were under-equipped compared to the official Regional Centres. Pinell, *Naissance d'un fléau*, 332.

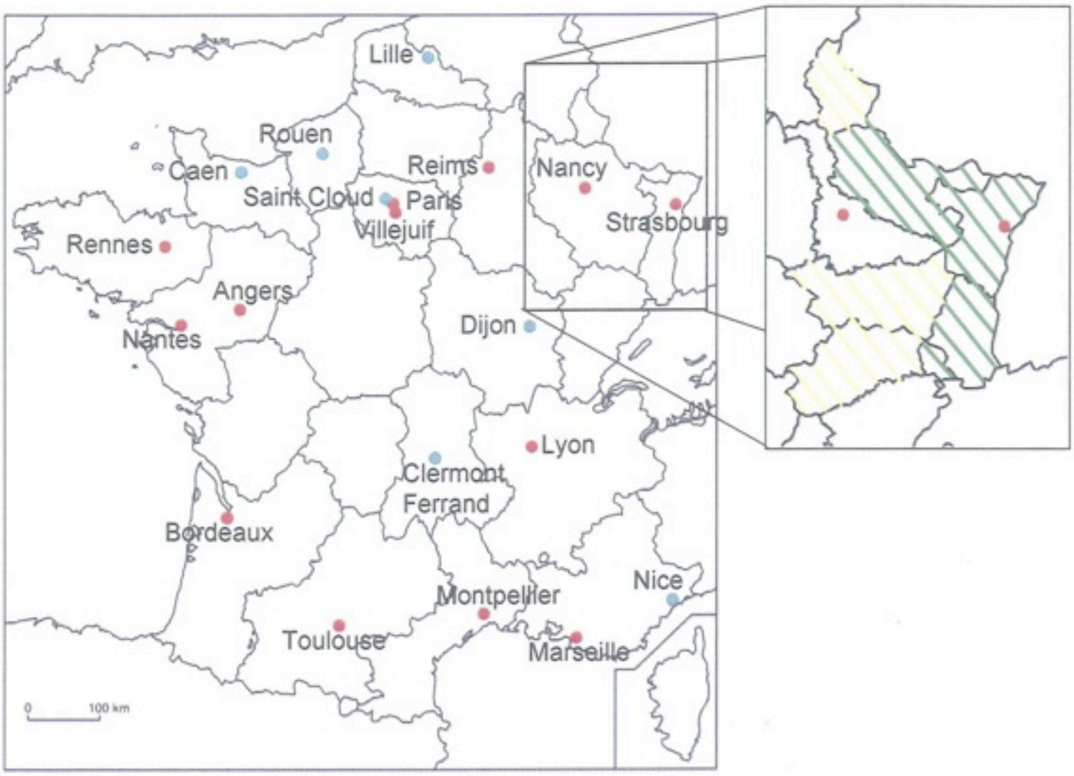

Figure 4.3 Map of France with the CACs and the medical schools in the interwar period. The map is divided into the twenty-one regions of France. The red dots represent the fourteen *Centres Anti-cancéreux* that opened before 1925. The blue dots represent those after 1925. The shaded yellow and green areas in the insert illustrate the initial constituency under the jurisdiction of the Strasbourg centre (Bas-Rhin, Haut-Rhin, Vosges, Belfort Territory, Haute-Saône, Moselle and Luxembourg). After a CAC opened in Nancy in 1925, Strasbourg's constituency was reduced to the shaded green area (Bas-Rhin, Haut-Rhin, Belfort Territory and Moselle).[86]

Between 1923 and 1925 fourteen regional cancer centres were the designated *Centres Anti-cancéreux*. In Marseille the cancer treatment centre remained an annex to the surgical unit.[87] In Reims the radiation therapy apparatus had been in the surgery unit but were integrated into a new cancer centre, whose functioning stressed pluri-disciplinary collaboration.[88] In Nancy, the cancer centre facilities concentrated pathology diagnosis, radiation therapy treatment and surgery all under one roof.[89] The situation in Caen seems unclear: the centre opened in 1923, received its first patient in 1925, was officially recognised

[86] This map was prepared by T. Close-Koenig.
[87] X. Serafino, ed., *Le nouveau centre régional de lutte contre le cancer. Marseille.* (Marseille: Centre régional de lutte contre le cancer, 1972).
[88] Dr. Baud, *Le Centre Régional Anti-cancéreux de Reims et le traitement actuel du cancer* (Reims: Matot-Braine, 1925).
[89] Vautrin, *Organisation de la lutte contre le cancer.* (Nancy, Paris and Strasbourg: Berger-Levrault, 1925).

as a regional centre in 1930 and hired a pathologist that year, although they may have been sending tissue samples to the pathologist in the autopsy pavilion.[90]

Despite the numerous ways of adapting existing facilities to meet the *Commission du Cancer*'s requirements, pluri-disciplinary teams provided assessment of and treatment to cancer patients. Not only did the commission require that cancer centre personnel consist of medical school staff, but specific competences had to be united. This was considered the best way to guarantee adequate treatment of each patient. These included:

> "1. An anatomo-pathologist to determine the nature of the cancer to be treated;
> 2. A surgeon to take care of curative and palliative interventions;
> 3. A medical-electrician, with a thorough knowledge of deep radiotherapy and brachytherapy, to direct these applications;
> 4. A physicist to contribute, regularly or on occasion, advice on the operation of the instruments for treatment and measurement."[91]

This list placed the different specialisations intercepting cancers on equal standing and abated any dominant positions in the treatment of cancer and in the medical hierarchy. Pathologists were first on the list; diagnosis was mediation. Diagnosis would determine if patients were directed to surgeons or to radiotherapists (medical-electricians, as they are called here). Surgeons made necessary interventions. Radiotherapists applied roentgen-ray or radium therapy. Radiation therapies were heavy technologies; managing machinery and managing patients was divided between radiotherapists and physicists.

As a consequence of pluri-disciplinarity, the regional centres had to implicate collaborations between medical schools and hospitals. The physical and intellectual structures had to open corridors to allow interactions between pathology, surgery, radiotherapy and medical physics.

Why or how did pluri-disciplinarity emerge in France? Teamwork has been stressed as a strength and the distinguishing feature of the French cancer centres.[92] It might be suggested that the organisational framework was another strength, as well as a distinguishing feature. The framework was top-down as it was initiated by the state, but it was issue of a list of

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[90] Eliane Blanchemain-Bouche, "Naissance et évolution des centres de lutte contre le cancer en France. L'exemple de Caen de 1923 à 1973. Origine du Centre François-Baclesse" (Thèse de médecine, Caen: Université de Caen, 2003).
[91] "Commission du cancer. Principes d'après lesquels doit être organisé un centre régional de lutte anticancéreuse," 107-108 (My translation.)
[92] Teamwork efforts were not unique to France. There were for example incidences of group meetings at the Westminster Hospital in London and the Christie in Manchester. Furthermore, as Pickstone notes, the advocacy of teamwork, as integral to centralization, was not limited to medicine in the interwar period. Pickstone, "Contested cumulations," 178.

principles drawn up by a commission of medical specialists, researchers, and practitioners. The members of this commission were interested in and were working on/against cancer from different medical disciplines. The state initiated or set up the context for this national and pluri-disciplinary organisation.

There were 84 people on the Commission. These people collectively formatted the cancer centres and the professional jurisdiction over cancer patients. Without knowing the details of this Commission's decision-making processes, some hypotheses can be laid out.[93] There were, expectedly, some network relationships at play and some particularly prominent actors. There were also existing cancer centres that functionned more or less efficiently.

In 1922, there were three centres that may have been models for the ideal regional centre. First, the cancer treatment unit at the Paul-Brousse Hospices in Villejuif founded by Gustave Roussy in 1921. Here research focused on pathological anatomy was situated alongside the clinic. After radium had been purchased in 1922, the unit also offered treatment.[94] Second, at La Salpêtrière and Tenon Hospitals, cancer treatment units were annexed to the general surgery wards. Here, the supremacy of surgeons (over radiotherapists) was notable, and there was no particular interest in research.[95] Finally, the cancer centre organised by Claudius Regaud in 1919 as an extension of the Radium Institute, which became the Curie Foundation in 1921, had multiple objectives: teaching, treatment, and research.[96] At the Foundation all actors – clinicians, radiotherapists, surgeons, physicists or pathologists – were complementary and mutually respected.[97] Pinell has suggested that the regional centres were a hybrid of these Parisian examples, but also of provincial centres in Lyon, Montpellier, and Strasbourg.[98] The latter of the three Parisian examples, Regaud's cancer clinic at the Radium Institute, however, stands out as one that melded teaching, treatment, and reasearch and that implemented pluri-disciplinarity.

Regaud was, in fact, a vocal spokesman for teamwork in cancer treatment, in addition to innovating techniques for roentgen-radiation and radium in therapeutics. He travelled to

[93] An examination of Commission's constitution and collaborations would be interesting to pursue with primary archive sources.
[94] Pinell, *Naissance d'un fléau*, 154 and 157-158.
[95] Ibid., 158-159.
[96] Ibid., 149-154; Camilleri and Coursaget, *Pionniers de la radiothérapie*, Chapter 9.
[97] Pathologists in the interwar period included Claudius Regaud, the founder and first director, Antoine Lacassagne who was Regaud's assistant and then his successor, and George Gricouroff, a surgeon who was the chief pathologist.
[98] Pinell, *Naissance d'un fléau*, 160 and 164.

international conferences to speak about the French regional centres.[99] Regaud also had hundreds of doctors from abroad visit him in Paris.[100] Who was Regaud and how did he come to advocate pluri-disciplinarity?

In 1913 Claudius Regaud joined Emile Roux and Marie Curie in creating the Radium Institute in Paris.[101] They were still soliciting support to further develop the Institute, but the efforts and plans were interrupted by the war.[102] Regaud's war experience was influential for his later policies and for network connections.[103] The cancer clinic founded by Regaud at the Radium Institute in 1919, for example, employed some of his acquaintances from the war.[104] In 1915 Regaud was charged with reforming health services [*Service de santé*] by Justin Godart, under-secretary of state.[105] Regaud put together a group of medical specialists to improve medical facilities at the front lines and to train military doctors.[106] The *Groupement de Services Chirurgicaux et Scientifiques,* initially stationed in Prouilly and later in Bouleuse near Reims, comprised medical services, radiology, bacteriology, haematology and pathology laboratories, alongside surgery facilities. Boundaries disappeared as doctors, civilians, military, surgeons, radiologists and biologists worked in collaboration. Of interest here, are the laboratories that sat alongside operating rooms, pictured below.[107]

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[99] Regaud's international communications include the international symposium on Cancer control at Lake Mohonk, NY, USA in 1926 Claudius Regaud, "What is the value and what should be the organization and equipment of institutions for the treatment of cancer by radium and X-rays?," *Surgery, Gynaecology and Obstetrics* 154 (1927): 116-136; and the French translation: Claudius Regaud, "Quelle est la valeur et quels doivent être l'organisation et l'équipement des institutions pour le traitement du cancer par le radium et par les rayons X?," in *Archives de l'Institut du radium et de la Fondation Curie*, vol. 1 (Paris: Les Presses Universitaires de France, 1929), 135-161; Other destinations included: Belgium, Beyrouth, London, Peru, Columbia, Berlin, etc. Camilleri and Coursaget, *Pionniers de la radiothérapie*, 146-147; 151-152.

[100] "Report to Authorize the Executive Committee to appropriate up to $252,000 to the University of Paris, 4/13/1932" RF, 1.1, 500A Université Paris Radium Institute, Rockefeller Archive Centre

[101] Maurice Lenz, "The early workers in clinical radiotherapy of cancer at the Radium Institute of the Curie Foundation, Paris, France," *Cancer* 32 (1973): 519-523; Pinell, *Naissance d'un fléau*, 107-114.

[102] Camilleri and Coursaget, *Pionniers de la radiothérapie*, 187.

[103] The first world war efforts also contributed to the further development of radiotherapy apparatus: Alain Laugier, "Le premier siècle de la radiothérapie en France," *Bulletin de l'Academie nationale de médecine* 180 (1996): 143-160; on the distribution and training of X-ray diagnosis and therapy material Camilleri and Coursaget, *Pionniers de la radiothérapie*, 90-92; and cancer centres are organised in Lyon and Montpellier Pinell, *Naissance d'un fléau*, 126-131.

[104] Pinell, *Naissance d'un fléau*, 145. Pinell lists Henry Coutard as radiotherapist at the Gerardmer military hospital; Octave Monod worked with Justin Godart at the Secretary of State; René Ferroux physicist worked at Bouleuse; Jean Louis Roux-Berger was surgeon at Bouleuse, and Mary Thurneyssen nurse at Bouleuse.

[105] Regaud was first head of the *Hôpital d'évacuation* in Gerardmer. In 1915, he received honorary distinction from Raymond Poincaré. It was in Gérardmer that he met Justin Godart. Camilleri and Coursaget, *Pionniers de la radiothérapie*, 90.

[106] Ibid., 92-96.

[107] These laboratories were affiliated with the Pasteur Institute, with materials and reactants coming from the Institute.

Figure 4.4 Members of the *Groupement de Services Chirurgicaux et Scientifiques*, WWI.
Top row (from left to right) Claudius Regaud, Louis Roux-Berger, René Leriche.
Bottom row (from left to right) Thomas Nogier, Pierre Masson.[108]

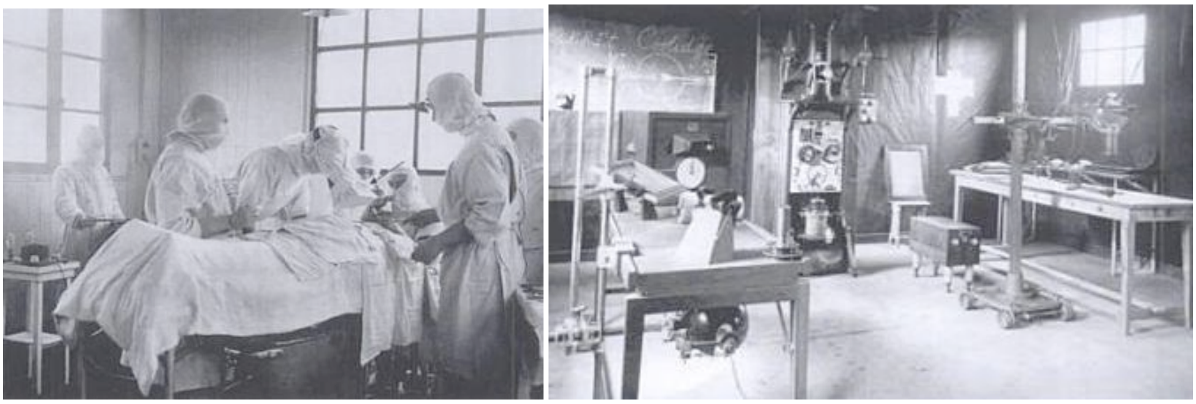

Figure 4.5 Operating rooms and laboratories side by side in Bouleuse, WWI.[109]

Regaud chose and appointed individuals of notable competence to join his military medical team: René Leriche, surgeon; Jean Louis Roux-Berger, surgeon; Thomas Nogier, medical physicist and radiologist; and Pierre Masson, pathologist.[110] The parallel of the list of specialities of the leading members of the *Groupement de Services Chirurgicaux et*

[108] Reproduced from: Camilleri and Coursaget, *Pionniers de la Radiothérapie*, 96.
[109] Reproduced from: Camilleri and Coursaget, *Pionniers de la Radiothérapie*, 94.
[110] The interaction within this group was not limited to the war years. Nogier was a friend of Regaud's from before the war and had introduced him to radiology techniques in Lyon. In fact, a number of these men may have crossed paths in Lyon, where Leriche, Roux-Berger, Nogier and Regaud had all spent some time, as had Justin Godart, the parliamentary under-secretary who appointed Regaud to his war post. Masson may have met Regaud at the Pasteur Institute in Paris immediately before the war. Pinell, *Naissance d'un fléau*, 110. They also published together: Regaud and Nogier, "Actions des rayons X très pénétrants, filters, sur le derme et l'épiderme de la peau."
(Note: Patrice Pinell indicates that this was Théodore Nogier, but I have only found trace of a Thomas Nogier.)

Scientifiques to that of the expertise required by the *Commission du Cancer* for the organisation of the Regional cancer centres is noteworthy. Both put laboratory pathologists, surgeons, radiologists and physicists on equal footing. This was not a coincidence. A number of those who participated in pluri-disciplinary military medical teams were also appointed members of the *Commission du Cancer* and their personal experiences likely contributed to the conditions set by the commission.

It might be emphasized that Claudius Regaud, Gustave Roussy and Charles Bouchard, all heavily involved in the first French cancer research and treatment centres in the Paris region, were pathologists.[111] Furthermore, many of these early cancer network members had associations with the Pasteur Institute, which strongly advocated laboratory methods. The influence of non-surgeons in mobilising units that merged research and therapy for cancer was significant to the development of the type of centres that were found in France. The potency of the teamwork approach in France, for example, is in strong contrast with the surgeon-dominated model of the United States.

The situation described above was centred on Paris, but provincial cancer centres were considered in establishing a model for the regional cancer centres, which would equally be implemented around France. In a study of the history of radiation therapy in Alsace, Christoph Voineau describes the *Commission du cancer* model as identical to that operating out of the central radiology service in Strasbourg since mid-1921.[112]

4.1.3 Cancer & treatment in Strasbourg

Radiology brought medical technologies and large apparatus into hospitals in the first decades of the twentieth century. Radiology was undeniably important for revealing lesions and was also a memorable experience for patients.[113] The first X-ray machine was installed in Strasbourg in 1901, a central radiology service created in 1912 (with diagnostic radiology and deep roentgen-ray therapy apparatus), radium was purchased in 1913, and a central radiology pavillon opened in 1914.[114] The facilities were, albeit, constricted. On the main floor there

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[111] The presence of bacteriologists might also be followed. Recall that I mentioned that there were two bacteriologists from Strasbourg on the *Commission du Cancer*. I have not, however, explored this any further.
[112] Voineau, "Science, technique et médecine: une histoire de la radiothérapie en Alsace (1913-1940)," 17.
[113] Howell, *Technology in the hospital*.
[114] On the history of the cancer treatment centre in Strasbourg: *Les Centres Anti-Cancéreux Français. Vingt-cinq ans d'activité. 1945-1970.* (Rouen: Imp. le Cerf, 1970); Voineau, "Science, technique et médecine: une histoire de la radiothérapie en Alsace (1913-1940)"; Jean-Christophe Petit, *La lutte contre le cancer en Alsace* (Barr: Le Verger Editeur, 2010); "Le centre Anti-cancéreux de Strasbourg," *Lutte Contre le Cancer* 31 (1931): 860-864; Géo Marchal, "Le Centre Régional Anti-cancéreux de Strasbourg," *La Vie en Alsace* 1 (1931): 13-17; "Le

were apartments and bathrooms for employees of the medical baths and of the surgical and medical clinic [*cliniques médicale et chirurgicale B*]. The radiology service was on the upper floor of the building. It consisted of a miniscule laboratory, closets for storage and for developing the X-ray images, a large room for X-ray imaging and a small room for roentgentherapy.[115] In this room, cancer patients were bandaged, biopsies were taken, blood work done, as well as the radiation therapy treatment carried out. The roentgentherapy services were limited, most likely, to a few inoperable cancer cases.

Biographical parentheses: Auguste Gunsett

Auguste Gunsett, the director of these radiology facilities, had initially been interested in specialising in gynaecology and dermatology. Gunsett, a francophone Alsatian, completed a medical degree in Strasbourg in 1899. He then worked as an assistant at the *Clinique gynécologique* of the medical school (under Professor H. W. Freund). After a decline in his health, due to the long hours and nights tending difficult births, he directed his interests to dermatology and became an assistant at the *Institut dermatologique* (under Professor Wolf). He became interested in physical therapeutic agents after meeting Jean-Alban Bergonié, renown medical physicist.[116] Gunsett had specialised training in gynecology and dermatology and these were precisely the two medical specialties that first used radiation therapy. Gunsett became a specialist in cancer treatment, and most particularly gynaecological and skin cancers.

Gunsett first learned of the promising effects of radium for skin cancers at a dermatology conference in Rome.[117] Upon his return to Strasbourg, in collaboration with gynaecology and dermatology professors, he raised funds to purchase enough radium to treat skin and uterine cancers. They formed a private organization in December 1913 and raised funds to purchase radium.[118] In 1913, Gunsett, accompanied by Professor Meyer, professor of dermatology, went to Armet-de-Lisle in Nogent-sur-Marne in France (Strasbourg was

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Centre Anti-cancéreux de Strasbourg," *Lutte Contre le Cancer* 54 (1936): 268-274; Héran, *L'histoire de la médecine à Strasbourg*; G. Batier, "La société médicale de curiethérapie de Strasbourg," *Le Médecin d'Alsace et de Lorraine* (1926): 196-201.

[115] Gunsett, Auguste. "L'Evolution des différents services de l'hôpital civil de 1918 à 1929: Service central de radiologie." 1930. AHUS.

[116] He wrote in 1925: "C'est [Bergonié] qui me persuada à m'engager dans la voie des agents physiques et me communiqua son enthousiasme pour l'électricité médicale qui lui devait déjà tant, et pour les rayons X qui n'en étaient alors qu'à leurs débuts, mais dont il entrevoyait déjà l'immense importance future." Auguste Gunsett, "La loi de Bergonié et de Tribondeau," *Strasbourg Médical*, no. I (1925): 49.

[117] Auguste Gunsett, "Les origines du centre Anti-cancéreux de Strasbourg. Quelques souvenirs lointains", 1970.

[118] I do not have further information on this organisation, i.e. whether it was non-profit or for-profit, the name, etc.

German at the time) and brought the radium back in his pocket.[119] He also went to the *Institut de Radium* to have the radium measured by Marie Curie.[120] This radium was used for a private service; a service not run by the hospital and medical school clinics.

After the armistice, Gunsett described the quarters as cramped, the equipment in poor shape, and the radioprotection measures insufficient.[121] The hospital's financial situation did not allow immediate renovation or expansion of the facilities. The private radium therapy services continued to operate. Gunsett kept the radiodiagnostic services functioning in 1920, in part, with equipment of his own. Parts of the radiology equipement had been removed and used for equipping and repairing equipment in other clinics. When Strasbourg became French, the acquisition of additional detached parts became a challenge, as the equipment was all of German make.

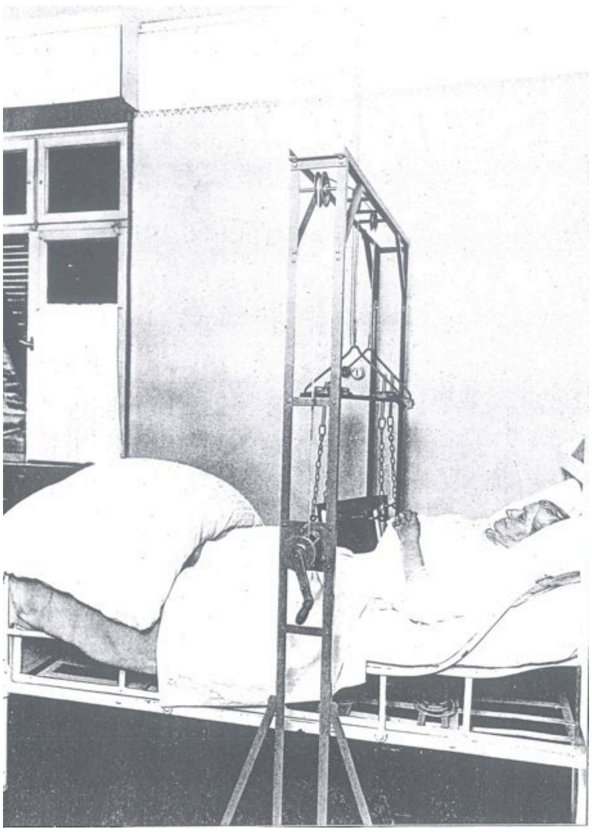

Figure 4.6 Instrumentation innovated by Gunsett in Strasbourg, 1920s.[122]

[119] Gunsett, "Les origines du centre Anti-cancéreux de Strasbourg," 5.
[120] Xavier Roqué, "Marie Curie and the radium industry: A preliminary sketch," *History and Technology: An International Journal* 13, no. 4 (1997): 267.
[121] Gunsett, Auguste. "L'Evolution des différents services de l'hôpital civil de 1918 à 1929: Service central de radiologie." 1930. AHUS.
[122] Reproduced from: Gunsett, *Centre Régional de Lutte Contre le Cancer. Centre Paul Strauss*, 18

Later, in the late 1920s, Gunsett elaborated a number of brachytherapy apparatus for use in cancer treatment in Strasbourg. Notably, a machine for gynaecological tele-brachytherapy, as well as an ordinary tele-brachytherapy apparatus.[123] In the 1930s, with the improvement of radio and radium therapy equipment, handcrafted constructions were no longer viable. He ordered and gave instructions for the construction of new equipment, including a horizontal table with a moving grid for skeletal radiodiagnosis, a urological table, and a table for radiography from Massiot.[124]

Until 1923, roentgentherapy and radiumtherapy remained marginal and of little interest to hospital administration. The facilities and apparatus were maintained and operated entirely by Gunsett within the radiology service.

The Strasbourg Centre régional de lutte Anti-cancéreux (CAC)

In 1921, the hospital financed the purchase of two 200 000 Volt roentgentherapy apparatus.[125] They also financed the first radioprotection efforts: a lead wall around the apparatus.[126] Early in 1923, the hospital purchased more radium; at the time, the centre had 350 mg (which may have been that purchased by the private organisation founded by Gunsett).

The 24 March 1923, Gunsett communicated Strauss' announcement to the medical society of the Bas-Rhin [*Société de médecine du Bas-Rhin*]. Gunsett, the director of central radiology services at the time, recounted that such a centre had been functioning in Strasbourg since mid-1921.

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[123] For example, two instruments pictured in the c1930 brochure designed by Gunsett: for gynecological radium therapy and for ordinary radium therapy (both for *télécuriethérapie*). Auguste Gunsett, *Centre Régional de Lutte Contre le Cancer. Centre Paul Strauss* (Strasbourg, 1930), 18-19.
The first of these, was built in 1928 by a mechanic in Strasbourg following Gunsett's instruction. This was a reproduction of an apparatus designed by Regaud at the *Institut de radium.* Gunsett's version is much lighter and artisanal. See Voineau, "Science, technique et médecine: une histoire de la radiothérapie en Alsace (1913-1940)," 92.
On user innovation of medical equipment: Brian Shaw, "The role of the interaction between the user and the manufacturer in medical equipment innovation," *R&D Management* 15, no. 4 (1985): 283-292.

[124] Radiguet & Massiot merged in 1899 and specialized in precise scientific instruments. In 1906, they employed 80 workers. The office and workshop were in Paris. They quickly turned their focus to medical apparatus and published a 300 page catalogue of radiology and electrotherapy equipment in 1903. In 1960, they fused with Philips.) "Historique de la maison Radiguet," in *Lumière éléctrique à domicile par la pile Radiguet*, 5th ed., notice n°98 (Radiguet et Massiot constructeurs, 1906), http://genealogie-radiguet.ifrance.com/pages/Radiguet/Pages/HistoriqueMaison.htm. Radiguet and Massiot, *Catalogue raisonné de radiologie et électrothérapie comprenant aussi quelques appareils spéciaux de notre fabrication se rattachant à la médecine et à la chirurgie.* (Paris, 1903).

[125] Contrary to what Patric Pinel affirms, it was not German administration that financed or equipped Strasbourg's hospital with deep roentgentherapy apparatus. Pinell, *Naissance d'un fléau*, 164 and 205.

[126] Anne Fellinger, "Du soupçon à la radioprotection. Les scientifiques face au risque professionel de la radioactivité en France (1901-1967)" (Thèse de doctorat d'histoire des sciences, Strasbourg: Université Louis Pasteur, 2008).

The Strasbourg *Centre régional de lutte Anti-cancéreux*, named the *Centre Paul Strauss*, was created by ministerial decree on 19 November 1923. It was organized according to the cancer commissions guidelines and officially approved as a regional centre on 27 March 1924. The region included: Bas-Rhin, Haut-Rhin, Moselle, Vosges, Haute-Saône departments, Belfort territory, as well as Luxembourg.

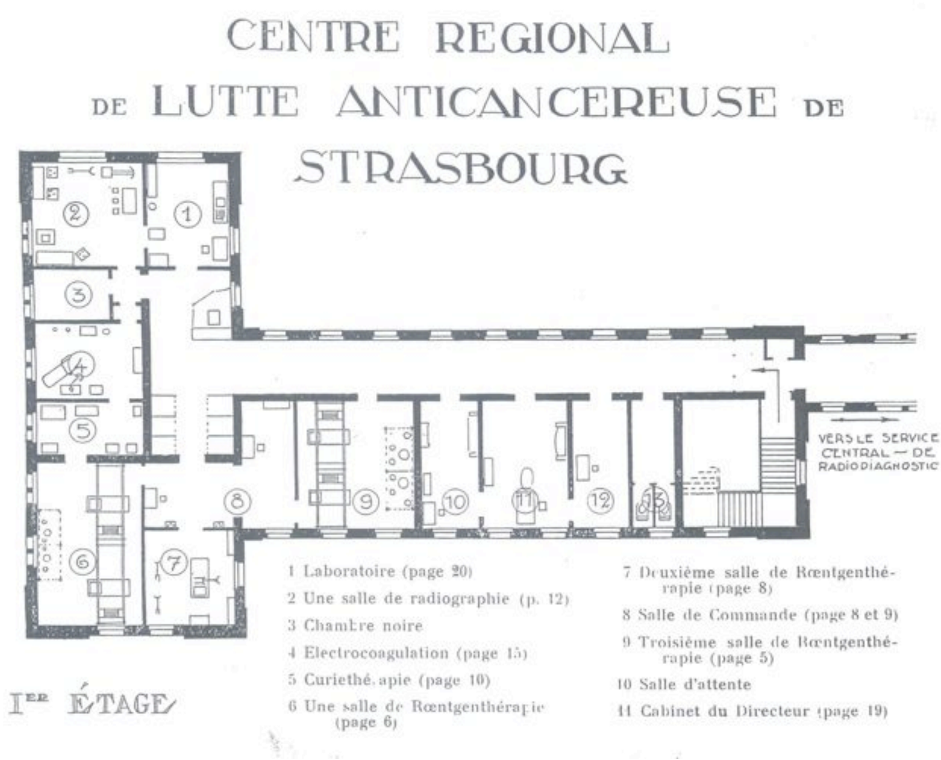

Figure 4.7 Centre régional de lutte anticancéreuse de Strasbourg, c1930[127]

The creation of a regional cancer centre involved re-organizing, expanding and renovating the central radiology service. This regional cancer centre was located alongside hospital services. Gunsett was director of both the central radiology service and the regional cancer centre, and he also worked as medical electrician. He worked alongside two medical assistants, a scientific assistant and four technicians (three working with roentgentherapy apparatus). The administrative council of the centre included the medical school dean, the *chefs de services* of the surgical clinics, gynecology clinic, dermatology clinic, opthalmology clinic and the otorhinolaryngology clinic, the directors of pathological anatomy institute and

[127] Reproduced from: Gunsett, *Centre Régional de Lutte Contre le Cancer,* 4.

cancer centre, and delegates of the region, the municipality, the hospital, the medical union, the municipal hygiene office, and social insurance services.[128]

Despite equipment and infrastructure having been previously established, by the official opening the centre Paul Strauss in March 1924, 1 247 000 FRF had been spent for radium and equipment.[129] The hospital's radium supply and facilities were acquired for 126 000 FRF. A new large constant tension apparatus 200 000 Volts (*Gaiffe, Gallot et Pillon*) was bought. The State contributed 242 000 FRF and the *département du Bas-Rhin* subsidised 80 000 FRF. But the largest expense was radium. In 1924, the hospital purchased 199 000 FRF worth and further State funding (via *Pari mutuel*) bought a further 600 000 FRF worth. This brought the total to 821.49 mg of radium and four X ray tubes.[130]

The centre continued to receive generous financial contributions; between 1927 and 1930, several millions of francs (funding and radium) from the State and over 500 000 FRF from the surrounding departments and social insurance.

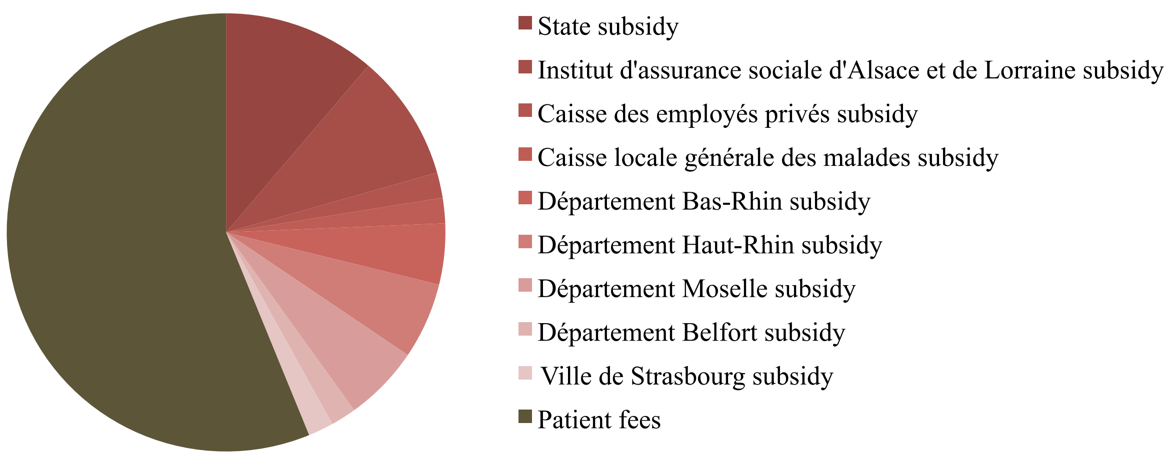

Figure 4.8 Distribution of fianance sources of the Centre Paul Strauss in Strasbourg, 1926.
The pink & red shaded sections on the right were subsides. The dark brown on the left was patient fees.

In 1926, the ordinary budget of the CAC in Strasbourg represented 267 000 FRF. Subsidies from the State, the *départements* od the surrounding region, the city of Strasbourg,

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[128] Gunsett, Auguste, Centre régional de lutte contre le cancer. Centre Paul Strauss. 1931. ACPS.
[129] Voineau, "Science, technique et médecine: une histoire de la radiothérapie en Alsace (1913-1940)," 31.; "Rapport administratif du directeur du centre sur la première année de fonctionnement du centre de lutte anticancéreuse Paul Strass" Dossier: Centre régional de lutte anticancéreuse, 1924-1929, casier 43. n° 7a. AHUS.
[130] In 1929, they had 2 grams. 360.41 milligrammes funded by the hospital and 1631.64 by the State. This was valued at 3 million Francs. Gunsett, "Service central de radiologie", 30.

and the insurance funds consisted of 44% of the budget, or 117 000 FRF.[131] Roentgen-ray and radium therapy applications were invoiced for 150 000 FRF in 1926. In 1926, 447 patients were treated; thereby an average invoice of 335 FRF per patient. All treated patients were paying patients. The operating budget was divided between contributions by private or official organisms and the hospital and by the fees paid by patients.[132] Although, the various subsidies contributed to the centre, patient fees were the centre's prinicple source of funding. In 1935, there was 80 000 FRF in State subsidy and 400 000 FRF in patient fees; an average invoice of 396 FRF. This represents a significant overall increase in budget; from 267 000 FRF in 1926 to 480 000 FRF in 1935. But also the retraction of the various subsidies.

That patients were all paying fees, some issue of the Alsace-Lorraine social insurance, some were private paying patients. This was very different than the rest of France, where social insurance did not exist to the same extent[133] and regional cancer centres were limited to poor and non-paying patients.[134] It was only in Strasbourg that the CAC was open to the middle and upper classes, with insurance or paying from their pocket. Other CACs in France did not have this additional source of funding. Elsewhere in France, upper class paying patients went to private cancer centres.[135]

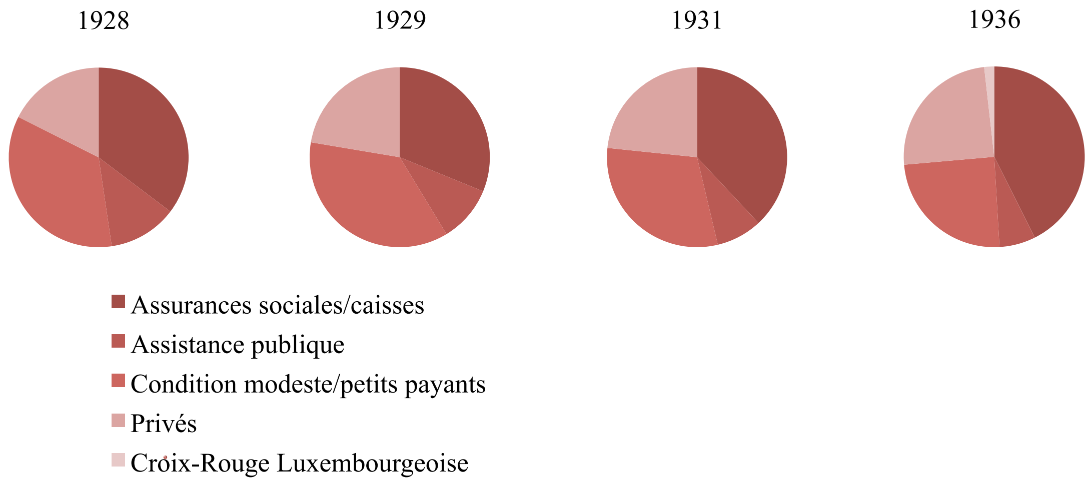

Figure 4.9 The fianancial status of the patients treated at the CAC, 1928-1936

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[131] Voineau, "Science, technique et médecine: une histoire de la radiothérapie en Alsace (1913-1940)," 37.
[132] Gunsett, Auguste, *Service central de radiologie.* L'évolution des différents services de l'hôpital civil de 1918 à 1929, AHUS.
[133] The 1928 social insurance covered a small percentage of the population.
[134] These centres were initially for non-paying patients, with the logic that upper classes could benefit from private centres. But this was not without ensuing problems, financial and other. See discussion notably of Regaud's reaction and commentary to this in Pinell, "Cancer policy and the health system in France." As well as, Pinell, *Naissance d'un fléau*, 222-223; Voineau, "Science, technique et médecine: une histoire de la radiothérapie en Alsace (1913-1940)," 38.
[135] This is stated by Pinell. I did not explore this question when I looked into the organization of other regional cancer centres. Confirmation and the particulars of this situation would be interesting to study further.

There was a second criterion for admittance to the regional cancer centres, the cancers diagnosed had to be curable. This was determined with a biospy and histopathological examination. In Strasourg's CAC annual reports, Gunsett stressed the importance of respecting this prerequisite.[136]

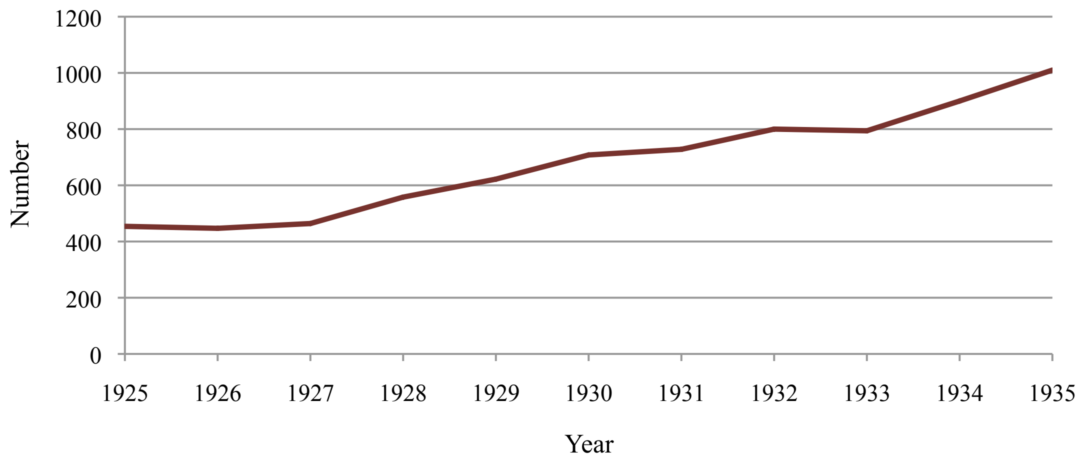

Figure 4.10 Number of CAC patients, 1925-1935.[137]

The number of patients treated at the cancer centre in Strasbourg increased between 1925 and 1935 from 454 patients in 1925 to 900 in 1935. A doubling of number of cancer patients being treated could possible indicate a significant rise in the number of cancers being diagnosed and determined to be curable and recognition of the centre as a specific place for cancer therapy. In the 1920s and 1930s educational campaigns and propoganda were directed to the public and to general practitioners. They looked to modify practices in terms of early detection of cancers.[138] For example, in Alsace-Lorraine, a bilingual French and German poster was printed and distributed to every community for posting. Auguste Gunsett promoted roentgen ray treatment iin Strasbourg in 1932[139] and he spoke regularly on the radio.[140]

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[136] Auguste Gunsett. Compte moral et administratif pour l'exercice 1928. & Compte moral et administratif pour l'exercice 1929. Dossier concernant le budget et le compte du centre Anti-cancéreux. Casier 139G. AHUS.
[137] The data used to generate this data from: "Le Centre Anti-cancéreux de Strasbourg."
[138] Cf. Regaud, "Le rôle du médecin sans spécialité dans le diagnostic du cancer"; "Principes d'organisation pratique de la semaine de défense contre le cancer"; Pinell, *Naissance d'un fléau*, 253-288.
[139] Auguste Gunsett, "Le cancer," *Strasbourg Médical* 15 (1932): 331-334.
[140] Gunsett, "Les origines du centre Anti-cancéreux de Strasbourg."

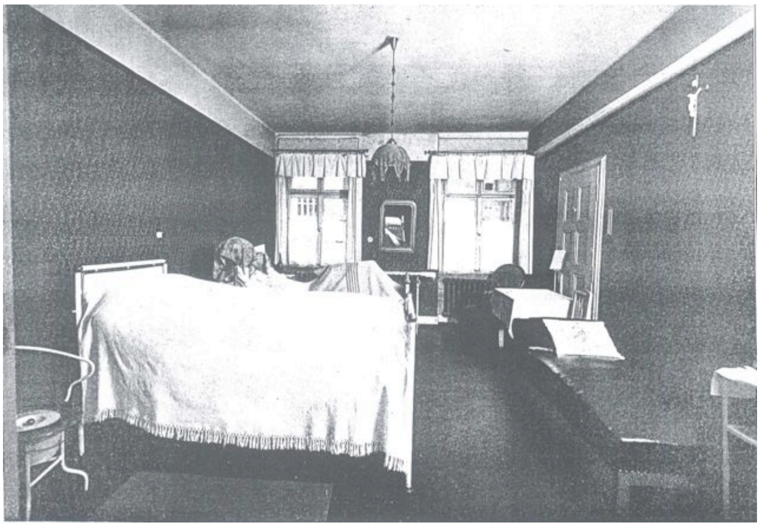

Figure 4.11 Photos of rooms for different patients, Centre Paul Strauss, Strasbourg.[141]
The upper picture depicts rooms for "3e classe" patients. The lower picture rooms for private "2e classe."

The services were provided according to social class, with different rooms for private second class patients and for non-paying third class patients, pictured above. Like in the hospital and the medical school clinics, there were different classes of patients: 3rd class were non-paying, whereas 2nd class and 1st class were paying.[142] The clientele were not all of the same social background and different rooms accomodated this. These rooms, along with the apparatus, were featured in an illustrated mid-1920s publication, titled *Centre Régional de Lutte Contre le Cancer: Centre Paul Strauss*, advertising the regional cancer centre.[143]

141 Reproduced from: Gunsett, *Centre Régional de Lutte Contre le Cancer. Centre Paul Strauss*, 22-23.
142 The different classes of patients were determined according to their income and social class. The first class being well-to-do bourgeois. I do not have more details on the distinction between them.
143 Gunsett, Auguste. Centre Régional de Lutte Contre le Cancer. Internal publication. c.1925. ACPS.

The brochure consists of twenty-one photos of the centre. These are preceded by a one-page description, in which the organisation of the centre is detailed in nine points. The first gives the location of the centre on the hospital grounds. The second lists the rooms in the centre. The third extols: “The *biopsies* are performed at the *Institut d’Anatomie Pathologique* of the medical school.” The fourth and fifth note technical details of the apparatus. The sixth states that *surgical operations* are performed in the medical school surgery wards. The seventh says that *hospitalisation* may be in the centre itself or in the hospital. The eighth assures that the *treatment* of every patient is a collaborative effort of medical professors. The last point describes *teaching,* which includes instruction at the medical school. This list reflected Gunsett’s conception of the centre’s strong points and of what was needed to treat cancer. It is interesting and revealing to note that the pathologist appears in number three and precedes the technical details, the surgical facilities, as well as the accommodation situation. It provides evidence of the primordial role of pathologists and the pathology laboratory in cancer treatment and of Gunsett’s union with the institute and its director, Pierre Masson.

In fact, there were three laboratories working with the cancer centre: biopsies were examined for practitioners in the surrounding regions and for the centre at the *Institut d’Anatomie Pathologique* by Masson; bacteriology analyses were performed at Strasbourg’s *Institut Pasteur* by Amédée Borrel; and further research was conducted at the *Institut de Physique Médicale* by Fred Vlés.[144] The pathological anatomy laboratory was the only one of these to be implicated in therapeutics directly. Masson defined cancers prior to admission. These were also needed for Gunsett’s research that aligned histopathology definitions of cancer with successful or failed treatment methods as the basis of statistical study.[145] Borrel and Vlès’s laboratories conducted research. These three laboratories effectively participated in meeting the triple objective of the centre: treatment by providing initial diagnosis and follow-up, teaching as these institutes were an integral part of the medical school, and research as the tissue samples not only provided patient information, but also furnished laboratory samples for medical students and research material for professors and research assistants.

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[144] Regaud, “Le rôle du médecin sans spécialité dans le diagnostic du cancer”; “Principes d’organisation pratique de la semaine de défense contre le cancer”; Pinell, *Naissance d’un fléau*, 253-288.

[145] Auguste Gunsett. Compte moral et administratif pour l’exercice 1928 to 1939. Dossier concernant le budget et le compte du centre Anti-cancéreux. Casier 139G. AHUS.

Lead users

In the story of the French regional cancer centres, there are a number of actors that stand out. Among them, there is one who knew and worked with Pierre Masson, Claudius Regaud. Regaud's training as a histologist, his active participation in roentgen-ray and radium therapy innovations, his outstanding leadership skills put to practice in World War I, and advocacy of pluridisciplinarity all seem to align in the guidelines of the cancer centres.

In the story of cancer treatment with radiation therapy in Strasbourg, Auguste Gunsett stands out. The brief biographical references to his achievements contribute to understanding why the *Centre Anti-cancéreux* opened in Strasbourg almost immediately upon the implementation of the legislation defining regional centres.

These two actors are, what innovation studies call, lead users. Von Hippel defines those who derive benefit from using a given product (or process or service) innovation as users. Novel and commercially successful scientific instruments, he says, are commonly developed or innovated by scientist-users.[146] Lead users, further, he defines as:

> "those who display two characteristics with respect to [a novel or enhanced product]:
> 1. Lead users face needs that will be general in a marketplace, but they face them months or years before the bulk of that marketplace encounters them,
> 2. Lead users are positioned to benefit significantly by obtaining a solution to those needs."[147]

Regaud and Gunsett were lead users, not only of the apparatus that they innovated and assembled, but of radiation therapy services, and of a particular organisation or administration of these services. Why characterize these actors as lead users? This can be a story of institutions and of legislations, but it is also a story of individuals. Individuals pushing to set (high) standards; individuals pushing to change and innovate.

In the international context of cancer treatment in the early 1920s, the French regional cancer centres, including that of Strasbourg, were exceptional. There was mobilisation and legislation to shift power away from surgery and to grant equal standing to less invasive treatments, via radiation therapy. This was implemented by attributing pathologists a status equivalent to that of a medical specialist and not a medical scientist. Masson stressed his wish for pathological anatomy to be acknowledged as a branch of medical practice.[148] He belived

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[146] Eric von Hippel, *The sources of innovation* (New York and Oxford: Oxford University Press, 1988), 19.
[147] Ibid., 107.
[148] Contrat entre l'Université de Montréal et le professeur Pierre Masson. Cote E38, 90/7/2/1, Pierre Masson, 80. Archives de l'Université de Montréal.

that if the laboratory he directed in Strasbourg was successful and filled with workers, it was because the activity was treated as a medical specialisation.[149] Equally, in addition to morphological identification and diagnosis, he gave particular attention to the treatment of different tumoural entitities.[150]

Pathologists entered medical clinic and medical practice as mediators between alternative therapeutic solutions. It was pathologists that made the verdict: “a patient has cancer because a pathology report said so.”[151] This meant that surgeons would not longer arbitrate the treatment of cancers.[152] Histopathology now inhabited a new arena: medical practice.

By shifting the scene from medical teaching and anatomy classes to cancer, the national fight against it and the pathologists participation in this medical practice and clinic, the context of the laboratory activity shifted as well. In Chapter 3, a disinterested and research focused medical school laboratory was portrayed. But when diagnosis became one of the laboratory's activities, the laboratory of the *Institut d'Anatomie Pathologique* transformed into a different laboratory, one interested in patient and therapeutic outcomes and medical practice. How did this play out within the laboratory?

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[149] Correspondance Pierre Masson à L. de L. Harwood, 1 Aout 1926. Cote E38, 90/7/2/1, Pierre Masson, 99. Archives de l'Université de Montréal. (*“celui des histodiagnostics pratiqués à l'Hôpital pour les maladies payants, d'où qu'ils viennent. J'estime que ces examens sont des consultations de Médecin-spécialiste et doivent être payés comme tells à celui qui les fait. .. Je vous demande pardon d'insister sur ce point, mais il est, à mon avis, fondamental. Il est juste sur ce qu'il rémunère le spécialiste selon la part qu'il prend au traitement des maladies, il est habile en ce qu'il l'intéresse au mouvement et à la prospérité de son laboratoire, il est indispensable en ce que, faisant de la discipline anatomo-pathologique une branche de la Médecine pratique, il multiple ses adeptes. J'ai toujours défendu ces idées en France et si mon école a quelque succès, c'est à leur mise en pratique qu'elle en doit la plus grande partie, car c'est elles qui ont peuplé mon laboratoire de travailleurs.”)*

[150] R. L., “Joseph-Luc Riopelle: Pathologiste et homme de culture,” *Le Mum*, March 1972.

[151] Löwy states that this was established in the early twentieth century, and was still the case in 2010. She goes on to say "A pathologist's verdict is indispensable in obtaining access to treatments in a national health system, reimbursement of medical expenses by health insurance, or a leave of absence from work." Löwy, *Preventive strikes*, 19.

[152] Regaud, “Les idées directrices de la lutte contre le Cancer,” 98.

4.2 (Ac)counting. What the books tell

4.2.1 Bifurcating books

The laboratory logbooks issue of the *Institut d'Anatomie Pathologique* initially recorded samples sent to the laboratory for research. These logbooks were a means of recordkeeping for the laboratory. They were not (just) research notebooks. These logbooks might be considered a turnstile that records the passage of people and material coming in and out of the laboratory. A peek into the logbook entries is like a peek through the laboratory door at the flow. Firstly, the sheer numbers of raw material donations. Secondly, the laboratory observations recorded. And lastly, of the lab reports returned.

In the previous chapter, Book 1 of these laboratory logbooks was described. Book 1 dated from 14 March 1919 to 29 November 1919. Book 2 was not described. In fact there were two Book 2's: Book 2A and Book 2B. Book 2A recorded histopathology examinations of samples extracted during autopsies. Book 2B recorded histopathology examinations of samples extracted during surgeries or biopsies. In 1919, samples from autopsies and samples sent to the institute for examination had figured in the same logbooks. But then the distinction of the two sources of samples was administered with a distinction of the records.

The logbook bifurcated into two. This may have been a question of practicality: perhaps this histopathology work was not done on the same workbench or at the same time and therefore it was not practical to move the logbook around. This may also have been a differentiation of examination purposes. Obtaining diagnostic information for post-mortems contributed to research and teaching via the anatomo-clinic approach. Obtaining diagnostic information for living patients similarly contributed to research and teaching, but communicating it to surgeons or practitioners could contribute to patient treatment. This could affect patient treatment on different levels. Surgeons use of this diagnostic information brings us back to the question of pathologists' involvement in therapeutics. If such information was exchanged only in medical school contexts, then this was not particularly contributing to individual patient treatment, although it could confirm or contest clinical diagnosis. Similarly, if such information was exchanged without adherence to any time constraint, it could confirm or contest clinical diagnosis. However, such information was often being received after surgical procedures were complete. This would be very different, if a time constraint was indicated and if surgeons or practitioners waited for diagnostic information before completing surgical procedures or choosing therapeutic paths. A qualitative and quantitative analysis of the laboratory logbooks can determine which of the above scenario's best characterizes the surgeon-pathologist relationship in Strasbourg.

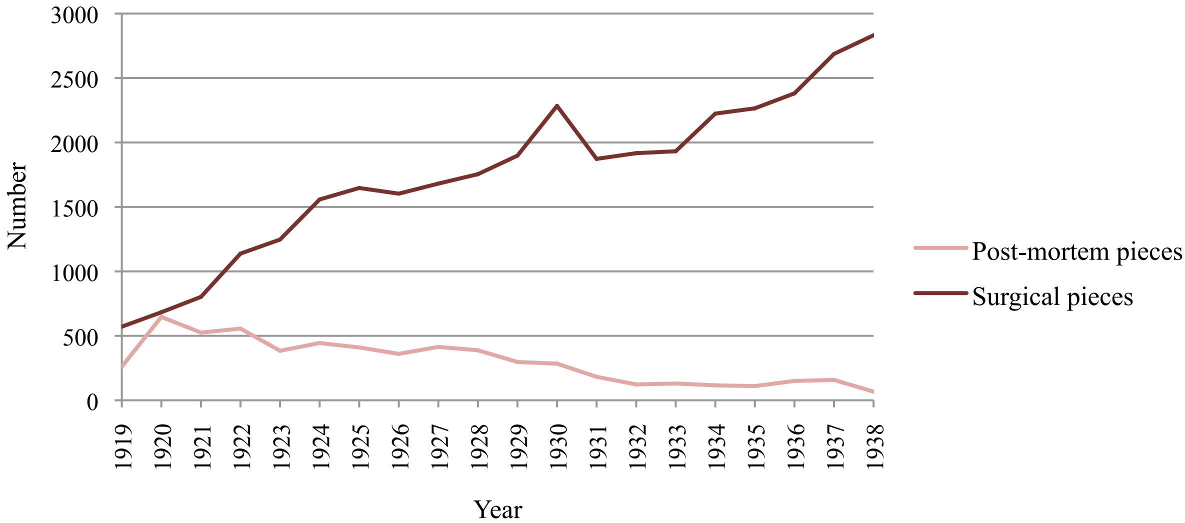

Figure 4.12 Number of histopathology examinations of post-mortem and of surgical samples, *Institut d'Anatomie Pathologique*, 1919-1938.

There was equally a bifurcation in the number of examinations of post-mortem and of surgical material. From 1920, the number of histopathology examinations of post-mortem material dropped. From 1920, the number of histopathology examinations of surgical material increased drastically. Was this increase in line with the supplementary material the pathologists required for research and for teaching? Was this increase due to something else?

Between 1919 and 1938, there was a fivefold increase in the number of histo-pathological examinations performed in this lab. This was a laboratory in a scientific institute of a medical school. This laboratory was principally concerned with teaching and research. The examination of post-mortem tissue samples ties, unquestionably, to the teaching and research activity, as well as the prosecture activity for the hospital. In this section, only the examinations of those samples sent to the institute are examined. An explicit request for surgical samples for research had been made around 1919. Local surgical samples represented only a portion of these entries. Who was the sending the others and why? Were samples sent for the pathologists' research or for examination for attaining medical knowledge (to help future patients) or for diagnostic information that would help further treatment of that patient?

4.2.2 Analysing the books

The source material

The logbooks record every sample sent to the *Institut d'Anatomie Pathologique*. These were black hardcover bound books. They stood 37cm high, 25cm wide and most about 3 to 3.5cm thick; slightly smaller than the bound autopsy protocols. Some have solid black covers, some have marbled yellow, green or red and black covers. Some have a paper label on the inside cover: "*Fabrique de registres. Papeterie centrale Ch. Hiller. Grand'rue 115 Strasbourg. N° 3161. L'indication de ce numéro suffit pour recevoir le même registre.*"

One half page was consecrated to each entry. The entries appear to have been made as two or three stages. Once a day, perhaps at the beginning of the day, someone sat down and created an entry in the logbook for each sample delivered to the institute. As the sample arrivals were received, there were five things copied: a sample number; the date; the name of the patient; the clinic, hospital or doctor who had sent the sample; and a few words about the sample. These few words were descriptive - small, large, fragment, debris; designatory of the origin - scalp, lip, uterus, breast; and at times interrogative - "tb or tumour?." These few words may relate something that appeared on a paper that accompanied the sample. On rare occasion a letter addressed to the pathologist was inserted in the logbook.

The entries in these logbooks were referred to as *observations*. They were not considered by pathologists to be reports or diagnoses, but a recording of what the purveyor or the pathologists observed.

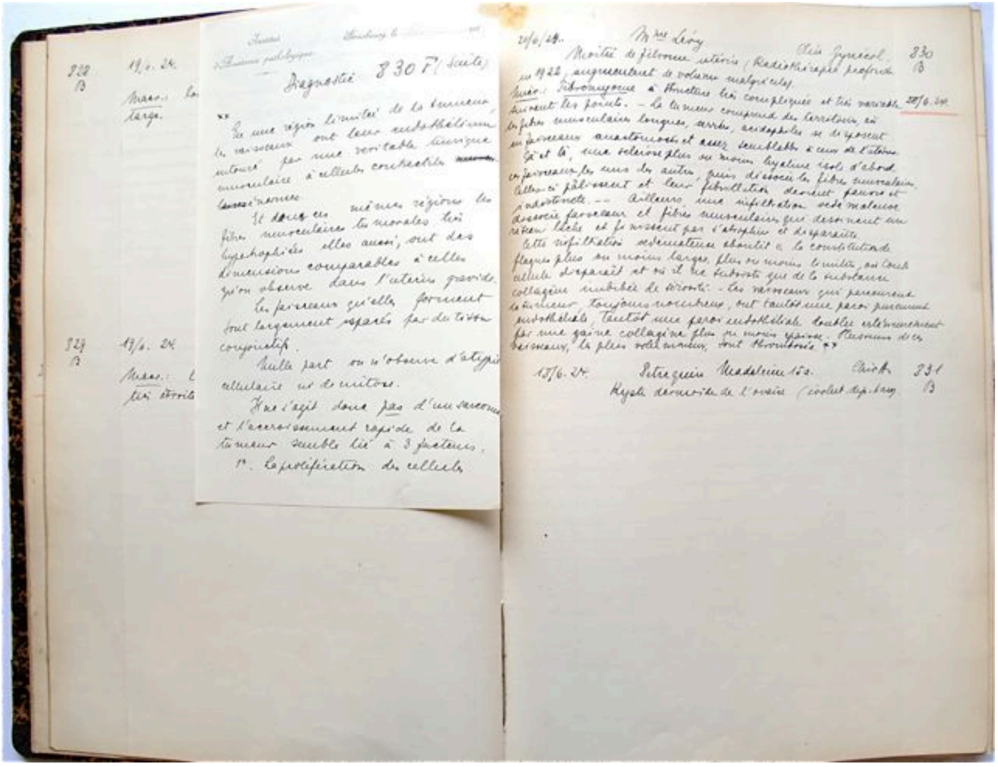

Figure 4.13 Sample logbook entry of a very long descriptive histopathology observation and very short, i.e. one word, observations, 1921.
The entry on the top right fills the full half page and additionally a sheet of paper has been added to the logbook. The entry below is blank with no observation. The two entries on the left hand page are both very short; the observations begin with the word “Micr” and do not require more than a few words.[153]

The laboratory examinations were recounted sometimes in a few words, sometimes in a lengthy and detailed text. In a six month sample from 6 June 1924 to 18 December 1924, there were 791 examination entries.[154] Of these, 78% of the entries included what might be called an examination report recording the pathologist’s observations and notes and 22% just had the entry head with information on the sample, but no histopathology observations. Of those with the examination description, 71% filled a paragraph and 29% were limited to one phrase.[155] This is very different from more recent laboratory reports which are limited to few, if any, words and often a code.

In the 1920s, the pages were folded 4cm from the outer edge; the crease acted as a margin. Between the edge of the page and the crease, figured the sample number and letter. The number and letter were a code attributed to each sample as they arrived in the laboratory and were entered in logbooks, in chronological order. These ran in series from 1 to 999; the

[153] Book 7. *Régistres de laboratoires.* AIAPS. Photo: T. Close-Koenig
[154] The beginning of the six month sample was chosen at random.
[155] I considered anything exceeding one line to be a paragraph.

first being 1 to 999, then 1B to 999B, 1C to 999C, and so on. As of the J series, they went up to 99999 before beginning a new series.[156] This reflects the rising numbers of examinations and a clearer distinction of entry numbers; a four or five digit figure rather than a three digit figure followed by a letter.

Writing in the examination results of the histopathological slides involved adding up to half a page of text to the entry previously created for that sample. The date the examination was made was entered in the outer margin, under the sample number. The format adopted in 1919 remained unchanged.[157] Counting them gives a total number of donations and examinations per year.

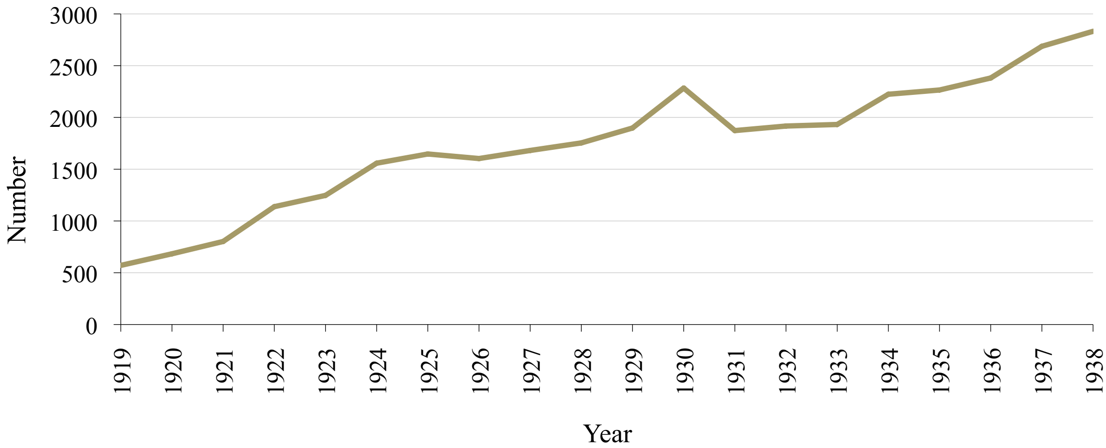

Figure 4.14 Graph of total numbers of histopathology examinations, 1919 to 1938.

A graph of the number of examinations recorded per year presents a rising slope, pictured above. The rise is fairly steady.[158] In 1919, there were 571 examinations recorded. In 1938, there were 2832. What does this imply?

In terms of human capital, there must have been more people working at the institute. In 1919, 571 examinations corresponded to 11 samples examined every week. Two examinations each day seems to be a manageable load for the lab director with the aid of an assistant or a student. In 1938, however, 2832 examinations corresponded to 55 tests every week or 8 per day. This rise in volume would have required an increase in laboratory staff and

[156] The J series began in 1926 and reached 99999, therefore the beginning of the K series, in 1955. The following K series beginning in 1955 reached 99999 in 1961.
[157] This format did not change as long as the entries were entered by hand. When they were typed in 1953, the same layout was respected.
[158] There is a small peak in 1930, although I have found nothing happening within the institute administration or structure to explain this.

a change in routine. Expectedly, the tasks would have become divided; lab technicians or assistants produced slides from samples and the pathologist(s) examined them, as well as someone managing the paper work.

The entries were not all entered or written by the same person. They were not often written by Masson and they were not usually written by Géry.[159] As there were no clerical employees in the interwar period in Strasbourg, it would have been a multi-tasking laboratory worker.[160] An analysis of the different writing styles could illustrate how many different people contributed to the bookkeeping process.[161]

There are innumerable aspects the laboratory activity that these logbooks witness. But first, who sent samples to the laboratory? Why were they sent?

Method

To address the above questions, a detailed and meticulous reading of the logbooks was undertaken. That is, each and every entry was read. The source of every sample was noted and compiled. The final list includes 953 names and institutions. When the practitioner name was simply given, a search through primary and secondary sources aimed to identify them and their location.[162] This list of nearly 1000 sources were divided into five geographical categories: 1) the Strasbourg hospital and medical school clinics; 2) elsewhere in Strasbourg[163]; 3) elsewhere in Alsace; 4) elsewhere in France; 5) elsewhere in the world. These five categories were chosen as a local suite of geo-political borders: from the nearest reaches of the institute to the furthest. There is a sixth category for (the few) logbook entries that either do not indicate who sent them, or (the many) that do not indicate where the medical doctors had sent the sample from (i.e., just their name and not their address or institution).

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[159] This type of task was undertaken by clerical workers at the Johns Hopkins Pathology Institute in Baltimore. MacCallum, "The pathological laboratory of The Johns Hopkins University and hospital."
[160] Twohig mentions multi-tasking employees, notably nurses, who were given clerical and laboratory responsibilities. Twohig, *Labour in the laboratory*, 93.
[161] Although it would have been of interest, time did not allow me to perform this analysis.
[162] For example: *Index bibliographique des publications parues depuis l'ouverture de la faculté 1919-1921* (Strasbourg: Imprimerie Alsacienne, 1922); Héran, *L'histoire de la médecine à Strasbourg*.
[163] This included the private practitioners and private medical clinics: Adassa/Maison de Santé Israélite(1878), Bethesda(1879), Diaconat(1842), Sainte-Anne(1927), Sainte-Barbe, Sainte-Odile(1909), Toussaint(1858), the Clinique des assurances sociales, l'Hôpital Stéphanie(transferred to HCS in 1936), l'Hôpital Saint-François(1920), Stephansfeld.

Initial results

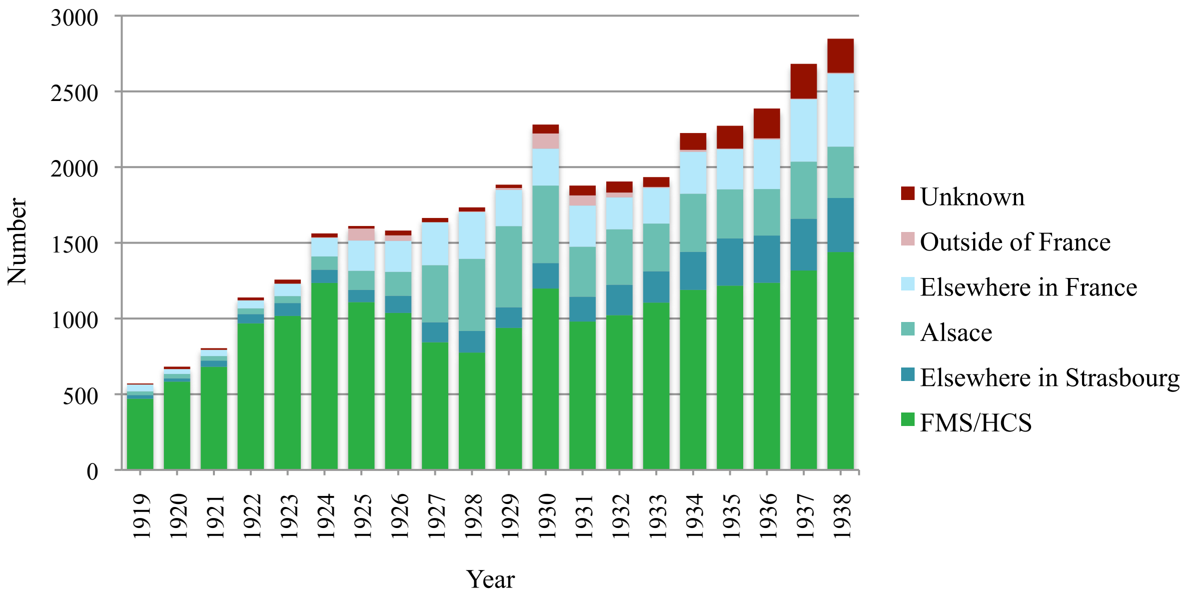

Figure 4.15 Histogram of geographical distribution of sample origins, 1919-1938.

The above plot of the sheer numbers of each of the origin categories shows that they were all on the rise. The number of samples from the Hospices civils and the medical school increased between 1919 and 1924 and then stayed nearly constant. The other categories however, did not increase as significantly between 1919 and 1924, but all rose between 1924 and 1938. The source of samples began changing from around 1923 or 1924 when the sources outside the Strasbourg hospital walls were increasingly represented. Examining the numbers as percentages illustrates the relative importance of the different sources of material.

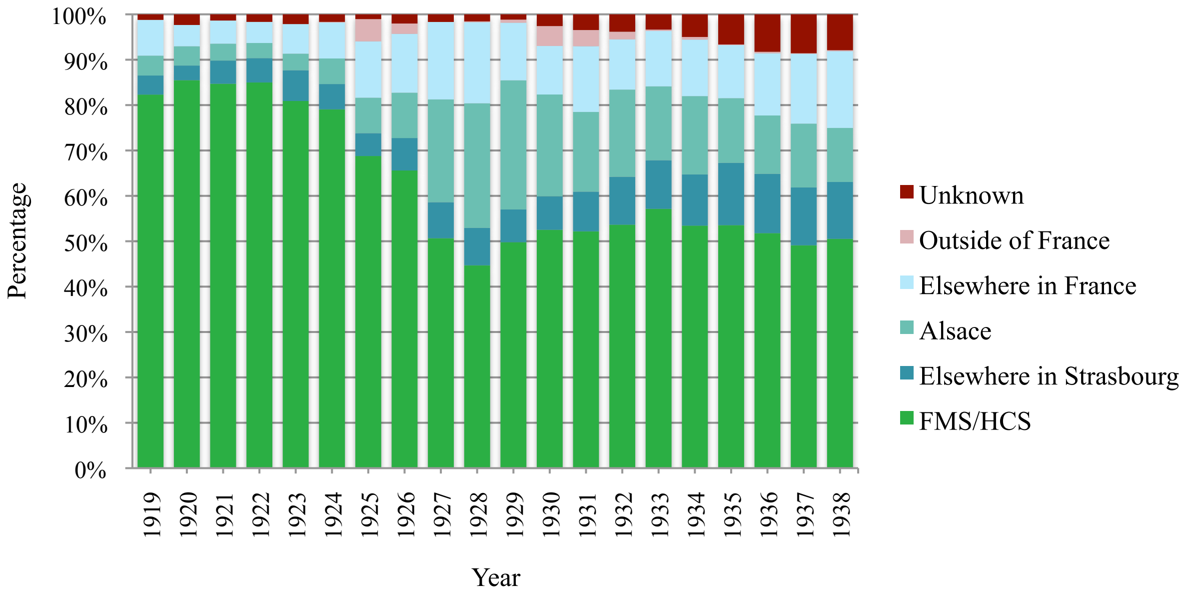

Figure 4.16 Histogram of geographical distribution percentages, 1919-1938.

The above histogram of the different geographical groups effectively shows a decline in the percentage from local sources and a rise in the percentage from Alsace and elsewhere in France. Looking closer at the division between internal and external sources reveals that something was indeed happening.

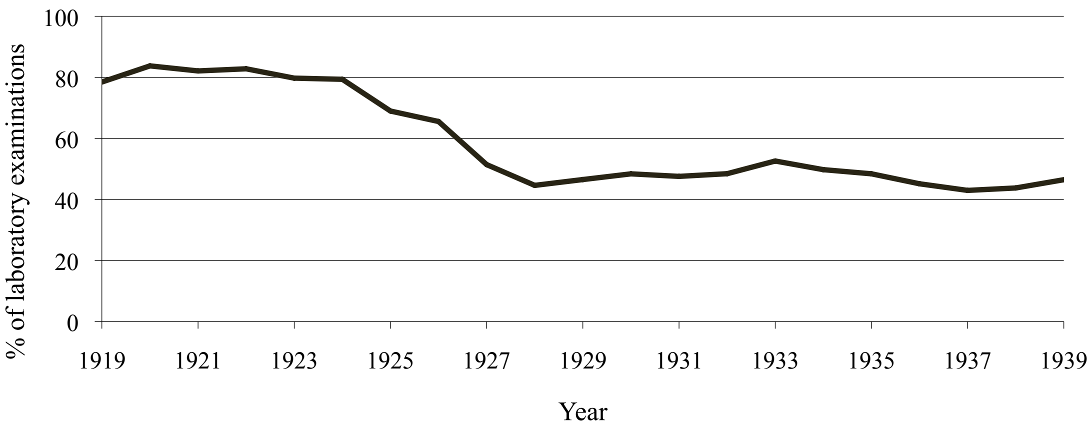

Figure 4.17 The percentage of samples from the HCS and FMS, 1919-1939.

The above graph indicates that the percentage of samples from the hospital and medical school clinics dropped from just over 80% to 50%. From 1919 until 1924, 80%, the vast majority, came from colleagues. This decreased between 1924 and 1928. And between 1928 and 1939, this was down to half of the samples. On the flipside, this means that the samples from outside the hospital-medical school complex counted for 20% between 1919 and 1924 and that this rose to 50%, as graphed below.

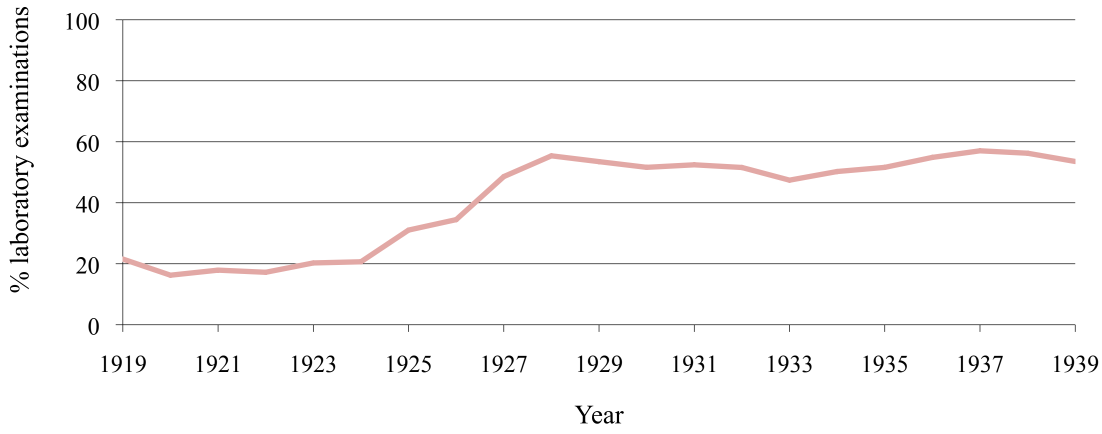

Figure 4.18 The inverse. The percentage of samples from outside the HCS and FMS, 1919-1939.

This stands out as an S-curve. This curve, characterizing a Sigmoid-function, exhibits a progression from small beginnings that accelerate and approach a climax over time. In business, this translates to "the growth of company sales for a new product showing a rapid, exponential increase in sales for a period time, followed by a tapering or leveling off. The tapering occurs when the population of new customers declines. At this point growth is slow or negligible, and is sustained by existing customers who continue to buy the product."[164] However, this was a medical school laboratory, can its activity be translated in business terms?

Supply and demand is perhaps one of the most fundamental concepts of economics and it is the backbone of a market economy. In imposing a market economy framework on the activity of the *Institut d'Anatomie Pathologique*, their know-how and knowledge represents supply. That is, that pathologists had know-how and knowledge that others did not have. And if the occasion or demand arose, they could offer or supply this knowledge to others. The research activities of the institute may be taken as example. Surgeons having an interest in what they extirpated could ask pathologists for histopathology reports on the microscopic structure of the tissue. The circumstance or demand here was the "academic marketplace" in

[164] Geroski, *The evolution of new markets*, 154.

which novelty and knowledge are accredited.[165] Beyond the academic sphere, however, university science and engineering laboratories were places of expertise and were regularly consulted and hired in the early twentieth century.[166]

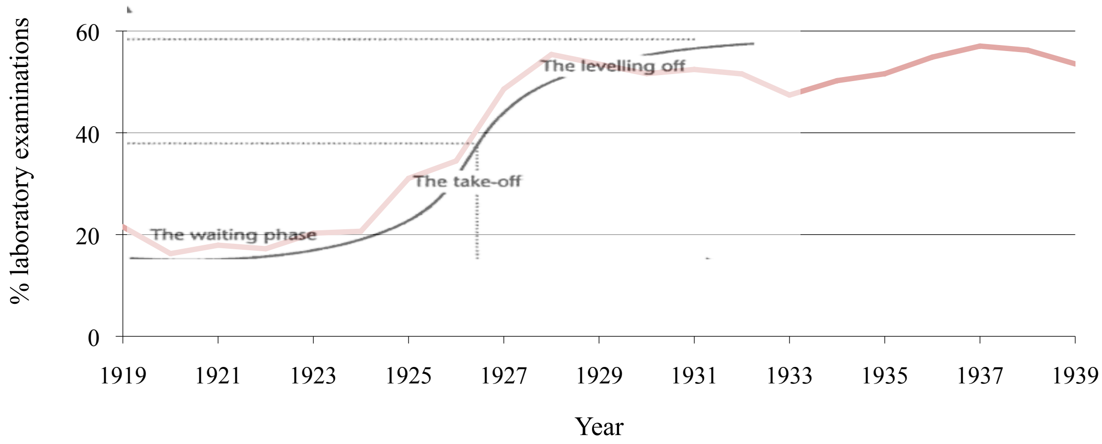

Figure 4.19 Mapping an S-curve on the percentage of samples from outside FMS/HCS, 1919-1939.

By making a parallel to business terms, as Paul Geroski has explained in his study of the emergence of new markets, the dynamics of a changing activity can be identified. To explain an S-curve, suggests Geroski, we must first understand why there is a waiting period, second when the take-off occurs and how fast it happens, and finally, we need to know when the levelling occurs and at what steady-state level of market size.[167] That is, he divides the transition into three phases, as indicated in the above figure and applied in the figure below.

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[165] Joseph Ben-David, *The scientist's role in society: A comparative study* (Englewood Cliffs: Prentice-Hall, 1971). See also, Latour, "Portrait d'un biologiste en capitaliste sauvage."
[166] Fox and Guagnini, "Laboratories, workshops, and sites"; Fox and Guagnini, "Laboratories, workshops, and sites. Concepts and practices of research in industrial Europe, 1800-1914. Part two."; Auger, "L'université au service de l'industrie"; Auger, "La commercialisation des produits de recherche en génie"; Gorbod, "Resources and management."
[167] Geroski, *The evolution of new markets*, 154.

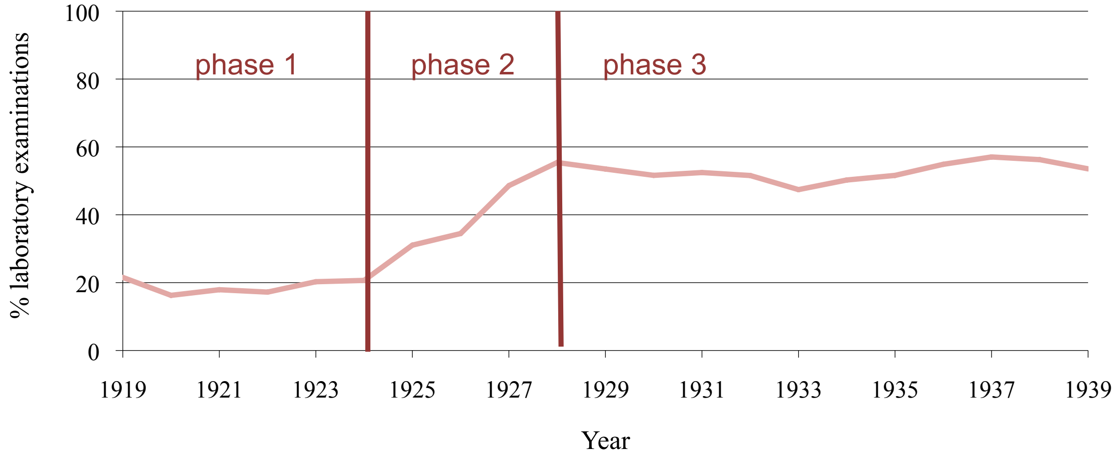

Figure 4.20 Three phases according to an S-curve analysis, 1919-1938.

Similarly, the interwar period can be divided into three periods or phases of evolution. Before detailing and exploring the dynamics at work in the three phases, it must be clarified that these are not the three phases on an emerging market, strictly speaking. This S-curve is a relative S-curve, based on the proportions of different sources and not on the numbers themselves.

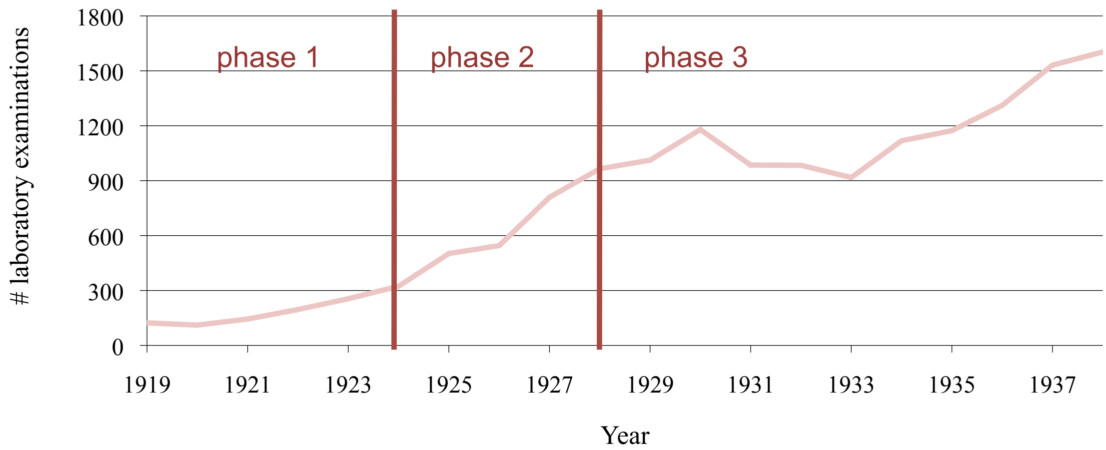

Figure 4.21 The three phases mapped on the sheer numbers from outside FMS/HCS, 1919-1938.

A graph of the sheer numbers of laboratory samples sent by doctors and hospitals outside of the medical school-hospital complex in Strasbourg illustrates an upward rise. (Albeit with a slight dip between 1930 and 1935.) In fact, this slope continues to rise after 1938, after 1945, throughout the second half of the century until the recent closing of the laboratory.[168] There was no leveling off in demand for lab work.[169] This is better characterized as a gradual change. The above graph does, however, also indicate a rather slow incline between 1919 and 1924 contrasting with a steeper slope between 1924 and 1930. In these relative terms, however, the S-curve is a useful analytical tool. This is not problematic because my goal is to explain what was happening and to locate (an otherwise invisible) shift in mindset and not to model the market per se.

4.2.3 Phase One: Waiting, 1919-1924

In 1919, the *Pathologisches Institut* was appropriated by Strasbourg's new(ly) French medical school and Masson arrived to reorganise it. He requested surgical material, notably for research and teaching and the majority of histopathology examinations performed were on this surgical material. The examinations were of tumours, ganglion, growths, as well as appendices and cervical scrapings, and epiglottis and larynx samples.

Masson studied nevus, cutaneous, germinal and neuroendocrinal tumours. He also published on his observations of small painful vascular tumours, that came to be known as Masson's glomus, and on intervascular hemangioendothelioma, known as Masson's tumour. This relatively wide breadth of tumour types issued from the variety of surgical pieces sent to the pathology institute for examination and study.

In a six month period from 1921, of the 510 samples recorded in the laboratory books, 92 were appendices.[170] This represented 18.4%. In another six month period from 1924, of the 791 samples, there were 142 appendices.[171] This represented 18.0%.

Masson, in addition to his research on cancers, conducted research on appendices. The large number of appendices reflects that material was destined for Masson's research.[172] The

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[168] This laboratory closed along with all of the medical school laboratories and the activity was transferred to the hospital.
[169] This may be considered in contemporary perspective with the development of molecular means of diagnosing cancers. See Löwy, *Between bench and bedside*; Keating and Cambrosio, *Biomedical platforms*.
[170] The period from 28 January 1921 to 28 July 1921. Volume 2. Registres de Laboratoire d'Anatomie Pathologique, Faculté de Médecine de Strasbourg, AIAP.
[171] In the six month period from 6 June 1924 to 18 December 1924, the examinations of 139 of the 142 appendices were not recorded. Volume 7. Registres de Laboratoire d'Anatomie Pathologique, Faculté de Médecine de Strasbourg, AIAP.
[172] Published on appendices while in Strasbourg: Pierre Masson, "Les lésions nerveuses de l'appendice hors des crises aigues", 1921; Pierre Masson, "Les lésions nerveuses de l'appendicite chronique," *Académie des sciences* 173 (Juillet 1921): 262; Pierre Masson, "Les névromes sympathiques de l'appendicite olitérante," *Lyon Chirurgicale* XVII, no. 3 (1921): 281-299; Pierre Masson, "La neurogénèse dans la muqueuse de l'appendice pathologique. Rôle des cellules argentaffines dans ce phénomène", 1922; Pierre Masson, "Les lésions du plexus nerveux péri-glandulaire dans l'appendicite chronique," *Bulletin et Mémoires de la Société Médicale des*

entries corresponding to these appendices depicted blank half-pages. That is, there was no examination result, no examination date and no characteristic red stroke. Masson was continuing research on appendices, work he had commenced in Paris, studying the endocrinal secretions of appendix tumours.[173] Through the study of a series of slides from select cases he was able to trace the transformation of cells and the histogenesis of carcinoids.[174] Through this work he characterized the notion of *neurocrinie.*[175]

The appendices sent to the institute in this period follow the procuration of research material described in Chapter 3. This was not material examined for colleagues or for collaborative research, this was not diagnosis work. The pathologists at the institute had however the technical know-how and expertise to offer disease identification or diagnostic information for research or for patient therapeutics. Was this done?

In 1921, Dr. G. Gruber from Lyon sent a tissue sample that he had extirpated that morning accompanied by a letter. He stated "I am waiting therefore for the result of the [histopathological] examination to act."[176] In this example, a diagnosis was being requested, from Lyon. This was exceptional and not representative of other cases. Furthermore, between 1919 and 1924, the majority of samples were from Strasbourg colleagues.

Hôpitaux de Paris (January 1922); Pierre Masson, "Volumineux névromes appendiculaires ayant provoqué l'éclatement des musculeuses," *Bulletin de la Société d'Anatomie* (March 1923); Pierre Masson, "Appendicite neurogène et carcinoïdes," *Annales d'Anatomie Pathologique* (January 1924).

[173] Published on appendices while in Paris: Pierre Masson and Péraire, "Appendice à deux cavités," *Bulletin et Mémoires de la Société d'Anatomie* (Février 1911); Pierre Masson, "Appendicite chronique avec kyste muqueux pariétal," *Bulletin et Mémoires de la Société d'Anatomie* (Février 1911); Pierre Masson and Antonin Gosset, "Les tumeurs endocrines de l'appendice," *Académie des sciences* 158 (1914): 59.

[174] As described in Necrologie Eloge du Professeur Pierre Masson. (Doc 32). Cote P22/N. 247. Dossiers biographiques de médecins et de l'histoire de la médecine au Québec. Pierre Masson. AUM.

[175] Pierre Masson and Louis Berger, "Sur un nouveau mode de sécretion interne: la neurocrinie," *Académie des sciences* (Juin 1923).

[176] "*J'attends donc le résultat de votre examen pour agir*". 282. Volume 2. Registres de laboratoire d'anatomie pathologique. Faculté de Médecine de Strasbourg, AIAP. (My translation.)

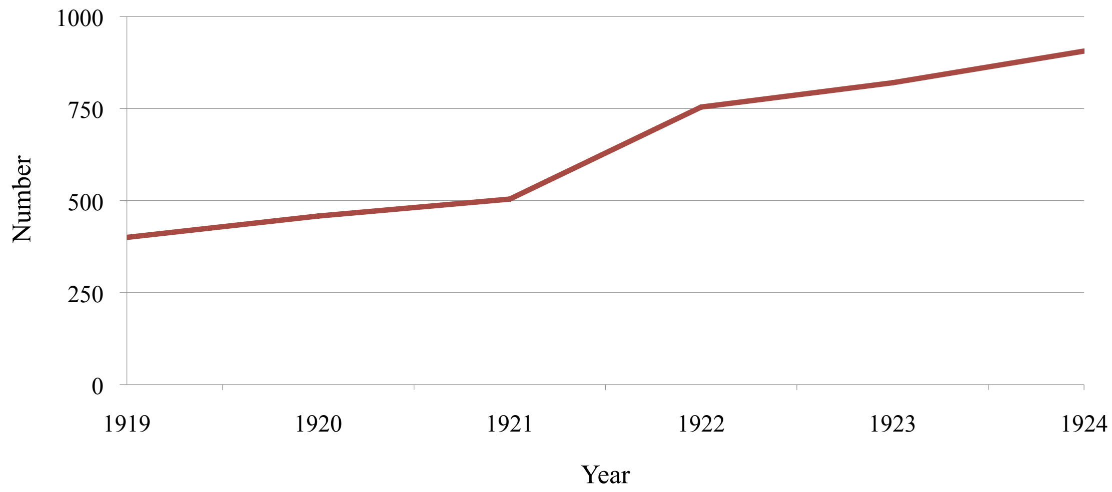

Figure 4.22 Graph of number of samples from "Chir A" & "Chir B", 1919-1924.

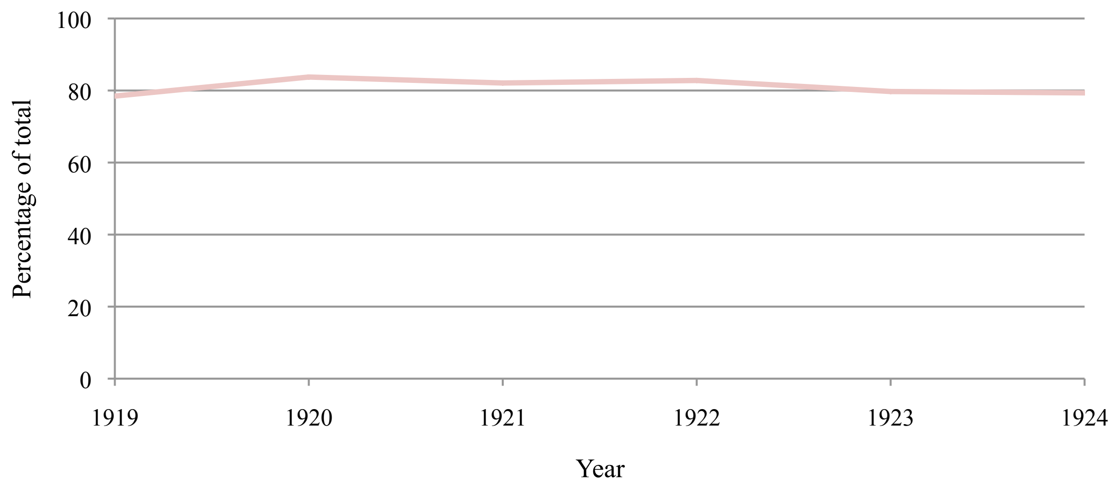

Figure 4.23 Percentage of samples from FMS & HCS, 1919-1924.

The samples from the surgical units doubled between 1919 and 1924. The context of Masson requesting surgical material for research was outlined in Chapter 3. This was the only source of surgical or biopsy material mentioned thus far. The local or FMS & HCS material was identified as the prominent source and one characteristic for identifying a waiting phase between 1919 and 1924. How much of this, quantitatively, was the surgical material?

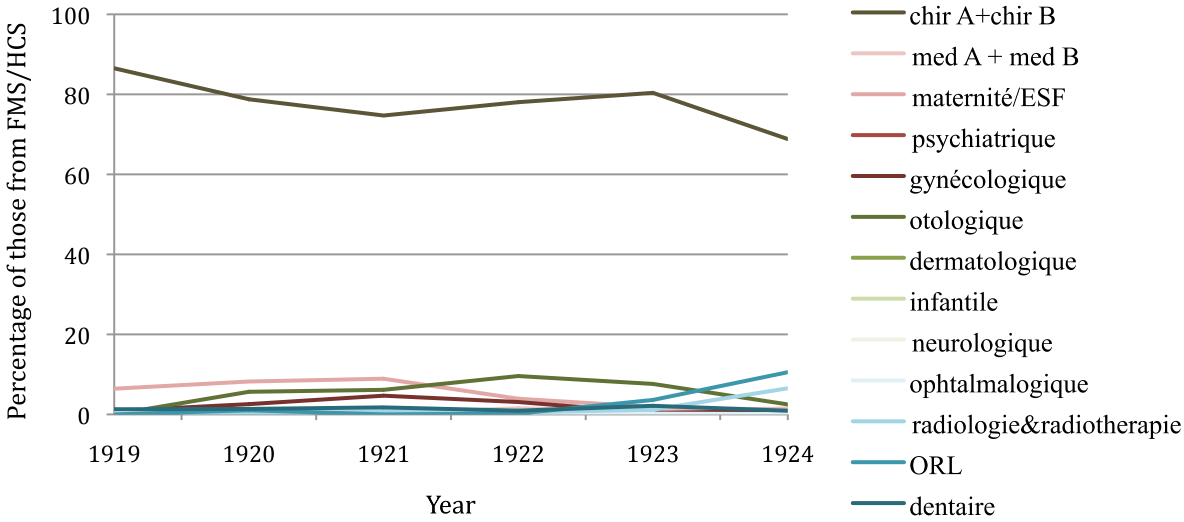

Figure 4.24 The percentages of locally sourced samples from the individual clinics & institutes of the HCS & FMS, 1919-1924.

Of the roughly eighty percent local material, the surgical material from medical school and hospital surgeons represented nearly all of the samples from the FMS and HCS between 1919 and 1924. That is, roughly eighty percent of roughly eighty percent or about 65% of the total. The remaining twenty percent from the FMS and HCS were a mix from the twelve other clinics. They cannot all be deciphered from this graph, but this is not important here. There are, however, two things to be pointed out. One, the clinic to send the most samples to the pathology institute was the dental clinic. This is interesting, but without further information on the dental clinic activity, it cannot be explained. The other note of importance is the slight increase beginning in 1924 of samples from the scientific institutes, the *ORL* (otorhinolaryngology) clinic and from the radiology and radiation therapy service.[177] These will be discussed in the next phase.

In the above graph, a classification of the samples sent from the different clinics of the medical school and hospital shows that these were almost entirely surgically removed samples. If diagnostic information was sought, it was post-operatory and not for patient therapeutics. It was post-intervention and not pre-intervention. Medical school and hospital physicians were not sending biopsies or tissue samples to this institute, and inversely this

[177] The scientific institutes that sent samples were: from someone within the *Institut d'Anatomie Pathologique*, *Institut d'Anatomie Normale*, *Institut d'Histologie, Institut de Médecine Légal, Institut d'Hygiène et Bactériologie, Institut de Physiologie*, *Institut de Chimie Biologique, Institut de Physique Biologique, Institut de Pharmacologie* and the *Faculté de Pharmacie.*
The radiology and radiation therapy services were both directed by Auguste Gunsett. I have thereby grouped them into one category as it was not always possible to know which service they were being directed from.

institute was not providing a diagnosis service to the hospital or to the medical school clinics. If there were any diagnosis requests, they were not numerous and their execution did not disrupt the research and teaching routines.

Geroski identified the first phase in the emergence of demand for new technologies as a waiting period. This he claimed is a period of legitimization: "Legitimating a new product or a new technology is, in part, a question of identifying what it is, it is also a question of certifying that what it purports to do actually gets done. Even more, however, legitimization is about changing attitudes and expectations about the usefulness of the product."[178]

Were practitioners equally "waiting"? No, they were not. There was legitimization of two degrees. Firstly, legitimating histopathology diagnosis as something above and beyond clinical diagnosis. Secondly, legitimating this particular laboratory. The first depends on a number of factors, one being practitioners' general use of laboratories for diagnosis. The legitimating of this particular laboratory, however, would be irrational - this was a medical school laboratory with one of the country's most renowned histopathologists.

This last point, though, is the reason why they were not waiting. This was a medical school laboratory. This was a laboratory for research and for teaching. Collecting material for research and for teaching were completely normal practices. That this changed in about 1924 is anormal, for a French medical school laboratory. However, for this might be characterized as a waiting period for histopathology diagnosis as therapeutic decision making.

4.2.4 Phase Two: Take off, 1924 to 1928

The rising number of samples sent to the laboratory from outside the hospital-medical school complex characterizes the "take-off" period between 1924 and 1928.

[178] Geroski, *The evolution of new markets*, 161. (The usual way to tell the story of an S-curve rise is through the diffusion of information to potential users (the epidemic model of diffusion), but Geroski takes an alternative view.)

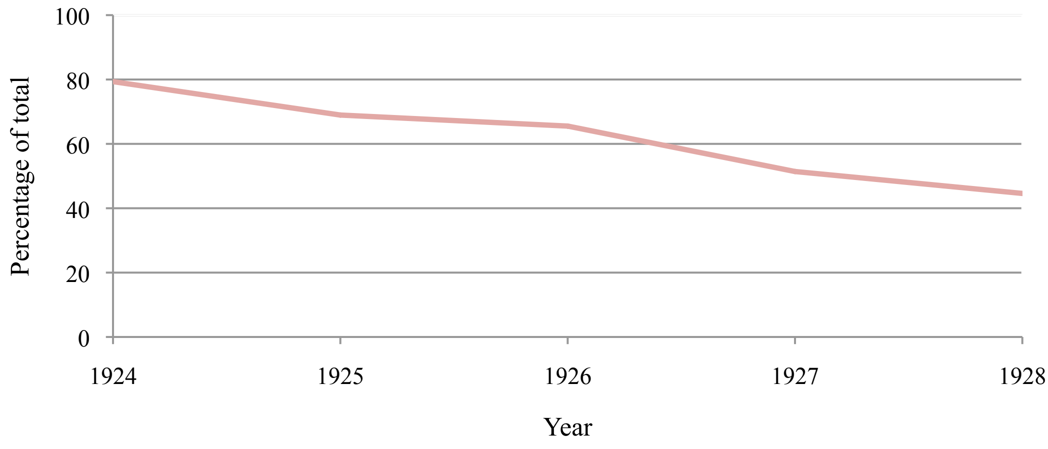

Figure 4.25 Percentage of samples from HCS & FMS, 1924-1928.

The relative amount of samples from the hospital-medical school complex dropped, in this second phase, from eighty percent to just below fifty percent.

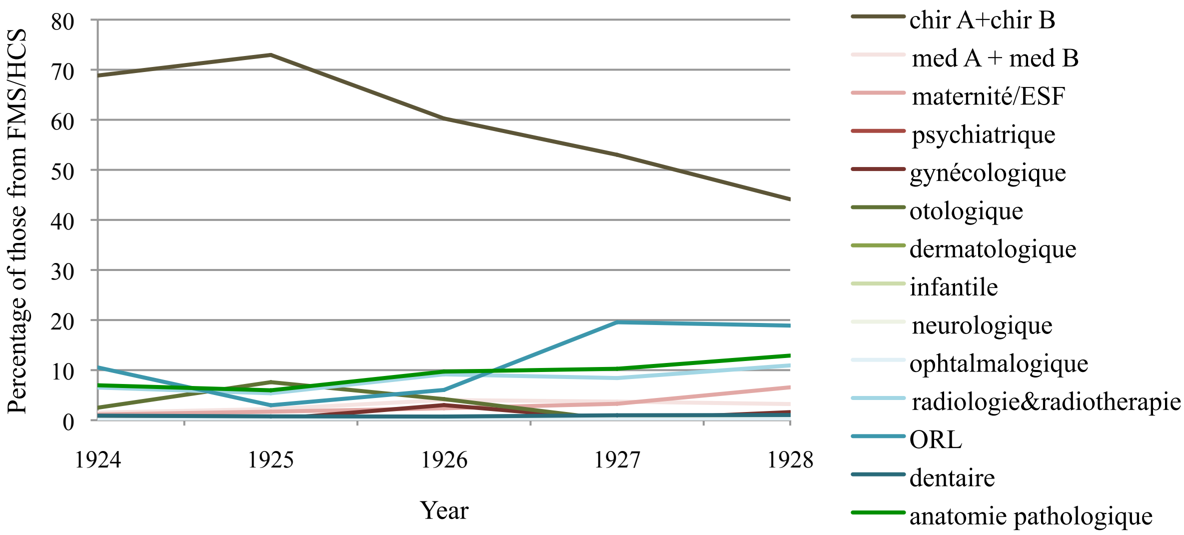

Figure 4.26 Breakdown of those from HCS/FMS, 1924-1928.

Within this, there is a drop in the portion of surgical pieces and a rise in samples from the other service. In phase one, a rise in samples from ORL clinic and radiology and radiation therapy services in 1924 was perceived.

There is equally a rise in the number of samples that the pathologists themselves brought it, which are labelled *anatomie pathologique* on the above graph. It might be speculated that these were research pieces; they might also have been examinations that they were completing for acquaintances. There are, for example, indications of when one of the pathologists communicated a result to someone directly.

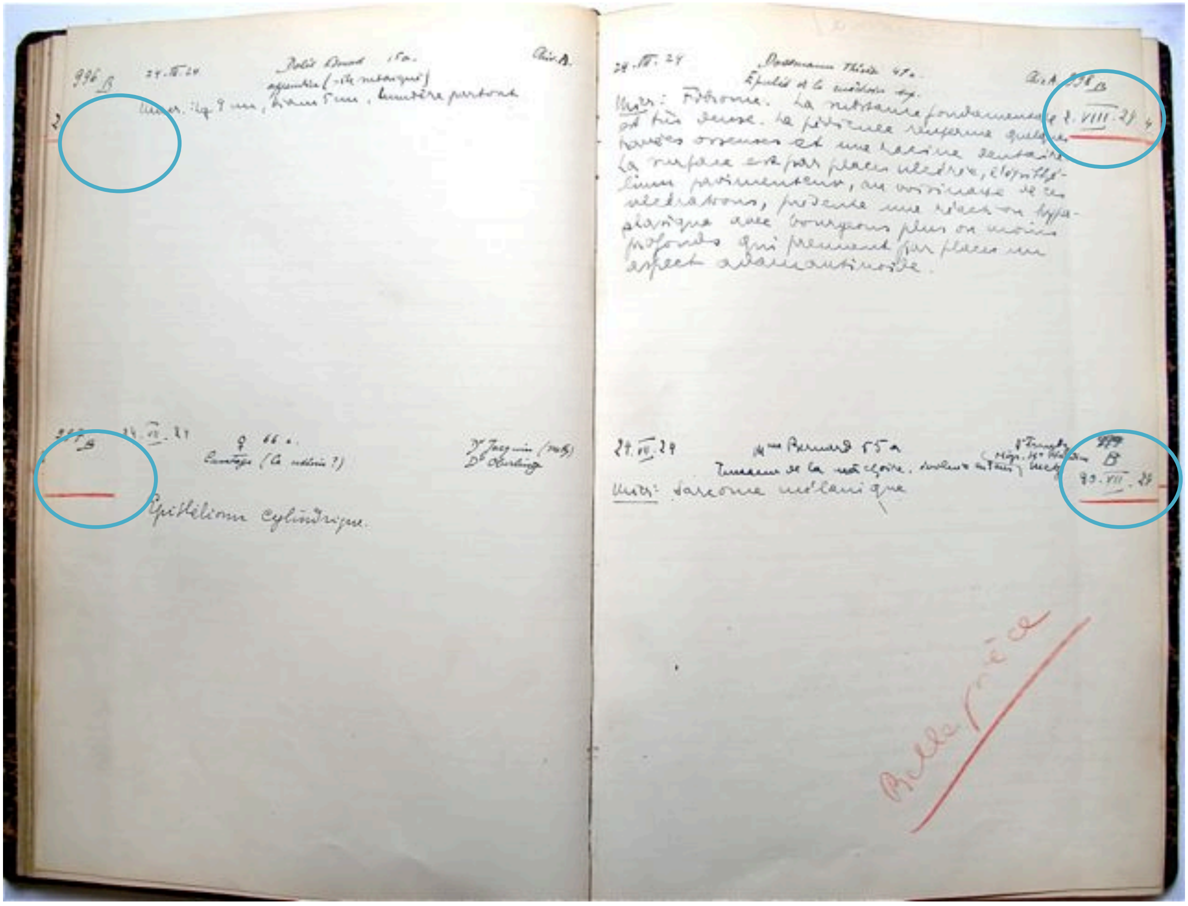

Figure 4.27 Example of dates that examination reports were written, 1924.
The dates that the histopathology observations were made were written in the outer margin. This was after the slide was prepared and stained. Note that for the top left hand entry, an appendix, no examination date was indicated, this was a research piece. Nor was a date written on the bottom left entry, however, the examination was performed for Dr. Jacquin in Metz and the request was addressed through Dr. Oberling. It is thereby likely that he transmitted the report but did not make the note in the logbook. The right hand entries have dates and red dashes.[179]

The date upon which examinations were completed was underlined with a red pencil. This red stroke might have been a mark of approval or confirmation that the examination result was dispatched.[180] There are a number of entries where rather than a date above the red line are the words “result communicated by Masson” or by Géry or by Oberling.[181]

[179] Book 7. *Régistres de laboratoire*. AIAPS. Photo: T. Close-Koenig

[180] There are no red strokes before 22 March 1921. In a six month sample, from 6 June 1924 to 18 December 1924, there were red strokes under 78% of examination dates and no red strokes under 22%.

[181] In the same six month sample, from 6 June 1924 to 18 December 1924, 53 of the 791 entries or 0.6% indicated that Masson, Géry or Oberling communicated the laboratory report.

This is to say that examinations reports were returned to the person sending the sample. The examination report may have been sent for general medical knowledge or research purposes. But seeing the increasing scale of samples from outside the hospital-medical school complex, it is more likely that these were practitioners requesting diagnostic information.

Between 1924 and 1928, there is a shift in the principal suppliers of materials for the laboratory as physicians and surgeons outside the hospital-medical school complex increasingly sent samples in. The samples were principally from the surrounding areas (*départements*): Bas-Rhin, Haut-Rhin, and Moselle.[182] It cannot be overlooked that Strasbourg had reputed medical research laboratories and a reputed medical school, albeit the only medical school in this area. It may seem somewhat natural that the hospital in Strasbourg turned to the medical school and its laboratory facilities.[183] One might expect the hospitals, at least in the larger cities of Mulhouse or Metz, to develop laboratory services, as they may have had a pathologist as prosector. However, a reputed researcher in a neighboring city may have attracted attention. In this respect, a medical school lab differs from a hospital lab. Thus, the presence of researchers or experts may have contributed to the regional, or even national, importance of Strasbourg's medical school labs.

Physicians and surgeons sending samples to this pathology lab were not limited to these three regions. There were also samples sent occasionally from Paris, Dijon, Lyon, Bordeaux, Marseille etc., as well as, Algeria and Morocco. The regular use of this laboratory by physicians in Elbeuf (600km from Strasbourg), in Pontarlier (300km from Strasbourg), and Luxembourg (250km from Strasbourg) is equally notable.[184]

Why were these physicians sending tissue samples to the pathological anatomy institute and why were pathologists sending them an examination report?

Indeed, some entries include clinicians' interrogation, such as: "Tbc ou cancer?" This indicates what such lab examinations represented: physicians or surgeons looking to confirm their diagnoses. The examination observations indicate that the diseases detected or described histo-pathologically included: the malignancy of tumours and growths, the differentiation of cancers, the differentiation of syphilis and tuberculosis, in addition other irritations and inflammations. These, in addition to letters written to the pathologist explaining the sample

[182] All of which had been German between 1870 and 1918. I have not explored this as a potential cause.
[183] Recall as mentioned in the intorduction, the variety of ways that laboratories were first integrated, notably by making due with existing facilities.
[184] These could be explored in terms of networks and personal connections between the different institutions. Time did not permit pursuing archival and biographical research of each of the individuals concerned.

they were sending, giving details of the patient history, and their clinical diagosis show the legitimization process that leads to take-off, evoked by Geroski.

The take-off period, stated Geroski, corresponded to the establishing of a dominant design and that depends on the legitimization process.[185] The waiting period before a dominant design is established varies according to the complexity of the product or service, the nature and number of its potential users, the importance of network efforts, amongst others.[186] The key to legitimization here is the conception of histopathology techniques (described in Chapter 3); the creation of the regional cancer centre and it's following of the Cancer Commission guidelines on histopathology diagnosis (described in this chapter).

The *Centre regional de lutte anticancéreuse*, established in Strasbourg in November 1923 and inaugurated in March 1924 as a regional centre, was to receive cancer patients from the Bas-Rhin, the Haut-Rhin, Moselle, the territory of Belfort, the Vosges, Haute-Saône, as well as Luxembourg, as mapped above.[187]

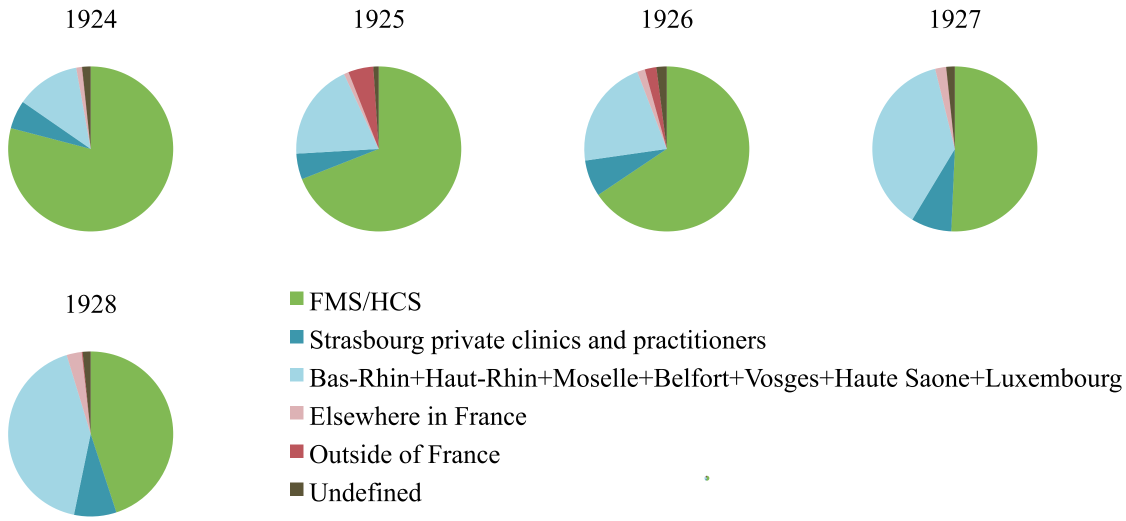

Figure 4.28 Geographical origins of patients tissue samples, *Institut d'Anatomie Pathologique*, 1924-1928.

An increasing number of samples came from the whole region that this regional cancer centre was to serve. From these regions, there were 196 samples in 1924 and 738 in 1928. This represented 13 percent in 1924 and 42 percent in 1928 of the laboratory examinations. The regional cancer centre would have also been providing diagnostic examinations for Strasbourg private clinics and practitioners. The representative area in the above pie-charts

[185] Geroski, *The evolution of new markets*, 163.
[186] Ibid.
[187] I would have liked to plot the locations that samples were coming from on a map, with increasingly large dots according to the density of laboratory use. Time has not permitted this.

then includes the two blue regions; 283 samples or 18 percent in 1924 and 878 samples or 50 percent in 1928. The expanding blue sections of the pie-charts grow as a laboratory diagnostic service grew, opening their doors to practitioners outside the hospital-medical school complex.

Practitioners were requesting screening of patients that might benefit treatment at the *Centre Paul Strauss.* Pathologists at this Strasbourg medical school laboratory were providing the diagnostic report that the Cancer Commission indicated was needed to determine the nature of the cancer to be treated.[188] In response to my earlier question, were cancer centres interested in pathologists, in Strasbourg the answer is yes, they were. Although the pathologists did not meet the patient, they provided vital information on the patient's condition, thereby warranting and validating the detour through the pathology laboratory.[189]

Some examination reports, in fact, referred to treatment undergone, indicating whether it was successful or not. Others indicate therapy advice with straightforward recommendations, such as: "Tumour likely radioresistant. If radiotherapy is undertaken, use strong doses."[190]; "Tumour likely radiosensitive."[191]; "Radiosensitivity low, radium therapy is recommended."[192]; "A radical operation is necessary."[193] The pathologists' reports were contributing to (complex) therapeutic choices: Should we operate, treat with radium, treat with roentgen radiation, or a combination thereof?[194]

The tone and the language of the pathologist at times reflected certainty in the diagnosis and are sometimes complemented with advice as to the radiosensitivity (*radiosensibilité)* of a tumour[195] or the potential of a growth becoming malignant by using the

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188 "*Un anatomo-pathologiste fixera, par un examen préalable, la nature du cancer à traiter.*" Documents officiels: Commission du Cancer LCC n°2, 1923, 106.

189 The institutionalization of medicine demoted patients' narrative role as patients saw physicians in contexts other than their own home. The laboratory and laboratory diagnosis effectively contributed or accentuated this. See Jewson, "The disappearance of the sick-man from medical cosmology, 1770-1870"; Graham Mooney, "Diagnostic spaces: Workhouse, hospital, and home in mid-victorian London," *Social Science History* 33, no. 3 (2009): 358.

190 18I. Biopsie d'une tumeur du maeilliaire (gauche). 1.11.1925. Volume 10, Registres du Laboratoire d'Anatomie Pathologique, AIAPS. (My translation.)

191 324I. Quelques parties du col de la matrice. 18.1.1926. Volume 10, Registres du Laboratoire d'Anatomie Pathologique, AIAPS.

192 187J. Ulcération de la bouche. 10.7.1926. Volume 12, Registres du Laboratoire d'Anatomie Pathologique, AIAPS. (My translation.)

193 503J. Tumeur du sein. 8.9.1926. Volume 12, Registres du Laboratoire d'Anatomie Pathologique, AIAPS. (My translation.)

194 The correlation between tumours and cures, however, was much more complex. Cf. Löwy, *Preventive strikes*, 43-46.

195 On radiosensitivity and radioresistance: Laborde who illustrates, for example, that histological variety of epithelioma did not correlate with radioresistance. And points out that this is of interest, not just biologically, but for practical utility in therapeutic application. Also the term radio- is used but the cases examined were all

term *precancereuse* or the phrase *patient à surveiller*.[196] At other times, the examination is met with blunt uncertainty: "no features allow the aetiology of this lesion to be indicated."[197] Advice on the use of radiation therapy is evidence of the pathologist's acknowledgement and participation in defining a bigger finality, that of therapeutic solutions.

It was pathologists who effectively bestowed imperative information about the patient and their diseased tissue. The histo-pathological examination identified microscopic structure of the tissue with benign and malignant tissue types; it also distinguished the radiosensitive from the radioresistant, and it provided a means of monitoring changes in tissues.[198] These three finalities of a pathology examination were cited in literature recapping the state of cancer treatment in the interwar period. The information imparted in the histo-pathological examination allowed the treatment to be more exact, thereby saving time and expenses for the specialists and the centre, as well as limiting the suffering of the patient. That pathologists had the tools and the means for doing this was due to several decades of research and study of the microscopic structure of diseased tissue. Pathologists had a long-running interest in cancers and the background to recognize and classify tissue structures morphologically. But until there was a therapeutic motivation, and therein a demand, for this diagnostic information, this was not applied. Pathologists' did contribute to cancer treatment. Not only did they help determine if patients in the region would benefit from cancer centre services, they helped choose different therapies for different cancers.

The *Institut d'Anatomie Pathologique*, despite a growing demand for diagnostic information, remained a centre for research and teaching. The renown of the pathologists and their place in the international research landscape is echoed in the samples arriving from beyond the regional vicinity.

The Strasbourg pathology institute received samples from all over the world. A large number were sent by Jean Bablet. Bablet was a pathologist at the anatomical pathology

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treated with radium therapy. Simone Laborde, "A propos de la radio-résistance des épithéliomas cutanés irradiés antérieurement," *Strasbourg Médical* (1929): 260-265.

[196] An interesting study would be to examine these cases of precancer. The history of precancer is the subject of Ilana Löwy's recent book *Preventive Strikes*. I have here material for a complementary case study on precancer in the interwar period.

[197] "Aucun caractère spécifique ne permet d'indiquer l'étiologie de cette lésion." I21, 2 Nov 1925. Registres du laboratoire d'anatomie pathologique, AIAPS.

[198] Regaud, "Le rôle du médecin sans spécialité dans le diagnostic du cancer"; Regaud, "Quelle est la valeur et quels doivent être l'organisation et l'équipement des institutions pour le traitement du cancer par le radium et par les rayons X?."; Louis Bard, *Précis d'anatomie pathologique* (Paris: Editions Masson & Cie, 1898); Castel, "Pierre Masson (1880-1959)," 20.

laboratory at the *Institut Pasteur* in Saigon and later at the *Institut Pasteur* in Hanoi.[199] Bablet was not alone. A number of samples were also sent from North African and South American countries, countries and regions related to France's colonial regions and *Institut Pasteur* implantations. However, their numbers were inferior to those sent by Bablet, who sent 122 samples in 1925, 73 in 1926, 69 in 1927, 12 in 1928, 95 in 1929, 38 in 1932. This contact relates to Masson and Géry's earlier terms at the *Institut Pasteur*.[200]

The temporal constraint of this exchange makes it apparent that these were not being sent for diagnosis, but for their value as novel samples and for research. Similar to the appendix entries described above, the entries did not detail examinations, but were blank pages. Effectively, Bablet published with Louis Géry in the 1930s.[201] Research in histopathology was focused on histo-pathological examination through microscope. But collecting samples remained necessary. Géry claimed it would be difficult to find a collection in French medical schools, equal in size and class, as well as in the interest of the pieces as that of Strasbourg.[202] The specimens from far away places presented rare pathologies and were valuable in terms of quality. Those from the surgical wards were valuable in terms of quantity.

The diagnosis activity was developing and encroaching on the workbench on the research and teaching laboratory. But they were co-existant and complementary, side by side and hand in hand.

4.2.5 Phase three: An established laboratory service, 1928 to 1939

By 1928, the lab activity was not limited to the local vicinity; it was regional. Not only did the geographical range of the clientele change, but the role of the laboratory changed. The systematic use of the lab by the surgery units of the municipal hospital had included histopathological examinations following appendectomies and hysterectomies. The examination of organs could confirm, or refute, a clinical diagnosis, whereas examination of a

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[199] Jean Bablet opened the anatomical pathology laboratory at the Institut Pasteur in Saigon in 1922, in order to study the surgical samples send to him by practitioners in Saigon and Cholon. In 1926, he founded the Institut Pasteur in Hanoi, which housed the first cancer diagnosis centre in Asia. Archives de l'Institut Pasteur: www.pasteur.fr/infosci/archives/bab0.html

[200] Frühling refers to Bablet as a friend of Géry's. Frühling, "Louis Géry (1883-1957)."

[201] Louis Géry and Jean Bablet, "Les néoplasmes malins des organs lymphoïdes. Essai de classification," *Bulletin de l'Association Française pour l'Etude du Cancer* 24, no. 6 (1935): 615-672; Frühling, "Louis Géry (1883-1957)."

[202] Prof Géry au Monsieur le Doyen. 15 mars 1933. "Enquête faite par Ch. Rives, Conseiller Référendaire à la Cour des Comptes. 1934." DEC. Cour des Comptes. AFMS.

tissue samples, tumour biopsies and cervical scrapings [*curettage*] could direct therapeutic action.

There was, however, a leveling off in the percentage of samples from the hospital-medical school complex and those from external sources. They remain at about half of the former and half of the latter from 1928 to 1938. In Geroski's description of S-curves, this relates to market saturation. Here, this is only a relative levelling off. The total numbers continued to increase and market saturation was not reached. This relative levelling off refers to a certain balance in the laboratory activity. There were however, a number of fluctuations within the different sources, as shown in the graphs of the source categories.

Pierre Masson left Strasbourg in January 1927. He was replaced temporarily, first by Charles Oberling, then permanently from September 1928 by Louis Géry. The change in director would be significant and would be reflected in the ensuing balance of research and service, but also in networks and personal relationships of the institute, as well as in research interests. Concurrently, lab services offered by the medical school labs for those outside the hospital were publicized from 1937.[203] These changes, along with others, are reflected in the fluctuations.

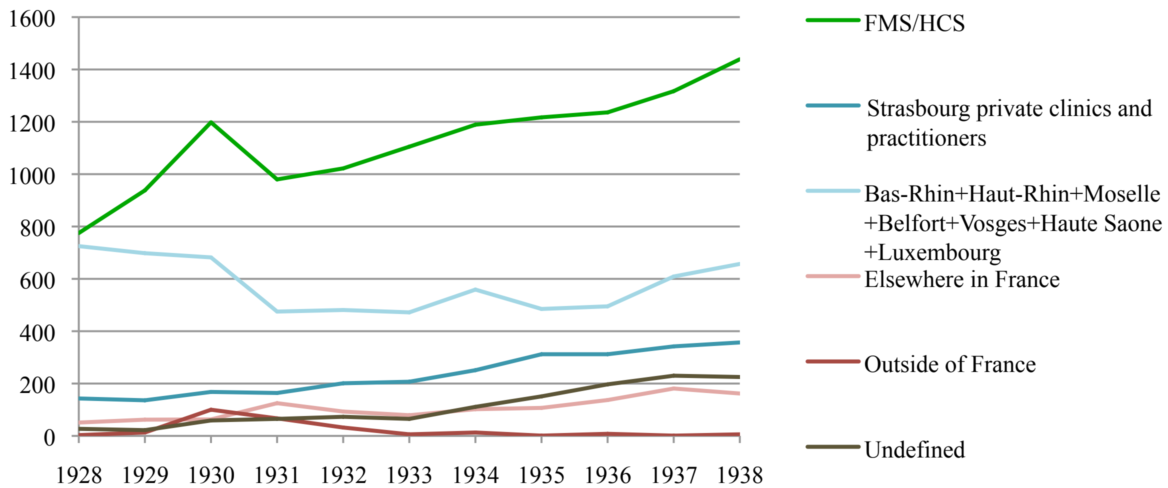

Figure 4.29 The number of examinations from different geographical ranges, 1928-1938.

There was a decline in the number of samples sent from the CAC region between 1928 and 1933; slightly dropping between 1928 and 1930, a considerable drop between 1930 and

[203] 6 mars 1937. Dossier: Cumul & Operations Régie et Gestion Fin des Laboratoires d'Instituts et de Cliniques. AFMS.

1931, a stagnancy between 1931 and 1933. This decline can be explained, in part, by considering the samples coming from the larger cities.

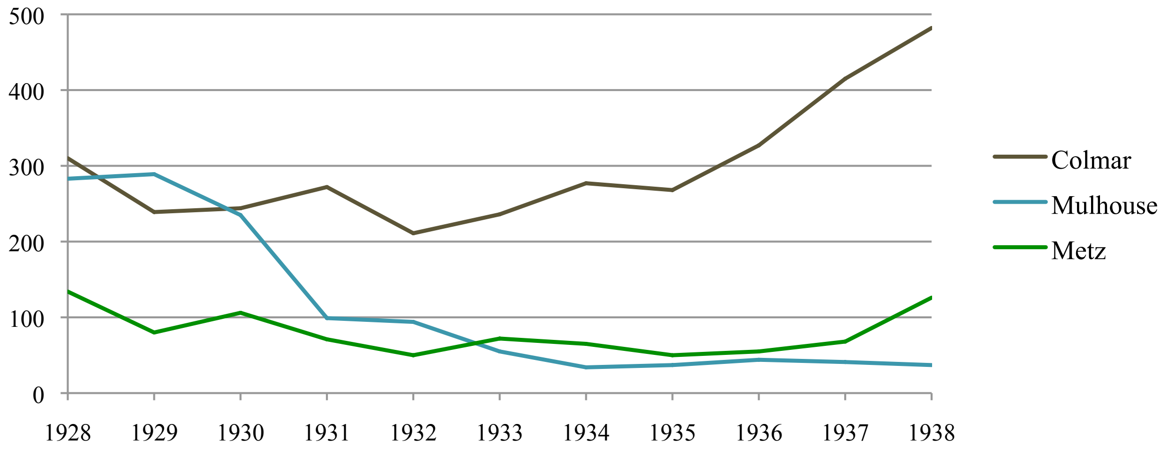

Figure 4.30 Number of samples sent from Colmar, Mulhouse, Metz, 1928-1938.

There is a significant decrease, from 289 to 34, in samples from Mulhouse. On the other hand, samples from Colmar decrease slightly, from 310 to 211, and then increase significantly, up to 482. Samples from Metz fluctuate between a high of 134 and a low of 50. Further study is necessary to confirm that there were histopathology services offered by someone else in Mulhouse and Metz, which is what these numbers imply.

There is also a decline in the number of pieces coming from outside of France. This may be due to two dynamics: 1) The researchers in Strasbourg not being as active in their research.[204] Géry was the temporary director of the institute from 1928 to 1946.[205] With the rising service activity and with full responsibility of administrative tasks, he may have had less time to collaborate with international colleagues. Later in his career and once his university position secured, he may have had less interest in research. 2) The international colleagues may not have needed to send them the samples; for example, perhaps the correspondance took another form or perhaps they had access to other histopathology services.

The steady incline from 1929, of other practitioners sending tissue samples, is significant and indicative of the increasing tendency to consult the laboratory for diagnosis. The laboratory under consideration was a pathology lab and this does not, however, directly

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[204] An interesting means of validating these suppositions would be to cross the number of samples with the number of publications. I have charted Masson's publications. But I do not have a list of Géry's publications.
[205] In 1946 he became full director and chair of pathological anatomy.

reflect the tendency to use monitoring tests by physicians in a side room of the ward or of the consulting room.

Research and diagnosis services were side-by-side and effectively feeding each other. The diagnosis material provided material for research and teaching. Systematic entries of histopathology examination in laboratory logbooks from 1919, illustrates a shift in focus; collecting was no longer a means but a side effect or an outgrowth of the diagnosis service.

The increase in laboratory use is associated with changing dynamics of medical practice. The emergence of the laboratory for medical practice may be said to rest heavily on physicians' use and trust in technology.[206] In his discussion of medical technology, Joel Howell distinguishes between three layers of technology: technology as physical artifact or machine, technology as activity, technology as tacit knowledge. The clinical laboratory may be considered to enter all three of these categories. Howell gives the X-ray machine as an example for the first and the laboratory for the latter two. The use of lab techniques corresponded temporally to the use of other medical technologies. In many terms, the laboratory may be considered to be a technology.[207] (Albeit, with the pathologist and the technicians integral to this technology.) Keith Wailoo examines medical technology and the identification of disease in a history of hematology.[208] However, in concentrating on diagnosis and disease identity, an important part of what represents reality for physicians is sidelined, that is, the information relevant for action that indicates what to do next. Although a large part of physicians' job is to identify the disease, they are solicited by patients to treat diseases (or the symptoms).[209] As such, it is essential to view the laboratory as providing a service to physicians and providing information that will help them to act. That this information helped to define or identify the disease was somewhat secondary to the larger goal. Physicians gather information that indicated the therapeutic path to take. In some instances, laboratory tests might contribute to or confirm a diagnosis. However, the physician was then responsible for interpreting the information and taking therapeutic action. The laboratory may have been able to contribute to this indirectly. For example, tissue samples were a means of examining the patient, without the patient so to speak. Physicians send samples (or patients) to the lab and

[206] Wailoo, *Drawing blood*, 2.: "In this century more than any other, physicians have pursued a technological understanding of disease-allowing their technologies to structure their thoughts."
[207] Howell, *Technology in the hospital*, 8.
[208] Wailoo, *Drawing blood*.
[209] Crenner, *Private practice in the early twentieth-century medical office of Dr. Richard Cabot*.

subsequently scrutinizes the pathology report that the lab sends back.[210] When samples were sent to a lab, the laboratory analysis results presented more than a "view" of the patients.[211]

The pathological anatomy lab activity that figures in the records involved the identification of cancers. At the turn of the century, surgical procedures were largely relied upon for dealing with cancers through the removal of tumours. The use of radiation therapy was developed in the first decades of the twentieth century as a means of eradicating cancerous cells. Microscopic study of tissue and the pathologists' recognition of tissue morphology proved therapeutically and administratively (or legislatively) valuable for determining therapeutic path. A demand was established for pathologists' knowledge. In order for this to be of value, the knowledge that histo-pathologists had (and had access to) needed to be expressed into something that practitioners, surgeons, and radiotherapists could understand. The knowledge had be communicated and thereby communicable.

4.3 Communicating histopathology knowledge as diagnosis

4.3.1 Codification

Histological techniques, and notably staining techniques, were determined and regularly experimented in research contexts. In order for a pathologist to routinely identify disease from a histopathology slide, stability and reproducibility of techniques had to be established. In his manual on histology, Masson acknowledged techniques that could and were used routinely in diagnosis work. Research and routine are different laboratory goals.[212] Routine aims as sameness and remains within the realm of existing corpus of knowledge. Stability is key to establishing routine, whereas research produces novel and looks beyond the existing corpus of

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[210] To be more explicit, by the middle of the 20th century, technicians were taking blood samples and not the doctors themselves. As such, the technician (or nurse) goes to the bed of the hospitalized patient or the patient would go to a centralized or a private lab.

[211] The instrumentation Reiser studied, as mentioned earlier, allowed physicians to see what had previously been beyond reach, such as the stethoscope for the detection of pathology via sound or the ophthalmoscope and the laryngoscope for visualization. Using urinalysis for prognosis also provided a new view of the patient by considering health and ill health without external symptoms or patient narrative. In the example of the two patients with a broken leg that opens Joel Howell's study of hospital technology innumerable lab tests were performed in 1925 that were not performed in 1900. That the patients both suffered from broken legs could be determined without any tests. The tests did not reveal information that contributed to treating the patient; nevertheless they were performed and figured on the patient's medical chart. In this case, the laboratory did not reveal information that physicians themselves did not have in their black bag.

[212] Rheinberger, *Toward a history of epistemic things*, esp. Chapter 5.

knowledge. In order for laboratories to supply knowledge, that knowledge had to be reproducible and communicable. The establishment of regularity in behaviour is in fact defined as routine and is used as analytical lens to understand how practices influence organisation, and vice versa.[213]

The transmission of information is studied in applied mathematics.[214] Information theory involves the quantification of information. It defines five stages whereby information is transmitted: there is a source, then an encoder processes the source into a suitable form for transmission. The information is transmitted. The last two stages reverse the first two stages and when they are completed the information will have been transferred. Equivalently, in diagnosis, pathologists had to first differentiate and name cancers (and non-cancers). Second, the information had to identify with something of relevance to practitioners, surgeons and radiotherapists. Third, after examining histopathology slides through a microscope lens, pathologists had to write or dictate a descriptive words or sentences. Paper slips with these words were then mailed to practitioners or surgeons that sent the samples who read the words and made decisions.

Research in histopatholgy involved studying the morphological structure of tissue microscopically. The microscopic structure of tissue was thereby identified or matched with different pathologies. The anatomo-clinic approach of comparing post-mortem lesions with symptoms was extended beyond macroscopic to microscopic examination. With accumulated observations, it became possible to identify morphologies with histopathology definitions of diseases. Scientific publications illustrate this individual and collective research goal. Scientific knowledge cannot be wholly communicated.[215] But for pathologists' knowledge to be 'practical knowledge,' it had to be circulated, and thereby circulable.

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213 Markus C. Becker, ed., *Handbook of organizational routines* (Cheltenham, UK: Edward Elgar Publishing, 2008); Markus Becker, "Organizational routines: A review of the literature," *Industrial and Corporate Change* 13, no. 4 (2004): 643; Markus Becker, "The concept of routines: Some clarifications," *Cambridge Journal of Economics* 29, no. 2 (2005): 249; Markus C. Becker et al., "Applying organizational routines in understanding organizational change," *Industrial and Corporate Change* 14, no. 5 (2005): 775; Becker, "From entrepreneur to organization."

214 Information theory was developed to find fundamental limits on signal processing operations. Since its inception it has broadened to find applications in many other areas, including statistical inference, natural language processing, cryptography generally, networks other than communication networks. Claude Elwood Shannon and Warren Weaver, *The mathematical theory of communication* (Urbana: University of Illinois Press, 1964).

215 In science, the transfer of knowledge involves replicating the structures of knowledge production - laboratories, instruments, etc. That is, the knowing how cannot be separated from the knowing about. Bernard Ancori, Antoine Bureth, and Patrick Cohendet, "The economics of knowledge: The debate about codification and tacit knowledge," *Industrial and Corporate Change* 9, no. 2 (2000): 255 -287.

Knowledge can be circulated as information. Partha Dasgupta and Paul David have defined information: “Information is knowledge reduced to messages that can be transmitted to decision agents... such messages have information content when receipt of them causes some action.”[216] Or “Information can be considered as a ‘flux’ in that each sample of information brings with it a ‘quantum of novelty’ for one or more ‘receivers.’“[217] Effectively, histopathological diagnostic information contributed to choosing between different therapeutic actions. It was equally information that was not otherwise known. The microscopic structure, otherwise invisible, was revealed and allowed a differentiation of tissue type.

The exchange of ‘practical knowledge’ is principally a problem of finding an effective means of codifying knowledge as information.[218] The codified form must take into account the context of the information, as well as the identity and capabilities of the receiver. Communicating with practitioners and medical specialists, for example, required using language they would understand and relate to. The interwar laboratory reports prepared by the Pathology Institute laboratory in the Surgical Department of the Royal London Hospital, described by Ilana Löwy, included impressions generated when cutting through samples: smooth, gritty, elastic, resistant, grained, hard to cut, etc.[219] These were terms and sensations that surgeons were familiar with. These Londonian pathologists adopted surgical descriptive language to communicate with surgeons. However, surgeons were not the only recipients of histopathology knowledge and these adjectives were not sufficient to determine the nature of tumours and growths.

Establishing language and definition of cancers (or other diseases) common across different medical practitioners and specialists was a broad undertaking. Not only because defining cancers was complicated by the morphological and clinical variability of lesions.[220] But because cancers were increasingly interesting a multitude of specialties: practitioners, surgeons, radiotherapists, medical physicists, etc. Different medical specializations did not speak the same language. At the beginning of the twentieth century, the existing nomenclatures of cancers were dominated by specialty, each serving the needs of the

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[216] Partha Gasgupta and Paul A David, “Towards a new economics of science,” *Research Policy* 23 (1994): 487-521.
[217] Patrick Cohendet and W. Edward Steinmueller, “The codification of knowledge: A conceptual and empirical exploration,” *Industrial and Corporate Change* 9, no. 2 (June 1, 2000): 204.
[218] Cohendet and Steinmueller, “The codification of knowledge”; Ancori, Bureth, and Cohendet, “The economics of knowledge.”
[219] Löwy, *Preventive strikes*, 22.
[220] As discussed by Masson, *Tumeurs & Diagnostics histologiques*.

profession. For example, radiotherapists wanted to know the state of the disease (what is now considered staging), whereas surgeons wanted to have patients classified as operable or inoperable.[221] Classification systems held professional identities that corresponded to professional practices.[222]

Establishing a common codification of knowledge is usually costly.[223] In this case, for example, it required the organization, negociation, preparation, publication and diffusion of a system across disciplinary boundaries. Once constituted, however, a codebook would diminish time, labour and costs of the codification process performed by histopathologists and the de-codification process undertaken by surgeons, radiotherapists and other practitioners. Resultingly, histopathology diagnosis processes might be accessible to trained pathologists and not just to the experienced research pathologist, thereby potentially modifying division of labour.

The laboratory result did not present or provide a display of complex data or the full process from which the report resulted. However, the lab report articulated a certain definition of disease that had not existed before the lexicon or codebook formulated it.

4.3.2 Classification & Standardization

The histopathological slides that pathology laboratories produced were observed by pathologists through microscope objectives, they were drawn by medical illustrators, they were photographed, they were projected in medical school lecture halls and academic lectures, and published in academic publications. Pictures of the stained tissue were more than an account of what the slide beheld, they were the only means of communicating between medical specialists.

Histopathology disease identification was based on a visual process, and pathologists needed pictures to communicate amongst themselves. These were pretty pictures with bright colours and shapes and, as mentioned before, not entirely unlike topographical maps. Like

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[221] Pierre Denoix, "The birth of TNM," *International Cancer News* 9 (1988): 10-11; Pierre Denoix, *Préhistoire et histoire des centres de lutte contre le cancer en France.* (Federation Nationale des Centres de Lutte Contre le Cancer, 1991), 10.

[222] Categories for one purpose becoming used for another may be exemplified with the case of DSM (American Psychiatric Association's Diagnostic and Statistical Manual) of which Allan Young observes psychiatrists using the language of the DSM to communicate with each other and their accounting departments, although not necessarily believing in the categories they are using and also creating contention in patient identity. Allan Young, *Harmony of illusion: Inventing post-traumatic stress disorder* (Princeton: Princeton University Press, 1995).

[223] Robin Cowan, Paul A. David, and Dominique Foray, "The explicit economics of knowledge codification and tacitness," *Industrial and Corporate Change* 9, no. 2 (2000): 211-253.

topographical maps (especially when replicated as a drawing on paper), histopathological images are visual representations of knowledge. But they could be meaningless to other individuals not belonging to the expert circle of histopathologists.

However, with accepted lexicon or nomenclature, pathologists could translate the image into a disease name.[224] Otherwise, they could provide descriptive terms, of tissue type for example, or relate knowledge attained in research, of past therapeutic results for example. This was the content in the lengthy laboratory examination descriptions described above. In collecting material and exchanging information with different medical specialties, pathologists were, incidentally, a liaison between different specialists (thereby accessing elements of patient histories and therapeutic outcome).

First, in order for cancer researchers to communicate between themselves, they needed to have a common definition of what cancer (or non-cancer) was in histopathological terms.[225] In 1922, communication was problematic, according to dermatologist Henri Rubens Duval and pathologist Antoine Lacassagne who stated: "There is no uniform classification of malignant tumours, or a universally recognized description of their properties, or even a way to compare different terminologies. As a result a research report may be fully understood only by its author."[226]

Before a nomenclature of histopathology disease identities could be established, the disease identities based on microscopic morphology had to be defined. This was established in research. That is, through research a histopathology sample on a slide was encoded with knowledge and became a script from which disease can be read.[227] The established categories of information were then like inscriptions to be read and analysed.[228]

Pathologists viewed and compiled innumerous microscopic tissue structures. Through research and experience, pathologists obtained cognitive capabilities of identification. Processes of knowledge production allowed pathologists' acknowledgement or recognition of

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[224] On the confusion in nomenclature and non-aligning national and local systems Löwy, *Preventive strikes*, 27. cites J. Collins Warren, "The surgeon and the pathologist: A plea for reciprocity as illustrated by the consideration of classification and treatment of benign tumors of the breast," a talk at the 56th annual session of AMA, Portland, Oregon, July 11-14, 1905.

[225] Ibid., Chapter 2.

[226] Ibid., 47. cites Rubens Duval and Antoine Lacassagne, *Classification pratique des cancers dérivés des épithéliums cutanés et cutanéo-muqueux* (Paris: G. Doin, 1922), 6. I have not read this 1922 publication. It is almost absent from French libraries, with only one copy in Nancy.

[227] LeBreton, in describing the body as leftover material [*reste*], sees its role in medical study as a promotion to the eminent role of text to be deciphered in order to identify disease. Le Breton, *La chair à vif*, 104.

[228] This brings to mind the opposition between clinic and experiment that Foucault defined as "the difference between the language we hear, and consequently recognize, and the question we pose. The observer … reads nature, he who experiments questions." Foucault, *The birth of the clinic*, 132.

cellular structure as belonging to a particular disease. In research, knowledge was identified with tissue structure. That is to say that the slice on a slide (prepared histologically and stained appropriately) contained an inscription. Deciphering the inscription, not unlike deciphering and learning a language, was undertaken in research. Combined with anatomo-clinic methods, these structures were matched with diseases or signs and disease categories were established. They were accumulated for future reference: a collection of samples (complete with slides, embedded samples, patient information, etc.), a collection of published articles (obtained in the subscription to periodical journals), in the memory of the experienced pathologist.[229] But disease identification was something that only the most advanced histopathology researcher could do.

Figure 4.31 One box of Masson's slide collection.
When closed, the box fits on a bookshelf, like a book, with the back spine curved.[230]

The histopathology slides were essentially scripts to be deciphered or read by pathologists. Uncannily, the slide boxes Masson used while in Paris had a curved spine, thereby taking the form of a book when aligned on a bookshelf.

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[229] To quote researcher E. Margoliash on sequence databases: an atlas provides "a most valuable compilation, particularly as this sort of information accumulates and one's memory begins to be overburdened." Cited by Bruno Strasser, "Collecting and experimenting: The moral economies of biological research, 1960s-1980s," in *Workshop, History and Epistemology of Molecular Biology and Beyond: Problems and Perspectives*, vol. 310 (Preprints of the Max-Planck Institute for the History of Science, 2006), 120.
[230] Masson took his collection with him to Montreal. There are two boxes remaining in Strasbourg that had been his. Photo: T. Close-Koenig

The microscopic revelation of tissue structure and pathologists' recognition of different morphological structure, established in research, could be useful for diagnosis in practicing medicine. Pathologists could visually identify the pathology associated with a particular structure morphology upon viewing a histology slide.

The microscopic structures became translatable with codebooks or atlases that acted as "dictionaries of the sciences of the eye" for establishing classification schemes.[231] As mentioned above, this was a costly entreprise and one that would be undertaken only if a demand was established. Hence, and not surprisingly, early attempts to coin classification schemes of cancerous tissue were concurrent with the fight against cancer and emerging diagnosis services of cancer.

One of the first classification schemes for cancer was the *Atlas du Cancer*.[232] The French *Atlas du Cancer* was published as 10 fascicules (in 5 volumes) between 1921 and 1932.[233] Henri de Rothschild invested heavily into cancer research and cancer treatment centres in France. He also funded the printing of this Atlas.[234] Bringing scientific knowledge and histo-pathological definition of cancers together as a means of advancing in the fight against cancer was precistly the aim of the *Atlas de Cancer*. This was a series to which Masson contributed. The *Atlas du Cancer* was a collective effort to define standards for knowledge codification: a codebook.[235]

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[231] Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007), 22. See also Strasser, "Collecting and experimenting," 120.

[232] My efforts to identify the earliest schemes turned up a few single-author publications, such as Julius Vogel, *Icones histologiae pathologicae: Tabulae histologiam pathologicam illustrantes (Erläuterungstafeln zur pathologischen Histologie mit vorzüglicher Rüksicht auf sein Handbuch der pathologischen Anatomie)* (Leipsiae: Leopoldus Voss, 1843); Hermann Lebert, *Physiologie pathologique ou recherches cliniques, expérimentales et microsopiques sur l'inflammation, la tuberculisation, les tumeurs, la formation du cal, etc.* (Paris et Londres: J.B. Baillière, 1845); Max Borst, *Die Lehre von den Geschwülsten mit einem mikroskopischen Atlas* (Wiesbaden: J. F. Bergmann, 1902).
Rather discusses publications of John Abernethy on the classification of tumours based on gross anatomical structure in 1804, Rudolph Virchow and Julius Cohnheim classifications in the 1870s. L. J. Rather, *The genesis of cancer. A study in the history of ideas* (Baltimore and London: The Johns Hopkins University Press, 1978). For a summary of Virchow, Cohnheim, as well as Sutton's classifications, see John Sayre Marshall, *Injuries and surgical diseases of the face, mouth, and jaws* (Philadelphia: The S. S. White Dental Mfg. Company, 1909), 457-461.

[233] *Atlas du Cancer*, 10 volumes published between 1921-1932 by various authors and printed by the Librairie Felix Alcan. J. Darier.1922; L. Bazy et A. Peyron. 1923. "Epithéliomas des trompes utérines. Tumeurs de la notochorde"; Pierre Masson. 1924. "Tumeurs des glandes annexes des muqueuses de la face et du cou"; Pierre Delbet et A. Herrenschmidt. 1926. "Les cancers du sein"; Gaston Lion. 1927. "Les cancers de l'estomac"; Albert Peyron. 1929. "Les tumeurs des muscles"; H. Rubens-Duval. 1930. "Epithéliomas du col de l'utérus"; Gustave Roussy et Charles Oberling. 1931. "Les tumeurs des centres nerveux et des nerfs périphériques"

[234] Harry W. Paul, *Henri de Rothschild, 1872-1947: Medicine and theater* (Aldershot: Ashgate Publishing, 2011), 108-109.

[235] Robin Cowan and Dominique Foray, "The economics of codification and the diffusion of knowledge," *Industrial and Corporate Change* 6, no. 3 (1997): 595-622.

The impact of this publication is difficult to estimate. It is indexed in five university library catalogues in France: *Aix-Marseille 2 BU Médecine, Paris BIUM, Paris BUPMC Biologie recherche, Paris Académie Médecine, Bordeaux 2 BU Santé*. Although it is not in the medical school library in Strasbourg, there are two copies of the series in the *Institut d'Anatomie Pathologique* library. It has not been mentioned by historians of medicine in discussing history of cancer or history of cancer classification.[236] It was, however, known to and acknowledged by the *Union International Contre le Cancer* (UICC) at a 1936 meeting in Paris, who discussed the publishing of an international atlas of tumours based on histopathological classification in English and financed by Francis P. Garvan, president of the Chemical Foundation in New York that would be translated to French, German, Italian and Spanish.[237] This was not published; rather these efforts gave rise to the TNM classification system.[238] In the interwar period, the only published effort to uniformize cancer classification was the French *Atlas du Cancer*, to which Masson contributed.

A Commission of 25 medical scientists organized this "iconographic catalogue."[239] Pierre Masson wrote the 3rd and 4th fascicule. The microscope preparations, drawn by Constantin who worked with Masson, present a series of "ideograms." The terrain or the images are made comparable or standardized with the fixation and staining methods indicated for each. The *Atlas du Cancer*, rather than pretending to impose a terminology on the international level, aimed at pictorially uniformizing cancer diagnosis (descriptions) and providing a list of synonyms as complete as possible.[240] Histopathology was a morphological science and relied on the visual; it was not concerned with function, nor was it quantitative.[241]

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[236] The one exception is Löwy discussion of a 1922 publication by Duval and Lacassagne. Löwy, *Preventive strikes*.

[237] Maisin, *L'union Internationale Contre le Cancer*, 20.

[238] The first fully international system of classifying tumours dates to 1987 when the UICC (International Union Against Cancer) and the AJCC (American Joint Committee for Cancer) TNM classifications were unified. The international effort to exchange knowledge for cancer prevention and control, however, may be dated to the founding of the UICC in 1933. The first edition of the TNM system handbook was published in 1968.

[239] *"catalogue iconographique"* was the term they used to describe the publication.

[240] The first fully international system of classifying tumours dates to 1987 when the UICC (International Union Against Cancer) and the AJCC (American Joint Committee for Cancer) TNM classifications were unified. The international effort to exchange knowledge for cancer prevention and control, however, may be dated to the founding of the UICC in 1933. The UICC's efforts resulted in the TNM classifiction system published in 1967. On this history: Marie Ménoret, "The genesis of the notion of stages in oncology: The French permanent cancer survey (1943–1952)," *Social History of Medicine* 15, no. 2 (2002): 291 -302; Löwy, *Preventive strikes*, 47-54; M. Gospodarowicz et al., "History and international developments in cancer staging.," *Cancer prevention & control/Prévention & contrôle en cancérologie* 2, no. 6 (1998): 262-268; Maisin, *L'union Internationale Contre le Cancer*; Carsten Timmermann, *Lung cancer and 20th century medicine: The recalcitrant disease* (Palgrave MacMillan, (in press)), Chapter 6.

[241] It was not automated in the 1950s or 1960s like many routine lab examinations.

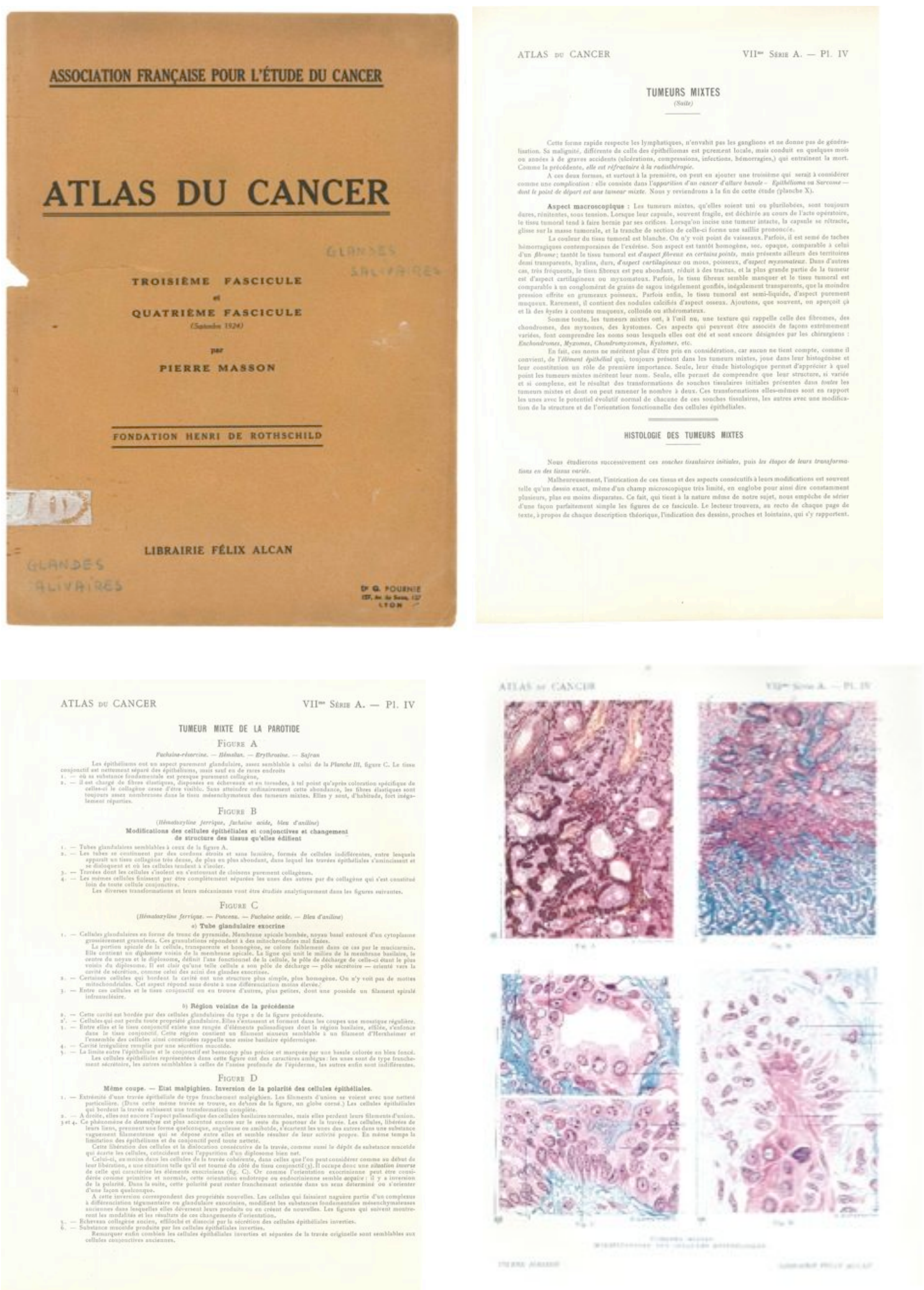

Figure 4.32 The *Atlas du Cancer* sample illustrations with accompanying text.
The atlas consisted of a number of folios bound together; each consisted of one printed sheet and one glossy colour page. The printed page began with a general description or discussion, the recto of had the descriptions and details of the illustrations, as pictured above.[242]

The atlas genre usually presents the challenge or compromise of presenting complex data on two-dimensional paper or flatlands, to use Edward Tufte's term.[243] But here it is presented as a means of avoiding this challenge, that words would imply compressing, and

[242] Reproduced from: Masson, *Atlas du Cancer,* VIIe Série A - Pl. IV
[243] Edward R Tufte, *Envisioning Information* (Cheshire, Connecticut: Graphics Press, 1990).

herein losing information. At this point in time, when there was no nomenclature or common language, less was lost in “ideograms.”[244]

The aim of this publication was detailed in the preface: to uniformize histological identities. This was destined to make academic publications and articles understandable amongst pathologists and researchers and was not a diagnosis manual, like later atlases. This was, however, the first step in establishing a diagnosis manual. The atlas was a translation tool.[245] The *Atlas du Cancer* was an effort to uniformize and commence a universal lexicon.[246]

Classifications effectively standardize biomedical entities, as the systems encode knowledge *and* coordinate practice.[247] Histopathology classification systems such as the (early) classification of cancers appear fully embedded in the laboratory, but actually went beyond the laboratory to form, and be formed by, therapeutic decisions and patient identities. That is, the distinctions between categories only made sense when they made a difference in medical practice. Already half a century earlier, Virchow had pointed out that a classification of tumours into malignant and benign was as unscientific as would be classification of plants into poisonous and edible. He did, however, recognize that both procedures would be useful in practice.[248]

Pathological anatomy had long catalogued and categorized gross specimens according to descriptive names based on anatomical system and tissue. This was no longer sufficient; a new language had to be established to describe and identify histopathology morphologies with disease. Histopathology disease identification and classification was based on a visual process, and although pathologists included images in communicating amongst themselves, these were meaningless to practitioners, surgeons or radiotherapists. In addition to producing intellectual (or scientific) knowledge, it had to be communicated, and pathologists had to

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244 "*idéogramme*" was the term used in the publication preface.

245 This could potentially be examined in light of Callon’s or Latour’s work on "translation." Callon, “La protohistoire d’un laboratoire,” esp. 102-113; Bruno Latour, *Cogitamus : six lettres sur les humanités scientifiques* (Paris: La Découverte, 2010), 9-36.

246 Once established, it would be used to facilitate comparison of treatment results and produce statistical evidence. National and regional cancer registries are not only another means of identifying cancer efforts, but useful to understanding pre-1939 classification attempts. I began to collect information on registries, but have not been able to compile and analyze them, due to time constraints. Löwy mentions a few interwar registries in discussing the TNM system and France’s Permanent Cancer Survey. Löwy, *Preventive strikes*, 47-49.

247 Alberto Cambrosio and Peter Keating, “A matter of FACS: Constituting novel entities in immunology,” *Medical Anthropology Quarterly* 6, no. 4, New Series (1992): 362-384.

248 Rather, *The genesis of cancer*, 216 (note 70).
Welch indicated similarly that there was more that classification could do and he promoted this, stating: "To be able to give a name to some pathological lesion, and to make it fit into some accepted scheme of classification, should not be the sole aim of pathological study." William H Welch, “Pathology and its relations to general biology,” *Johns Hopkins Hospital Bulletin* 2 (1890): 25.

additionally codify knowledge or make it talk.[249] The codified form had to take into account not only the context of the information, as well as the identity and capabilities of the receiver.[250] The *Atlas du Cancer* was one such collective effort to define standards for knowledge codification.[251] Codifying histopathology knowledge was of unquestionable value as it was the information that practitioners used to choose therapies.[252] The way that pathologists recorded and organised their observations was determinant in the identification of diseases, such as cancers, and their therapeutic solutions.

Diagnostic techniques produce specific ways of thinking about disease.[253] The (re)definition of cancer as a disease of cells and tissues modified diagnostic categories, in light of relative efficacy of different therapies.

Codification can further render knowledge, like a commodity, exchangable. Codifying histopathology knowledge was of unquestionable value: it was determinant in choosing therapeutic solutions. It was also of economic value - for surgical, radiotherapeutic and radium therapy structures. It became of economic interest for pathologists to codify their knowledge; it became a source of income.

The number of histopathology examinations at the *Institut d'Anatomie Pathologique* in Strasbourg increased fivefold in the interwar period. This was due to an emerging demand for histopathology information from about 1924. This has been explored and understood as a result of the implementation of cancer centres in France and Strasbourg. Demand for histopathological diagnosis emerged or took-off with the change in therapeutic modalities and the development of radiation therapies. The creation of demand for histopathology information was co-constructed with the creation or adaptation of supply through a codification of scientific knowledge. Once this practical knowledge was established, the demand and subsequent routine could determine laboratory organization and stucture.[254] That

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[249] Lorraine Daston, ed., *Things that talk: Object lessons from art and science* (New York: Zone Books, 2004); Christian Bonah, "Microbiology at the bedside (or how the lab works)," Manuscript, 2005.

[250] Cohendet and Steinmueller, "The codification of knowledge"; Ancori, Bureth, and Cohendet, "The economics of knowledge."

[251] Cowan and Foray, "The economics of codification and the diffusion of knowledge."

[252] Codification further renders knowledge commodifiable. It was also of economic value - for surgical, radiotherapeutic and radium therapy structures. It became of economic interest for pathologists to codify their knowledge; it became a source of income.

[253] In her book, for example, Löwy shows that the microscopic definition of cancer favoured the concept of premalignant lesion. Löwy, *Preventive strikes*, 5.

[254] For an example of how demand may determine productor activity and organisation: if there is increase in the demand for umbrellas in an unexpected rainy season; suppliers may simply accommodate demand by using their production equipment more intensively. If, however, there is a climate change, and the population will need umbrellas year-round, the change in demand will be expected to be long term; suppliers will have to change their equipment and production facilities in order to meet the long-term levels of demand.

is to say that the relationship between demand and supply underlies the forces behind the allocation of resources.[255]

In his illustrious article, Kenneth Arrow principally addressed the welfare economics of medical care industry, but some ideas and assertions are relevant to discussion of the economics of medical services adjacent to medical care.[256] For example he stated:

> "When there is uncertainty, information or knowledge becomes a commodity. Like other commodities, it has a cost of production and a cost of transmission, and so it is naturally not spread over the entire population but concentrated among those who can profit most from it. But the demand for information is difficult to discuss in the rational terms usually employed. … [I]nformation, in the form of skilled care, is precisely what is being bought from most physicians, and, indeed, from most professionals. The elusive character of information as a commodity suggests that it departs considerably from the usual marketability assumptions about commodities."[257]

In economy, where there is uncertainty, knowledge is recognized to be a commodity and to have competitive advantage.[258] The mobilisation of therapy led to the mobilisation of diagnosis procedures, responding to uncertain factors concerning disease definition and radium therapy application.

Tabulating the number of samples sent by each doctor and/or institution has allowed the evolution in the use of the laboratory by physicians in different contexts to be explored. The evolution, which has been defined as a three-phase process, was also likely to have been influenced by a number of other circumstances; such as, the increasing use of the laboratory techniques by physicians and thereby a familiarity with the laboratory. A snowball effect may also have been in play: the more samples examined, leading to more technicians trained and a more efficient technique, so that they could examine that many more, and thus a wider promotion of the service. The financial impact on this effect cannot be neglected, i.e.

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[255] In market economy theories, demand and supply theory will allocate resources in the most efficient way possible. The law of demand states that, if all other factors remain equal, the higher the price of a good, the less people will demand that good. In other words, the higher the price, the lower the quantity demanded. The amount of a good that buyers purchase at a higher price is less because as the price of a good goes up, so does the opportunity cost of buying that good. As a result, people will naturally avoid buying a product that will force them to forgo the consumption of something else they value more. Like the law of demand, the law of supply demonstrates the quantities that will be sold at a certain price. This means that the higher the price, the higher the quantity supplied. Producers supply more at a higher price because selling a higher quantity at a higher price increases revenue.

[256] Arrow, "Uncertainty and the welfare economics of medical care."

[257] Ibid., 946.

[258] Ibid., esp. 946; Ikujiro Nonaka, "The knowledge-creating company," *Harvard Business Review* (December 1991): 96.

capitalist industrial dynamics. The laboratory examination for diagnosis was a service paid for by (Bismarckian) social security.[259] The resourceful laboratory director could, and would, use this to fund their research activity.[260] For example, the cancer centre compensated the pathology lab 2000 FRF annually.[261] The financial and managerial dynamics are the focus of the next chapter.

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[259] Bismarckian social laws had implemented social security in Germany states at the end of the nineteenth century. In 1919, it was decided to maintain the coverage in Alsace-Lorraine, patients did not pay medical bills if they consulted members of the union (*syndicat medical*). Social security laws were voted for the whole of France in 1928, and implemented in 1930. But from what I understand this did not include lab costs. This detail merits further study.

[260] Pierre Masson and Louis Géry had both been investigated by the Cour des Comptes for the use of the income from their laboratory. Dossiers du personnel, AFMS.

[261] "Enquête faite par Ch. Rives, Conseiller Référendaire à la Cour des Comptes. 1934." DEC. Cour des Comptes. AFMS.

Chapter 5

Managing & commercializing laboratory services

The emergence of market for medical laboratory services and defining laboratory acts at the medical school in Strasbourg

Introductory material: A salary dispute

What the paperwork issuing of pathological anatomy collecting and adjacent recordkeeping processes, which have formed the opening of each of the previous three chapters, did not record was the money that the *Institut d'Anatomie Pathologique* was earning and spending. If this was recorded, these records were not kept. It was, however, recorded by and traced by an external body, outside the institute walls.

In 1933 a laboratory technician at the *Institut d'Anatomie Pathologique*, G. Rohfritsch, filed a complaint stating that the director of the institute, Louis Géry, had withheld a portion of his pay [*subsides*].[1] Rohrfritsch appealed to the dean of the medical school, André Forster, that he had always been paid 5 FRF per biopsy examined for private clientele. Forster solicited Géry for an explanation. Géry confirmed that over the previous four years (since his appointment as director *ad interim* of the institute in 1928) he had regularly compensated [*redevances*] Rohfritsch for histological examinations performed for private clientele. This work, he claimed, was voluntary and any compensation was paid in recognition of the technician's contribution and as a bonus. He clarified, however, that the 5 FRF pay was initiated by Charles Oberling who had managed the institute in 1927 and 1928 and prior to this, Pierre Masson (director and chair from 1919 to 1927) had not remunerated technicians for such work. Oberling had found it useful to ask these services of Rohfritsch, as his own workload was heavy.[2] Géry stated that he did not really need Rohfritsch to do this. These

[1] Louis Géry à M. le Doyen le 24 juillet 1933. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

[2] Oberling replaced both Masson (director) and Géry (chief assistant) simultaneously for just over a year upon Masson's departure for Montreal and Géry to Paraguay. That is, in addition to administrative tasks, he took on all teaching, autopsy and diagnosis services.

examinations usually took about two hours a day, sometimes three and rarely four. Géry stated that Rohfritsch had free time in the mornings in which he could do this rather than hanging about doing nothing. Géry further argued that this was not "supplementary work" as it contributed to the scientific richness of the pathology institute, and thereby as part of Rohfritsch's regular workload, did not require supplementary remuneration.[3] Rohfritsch left Géry's employment in 1933.[4]

Why recount an anecdote of a salary dispute between a worker and his employer in a thesis on history of science? First, Géry's response to the technician's complaint is useful for understanding the daily activity and management of this laboratory. The episode establishes that the lab technician Rohfritsch spent two to four hours every day preparing histological slides for private clientele. Secondly, Géry's response raises the question of the status of these examinations. That is, Géry stated that the two to four hours of work a day devoted to preparing biopsies for examination was not "supplementary work." We might conclude that it was truly a side activity seamlessly integrated into research and teaching routines. Within a medical school, it is to be expected that all laboratory activities were uniquely for research and teaching. If all the examinations performed for those outside the institute were for research colleagues, this conclusion might be correct. The diagnosis information would be (and was) furnished in an exchange of academic proportions among scientific peers. Here, however, this was not the case. The diagnosis information was furnished to private clientele in a exchange that involved money.

A commercial enterprise is defined as "the activity of providing goods and services involving financial and commercial and industrial aspects."[5] From about 1924, this laboratory was providing diagnostic services, as detailed in Chapter 4. If this involved financial transactions, could the diagnostic service be described as a commercial enterprise? And when this involved money and financial transactions, how much money? Was this cost recovery or was this a lucrative business?

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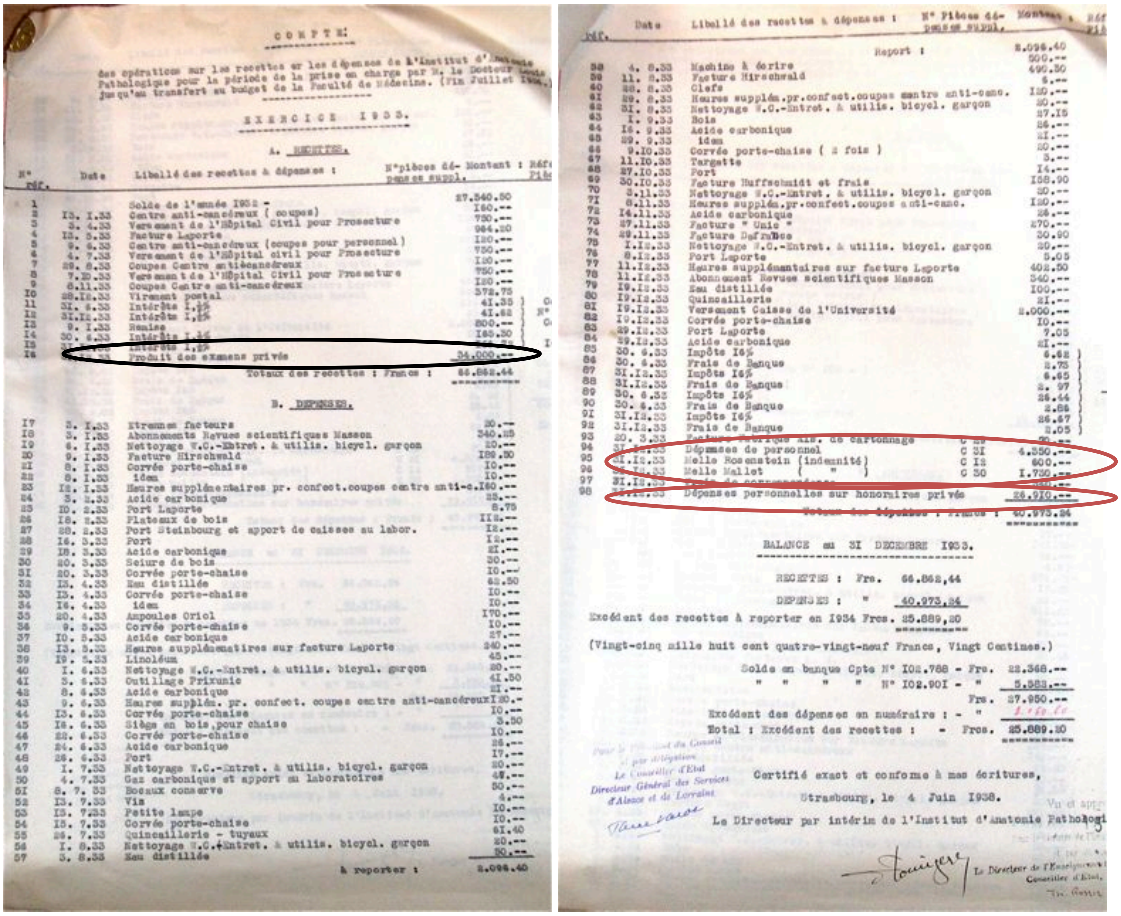
[3] Louis Géry à M. le Doyen le 15 mars 1933. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS. (My translation.)

[4] Etat des dépenses de Personnel, 1928-1934. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

[5] "commercial enterprise," *The Free Dictionary*, n.d., http://www.thefreedictionary.com/commercial+enterprise.



COMPTE:

des opérations sur les recettes et les dépenses de l'Institut d'Anatomie Pathologique pour la période de la prise en charge par M. le Docteur Louis [illegible] jusqu'au transfert au budget de la Faculté de Médecine. (Fin Juillet [illegible])

EXERCICE 1933.

A. RECETTES.

N° réf.	Date	Libellé des recettes & dépenses :	N° pièces dépenses suppl.	Montant :
1		Solde de l'année 1932 -		27.540.50
2	13. 1.33	Centre anti-cancéreux (coupes)		160.--
3	3. 4.33	Versement de l'Hôpital Civil pour Prosecture		750.--
4	12. 5.33	Facture Laporte		984.20
5	9. 6.33	Centre anti-cancéreux (coupes pour personnel)		120.--
6	4. 7.33	Versement de l'Hôpital civil pour Prosecture		750.--
7	29. 8.33	Coupes Centre anticancéreux		120.--
8	7.10.33	Versement de l'Hôpital Civil pour Prosecture		750.--
9	8.11.33	Coupes Centre anti-cancéreux		120.--
10	28.12.33	Virement postal		372.75
11	31. 6.33	Intérêts 1,5%		41.35
12	31.12.33	Intérêts 1,5%		41.62
13	9. 1.33	Remise		800.--
14	30. 6.33	Intérêts 1,5%		165.30
15	[illegible]	Intérêts 1,5%		[illegible]
16	[illegible]	Produit des examens privés		34.000.--
		Totaux des recettes : Francs :		66.862.44

B. DEPENSES.

N° réf.	Date	Libellé des recettes & dépenses :	N° pièces dépenses suppl.	Montant :
17	3. 1.33	Etrennes facteurs		20.--
18	3. 1.33	Abonnements Revues scientifiques Masson		340.25
19	6. 1.33	Nettoyage W.C.-Entret. & utilis. bicycl. garçon		20.--
20	9. 1.33	Facture Hirschwald		189.50
21	8. 1.33	Corvée porte-chaise		10.--
22	8. 1.33	idem		10.--
23	12. 1.33	Heures supplémentaires pr. confect.coupes centre anti-c.		160.--
24	3. 2.33	Acide carbonique		25.--
25	10. 2.33	Port Laporte		8.75
26	18. 2.33	Plateaux de bois		112.--
27	28. 2.33	Port Steinbourg et apport de caisses au labor.		12.--
28	16. 3.33	Port		12.--
29	18. 3.33	Acide carbonique		21.--
30	20. 3.33	Sciure de bois		30.--
31	20. 3.33	Corvée porte-chaise		10.--
32	13. 4.33	Eau distillée		62.50
33	13. 4.33	Corvée porte-chaise		10.--
34	16. 4.33	idem		10.--
35	20. 4.33	Ampoules Oriol		170.--
36	9. 5.33	Corvée porte-chaise		10.--
37	10. 5.33	Acide carbonique		27.--
38	13. 5.33	Heures supplémentaires sur facture Laporte		240.--
39	19. 5.33	Linoléum		45.--
40	1. 6.33	Nettoyage W.C.-Entret. & utilis. bicycl. garçon		20.--
41	3. 6.33	Outillage Prixunic		41.50
42	8. 6.33	Acide carbonique		21.--
43	9. 6.33	Heures supplém. pr. confect. coupes centre anti-cancéreux		120.-
44	13. 6.33	Corvée porte-chaise		10.--
45	16. 6.33	Siège en bois,pour chaise		3.50
46	22. 6.33	Corvée porte-chaise		10.--
47	24. 6.33	Acide carbonique		26.--
48	26. 6.33	Port		17.--
49	1. 7.33	Nettoyage W.C.-Entret. & utilis. bicycl. garçon		20.--
50	4. 7.33	Gaz carbonique et apport au laboratoires		47.--
51	8. 7.33	Bocaux conserve		50.--
52	13. 7.33	Vis		4.--
53	13. 7.33	Petite lampe		10.--
54	15. 7.33	Corvée porte-chaise		10.--
55	26. 7.33	Quincaillerie - tuyaux		61.40
56	1. 8.33	Nettoyage W.C.-Entret. & utilis. bicycl. garçon		20.--
57	3. 8.33	Eau distillée		50.--
		à reporter :		2.096.40

N° réf.	Date	Libellé des recettes & dépenses :	N° Pièces dépenses suppl.	Montant :
		Report :		2.096.40
58	4. 8.33	Machine à écrire		500.--
59	11. 8.33	Facture Hirschwald		490.50
60	28. 8.33	Clefs		6.--
61	29. 8.33	Heures supplém.pr.confect.coupes centre anti-canc.		120.--
62	31. 8.33	Nettoyage W.C.-Entret. & utilis. bicycl. garçon		20.--
63	1. 9.33	Bois		27.15
64	16. 9.33	Acide carbonique		26.--
65	29. 9.33	idem		21.--
66	9.10.33	Corvée porte-chaise (2 fois)		20.--
67	11.10.33	Targette		3.--
68	27.10.33	Port		14.--
69	30.10.33	Facture Huffschmidt et frais		158.90
70	3.11.33	Nettoyage W.C.-Entret. & utilis. bicycl. garçon		20.--
71	8.11.33	Heures supplém.pr.confect.coupes anti-canc.		120.--
72	14.11.33	Acide carbonique		26.--
73	27.11.33	Facture " Unic "		270.--
74	29.11.33	Facture Defranse		30.90
75	1.12.33	Nettoyage W.C.-Entret. & utilis. bicycl. garçon		20.--
76	8.12.33	Port Laporte		5.05
77	11.12.33	Heures supplémentaires sur facture Laporte		402.50
78	11.12.33	Abonnement Revues scientifiques Masson		340.--
79	19.12.33	Eau distillée		100.--
80	19.12.33	Quincaillerie		21.--
81	19.12.33	Versement Caisse de l'Université		2.000.--
82	19.12.33	Corvée porte-chaise		10.--
83	29.12.33	Port Laporte		7.05
84	29.12.33	Acide carbonique		21.--
85	30. 6.33	Impôts 16%		6.62
86	30. 6.33	Frais de Banque		2.75
87	31.12.33	Impôts 16%		6.65
88	31.12.33	Frais de Banque		2. 97
89	30. 6.33	Impôts 16%		26.44
90	30. 6.33	Frais de Banque		2.86
91	31.12.33	Impôts 16%		26.67
92	31.12.33	Frais de Banque		2.05
93	20. 3.33	Facture Fabrique Als. de cartonnage	C [illegible]	[illegible]
94	31.12.33	Dépenses de personnel	C 31	4.350.--
95	31.12.33	Melle Rosenstein (indemnité)	C 12	600.--
96	31.12.33	Melle Mallet (")	C 30	1.730.--
97	31.12.33	Frais de correspondance		[illegible]
98	31.12.33	Dépenses personnelles sur honoraires privés		26.910.--
		Totaux des dépenses : Francs :		40.973.24

BALANCE au 31 DECEMBRE 1933.

RECETTES : Frs. 66.862,44

DEPENSES : " 40.973,24

Excédent des recettes à reporter en 1934 Frcs. 25.889,20

(Vingt-cinq mille huit cent quatre-vingt-neuf Francs, Vingt Centimes.)

Solde en banque Cpte N° 102.788 - Frs. 22.368.--

" " " " N° 102.901 - " 5.582.--

Frs. 27.950.--

Excédent des dépenses en numéraire : - " [illegible]

Total : Excédent des recettes : - Frcs. 25.889.20

Certifié exact et conforme à mes écritures,

Strasbourg, le 4 Juin 1938.

Le Directeur par intérim de l'Institut d'Anatomie Pathologique

Figure 5.1 The account records reproduced by Louis Géry, 1933.[6]
On the left hand sheet, the income from histopathology examinations is circled in black. On the right hand page, the amounts paid to personnel, as well as for personal expenses, are circled in red.

The income from histopathology examinations for private patients [*malades privés*] was reported in the institute accounts.[7] (These accounts will be discussed in further detail below in Section 5.3.) The above document detailing the accounts of the pathological anatomy institute in 1933 shows that 34 000 FRF were received for histopathology examinations for private clients [*Produit des examens privés*], like those which Rohfritsch was asked to prepare. Of this 26 910 FRF was considered Géry's personal honorarium [*dépenses personnelles sur honoraires privés*] and other personnel costs were 4350 FRF for 7 employees. This was not their salary, but additional overtime or bonus pay. For example, M. Schmittbiel was an employee of the hospital delegated to the institute for the prosecture

[6] Louis Géry à M. le Doyen le 15 mars 1933. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

[7] The account records from 1924 to 1934 are in the archives. This activity figures from 1928 to 1934, the years that Louis Géry reported the activity. This does not mean that it did not exist before, but that Pierre Masson did not feel that he had to report this as part of the institute's financial activity, considering it his own activity. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

activity. The amounts indicated here were not consistent year to year and many of the employees were only paid 100 FRF per year. This might be compared with the university salaries of the *Institut d'Histologie* in Strasbourg in 1924, indicated below.

Position	Yearly salary
Professor (*Professeur 1e classe*)	22 000 FRF
Lecturer (*Chargé de cours*)	12 000 FRF
Assistants (*Préparateurs*)	6 000 FRF
Instructors (*Moniteurs*)	2 000 FRF
Lab workers (*Techniciens et Garçons de laboratoires*)	3 800 FRF

Figure 5.2 Salaries of Strasbourg *Institut d'Histologie* employees, 1924.[8]

The salarial bonuses and overtime were negociated in an undefined territory. There are no written contracts and no official account records to historically trace this. Juxtaposing archival sources is revealing, however. In 1933, a total of 1934 examinations were recorded in the laboratory registers.[9] There were 240 examinations for private patients.[10] At 5 FRF per biopsy, Rohfritsch would have receieved 1200 FRF. At about one third of the reference male lab technician annual salary, this was a significant bonus. It was equivalent to four months pay. But, in fact Rohfritsch had been making even more than this in the years prior to 1933.

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[8] Pol Bouin, "L'Institut d'Histologie de l'Université de Strasbourg," *Methods and Problems in Medical Education* Third Series (1925): 142.
It is interesting to note that at the hospital in Strasbourg in 1922 *garçons de laboratoire* were making 1800 FRF and *laborantines 1680 FRF.* Projet de Contrat forfaitaire. 1922. Casier 50/1. Dossier: Contrats avec l'Université. AHUS.

[9] My count and analysis of the laboratory logbooks.

[10] Relevé du registre de comptabilité des examens privés. 1932-1935. 27 Mai 1938. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

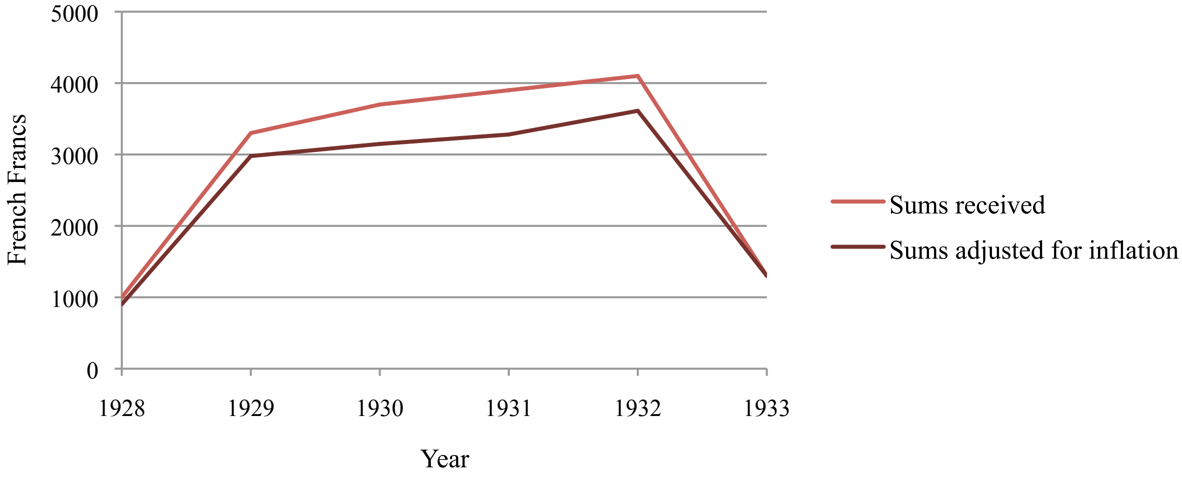

Figure 5.3 The amount Rohfritsch received in supplementary pay, 1928-1933.[11]
The darker curve has represents the sums calculated in terms of the 1933 value of the French Franc, which is adjusted for inflation.[12]

Laboratory archives indicate that Rohfritsch had received 1000 FRF in 1928, 3300 FRF in 1929, 3700 FRF in 1930, 3900 FRF in 1931, 4100 FRF in 1932 and 1300 FRF in 1933.[13] The amount indicated for 1928 was not likely the amount for the full year as there was a change in accounting practices with Géry's arrival in October 1928.[14] And the amount in 1933, either reflects that Géry cut his supplementary pay or that Rohfritsch left the service mid way through the calendar year. In any case, Rohfritsch's earnings had been rising significantly between 1929 and 1932. He was in fact doubling his annual income with this supplementary work. Expectedly, he was not the only one taking home additional income.

Géry was a professor, but was not chair, and he would have had a salary of approximately 20 000 FRF.[15]

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[11] This graph was generated from data from: Etat des dépenses de Personnel, Années 1928 - 1934. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.
[12] This was adjusted for inflation using the onversion available online: http://www.france-inflation.com/calculateur_inflation.php
[13] Etat des dépenses de Personnel, Années 1928 - 1934. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.
[14] Masson and Oberling did not include this data in their accounts.
[15] This estimate may be on the high side. Bouin, "L'Institut d'Histologie de l'Université de Strasbourg," 142.

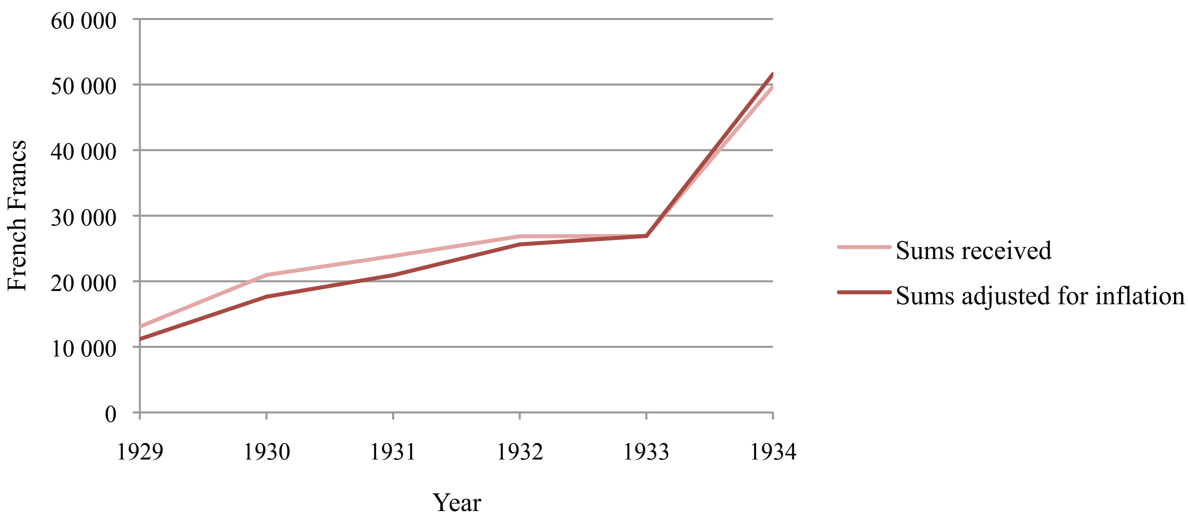

Figure 5.4 The amount Géry received in supplementary pay, 1929-1934.[16]
The darker curve has represents the sums calculated in terms of the 1933 value of the French Franc, which is adjusted for inflation.[17]

Even if this estimate of Géry's salary is a high estimate, he too doubled his salary between 1930 and 1933. And in 1934, he made two and a half times his salary with the diagnosis activity.[18] Not only was this an established commercial service enterprise, this was a gold mine. This was a win-win situation for both the lab director, Géry, and lab technician, Rohfritsch. However, when Géry changed the rules of the game, perhaps deciding that this was too much for the technician or deciding not to share the earnings with the lab technician in terms similar to previous years, Rohfritsch filed complaint and retracted his services.

Overtime hours were additionally paid for another commercial entreprise: the preparation of histopathology slides to sell. These were sold to students and professors. There were two clients, the *Centre anti-cancéreux* and *Laporte*, for whom overtime hours were indicated in the account records.[19] These overtime hours were over and above the amounts cited above.[20] The production of slides for the CAC was not profitable; the income received equaled the overtime paid and the institute absorbed any material costs. This was an activity internal to the hospital-medical school complex and may be characterised as similar to an

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[16] This graph was generated from data from: The account records from 1924 to 1934. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.
[17] This was adjusted for inflation using the onversion available online: http://www.france-inflation.com/calculateur_inflation.php
[18] A point of interest, Masson was asked to return to Strasbourg and was even considered a candidate for Roussy's successor in Paris. But he had gone to Montreal for the money and he would not be able to make as much in France as he was making in Montreal: "M. went to Montreal to make money." Citing Robert A. Lambert, September 27, 1937. RF 1.1 500 Box 7 Folder 70. RAC.
[19] I was unable to identify *Laporte*; I would guess that it was a distributor of materials for medical students.
[20] It is not clearly stated to whom this was paid. I have assumed it was the technicians.

academic economy transaction. However the *Laporte* activity was profitable. In 1933, *Laporte* paid 964.20 FRF with overtime labour and postage totalling 681.35 FRF. In 1933, this generated a very small profit of 282.85 FRF. The previous year, *Laporte* income was 4434.25 FRF and expenses were 360.80 FRF, generating a profit of 4093.45 FRF. This was the manufacture of histopathology slides for commercial sale.[21] There were two systems within the commercial entreprise: hospital and CAC, as not-for-profit services, and private, as for-profit services.

Considering and examining finances is one means of questionning institute structure. In addition to research and teaching, the *Institut* was involved in autopsies, histopathology examinations, and the confection of histopathology slides. The hospital hired and paid an assistant [*préparateur*] for the autopsy activity. The medical school also paid lab technicians for teaching and research. These employees additionally contributed to other activities, which Géry justified as lending equally to research. The accounts and the manner that Géry managed these, for example his use of the phrase "private honorariums" [*honoraires privés*], indicates that examinations for private clients was considered an activity for which he (and his expertise) was being paid. If he decided to pay the institute technicians for their contribution to this work, it was by way of a bonus and a share in the gold mine.[22] Whereas the preparation of histopathology slides was an activity for which technicians were remunerated for overtime, this might be interpreted in terms of division of labour. The preparation of histology slides was something that technicians did and were remunerated for. The preparation of slides for reasearch or for teaching fell within their salarial responsiblities. The preparation of slides for sale was something paid for above their salary. The slides prepared for diagnosis were considered potential research and teaching materials and thereby Géry did not always pay overtime, as in the case Rohrfritsch argued.

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[21] This activity was referred to the production of industrial slides by more recent pathologists of the institute.
[22] Income from the additional work could potentially, but not necessarily, contribute to top-up technician salaries for overtime hours to these perform diagnostic examinations. Whether additional work was remunerated was entirely at the discretion of the institute director. The diagnosis activity did not depend on the medical school. But the income could be re-invested in the institute.

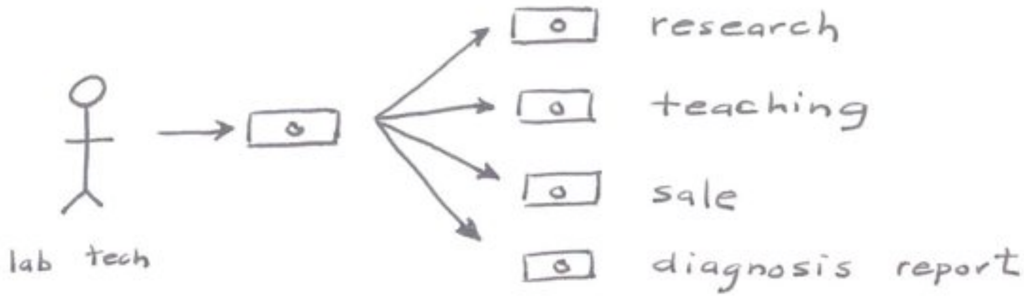

Figure 5.5 Schematic of technician preparing slide & multiple orientations of that slide.

A lab technician prepared a slide. The slide then could be used in research, in teaching, it could be sold as teaching tool, and it could be the basis of a diagnosis report that was paid for. All these orientations used the same "preparation." The slides were identical. They were only distinguishable physically by their paper labels, which indicated a number or a name. In some cases, the preparations were research and teaching tools. In others, they became goods and services that were exchanged for money. In strict "scientific" or "practical" terms there was no difference between the preparations. For the technician, there was just an amount of slides to produce and that increased. For the director who used and interpreted the slides the difference was significant. The pathologist's pronouncement of diagnosis (visualisation and recognition of morphology) was the act that was paid for. And that Masson, in 1923, had argued should be paid for. This may have been Géry's logic in directing these funds into his personal expenses.

Figure 5.6 The *Institut d'Anatomie Pathologique* employees, 1939
From left to right, the back, Siffermann, Frühling, Schmittbiel, Stricker. And the front, Mme Wendel, Mme Hoerner, Géry, Mme Holweg.[23]

Beyond the anecdote, this chapter provides a fuller analysis of the economic system that involved diagnosis emerging as an independent and self-subsisting activity for the anatomo-pathological laboratory in the 1920s. In describing activities taken on by the pathological anatomy institute laboratory, the notion of market has been summoned on a number of occasions already in this thesis. Effectively, the market is a key underlining principle in the emergence of laboratory diagnosis as a commercial service. In economics, a market is structured around supply and demand. Having established the presence of thse market ingredients, further questions emerge: Was the diagnosis volet of the laboratory activity pushed by monetary economics? How did the pathological anatomy lab become involved in a commercial market? And how was it accommodated on the hospital-medical school terrain? This chapter explores market dynamics and financial transactions in detail and addresses the question of money and commercialisation.

The incident described above brings up a number of questions about this laboratory and about laboratory management, notably related to costs, economics and economies; questions that will be addressed and discussed in the course of this chapter. The evolution of medical practice over the twentieth century has been described as "from what was essentially a small-scale cottage industry, based on fee-for-service private-practice physicians, to a large-

[23] Reproduced from: Héran, *L'histoire de la médecine à Strasbourg,* 503.

scale business, typically centered in a medical school-hospital complex, dominated by third-party payment, and characterized by high technology."[24] The transformation of medical practice, finance, and organization with the large outgrowth of medical services, technologies, and industries such as hospitals in the last century has involved what economist Eli Ginzberg has called "the monetarization of medicine,"[25] bringing to the forefront the question of money.

In Strasbourg's hospital-medical school complex identifying what activities, services, and employees were hospital-related and what were medical school-related requires tracing the financial arrangements between the medical school and the hospital. A general history of hospitals will provide background to their changing identity in the early twentieth century: from hospices to highly technological institutions. This will help address the question of who paid for what. That is, by considering how and where the medical school and the hospital in Strasbourg intersected.

The first section of the chapter establishes the wider institutional settings conditioning organisation and financial position of laboratories. First the arena was set by the relations and tensions between medical schools and hospitals. An institutional history of hospitals in France and Germany outlines the hybrid nature of those found in Strasbourg. Taking into consideration the identity of hospitals and their financial resources, the beginning of the twentieth century was the era in which medical technologies and services were implemented in hospital settings. This had repercussions on financial matters.

Clinics and laboratories appeared within hospitals as integrated entities. The second and third sections of the chapter elaborate on the Strasbourg institutions and the financial arrangements in view of a growing medical technology or service: clinical laboratories. The second section addresses the question of what this meant for laboratories in medical school clinics. And the third addresses the question of what it meant for laboratories in medical school science institutes, with a detailed analysis of the *Institut d'Anatomie Pathologique*. In the goal of this chapter, by trying to see who paid for medical services from the onset, the context of the commodification of laboratory examinations will become clearer.

The fourth section draws on the financial transactions of the *Institut d'Anatomie Pathologique* to discuss and characterize what kind of enterprise this was and how histopathology knowledge came to be commercialized. The chapter closes with a discussion

[24] Levitt, "The growth of technology and corporate profit-making in the clinical laboratories," 733.
[25] Eli Ginzberg, "The monetarization of medical care," *The New England Journal of Medicine* 310, no. 18 (1984): 1162-1165.

of the definition of diagnosis services as individual units or acts and correspondingly fees associated with such units.

5.1 From poor relief to medical care: Hospitals and medical schools

The larger institutional context of the pathological anatomy institute is a complex one. To fully grasp the ins and outs, a few historical frameworks need to be outlined. The institute may be considered as one of the central nuclei in the larger contexts of the medical school, the medical school-hospital relations, the hospital, and the general evolution of hospitals in the interwar period. First, the French hospitals and their financing by *Assistance publique* will be outlined. Second, the German model of academic hospitals and *Krankenkassen* will be briefly outlined. Then the Strasbourg situation, in which academic clinics were integrated with the municipal hospital, will be briefly detailed. Contrary to other French hospitals that were hospices at the time, the Strasbourg hospital had a goal of medical care. Further, the organization and administration of the medical school was very different than that of other French medical schools. Prior to 1935, the medical school in Strasbourg ran the teaching clinics and out-patient clinics. The origin of this was the creation of a German medical school with extensive clinics because the hospital had not allowed the German medical professors to use the hospital for teaching.

5.1.1 French hospitals and *Assistance Publique*

The interwar period was a period of change for French hospitals as social structures.[26] There were many developments in social services, including retirement homes, maternity clinics, public pools and baths, sports stadiums, workers' cultural centres and gardens, public housing

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[26] On hospitals in France: Jean Imbert and Michel Mollat, *Histoire des hôpitaux en France* (Toulouse: Privat, 1982); Daniel Hickey, *Local hospitals in Ancient Régime France: Rationalization, resistance, renewal, 1530-1789* (Montreal: McGill-Queen's University Press, 1997); Wickersheimer, *La medecine et les médecins en France à l'epoque de la Renaissance*; Timothy B. Smith, "The social transformation of hospitals and the rise of medical insurance in France, 1914-1943," *The Historical Journal* 41, no. 4 (1998): 1055-1087; Olivier Faure, "Splendeur et misère des petits hôpitaux en France aux XIXe et XXe siècles," in *Accueillir ou soigner?: L'hôpital et ses alternatives du Moyen Age à nos jours*, ed. Yannick Marec (Rouen: Publications des Universités de Rouen et du Havre, 2007), 153-170; Martha L Hildreth, "Doctors and families in France, 1880-1930: The cultural reconstruction of medicine," in *French medical culture in the nineteenth century*, ed. Ann La Berge and Mordechai Feingold (Amsterdam and Atlanta: Rodopi, 1994), 189-209.

complexes, and job placement centres.[27] The number of hospitals grew drastically.[28] Lower class patients visited the public hospital wards, while bourgeois represented private paying patients. In Paris, when sums were perceived by the hospital, they were collected on behalf of the *Assistance Publique*.[29]

In Paris and other French cities, patients who went to hospital out-patients (*policliniques*) were treated gratuitously or paid a fee calculated according to their income. Medical doctors were not generally paid for their hospital work.[30] Rather, it was through a hospital appointment that they gained a reputation that drew well-to-do, and well paying, private patients to their private medical practices.

Hospitals in France were, however, behind general trends in hospitals. Until the 1930s most French hospital regulations were imbued with the idea that hospitals were reserved for the indigent.[31] The concept of a hospital as a diagnosis or treatment centre with technical installations and notorious physicians within which paying patients could be admitted was a new idea that clashed with established institutions of the French interior.[32] Hospitals were poorhouses or charities. They were open and free for those whose income was below the poverty line. Middle and upper classes were treated in their home.[33]

Hospitals in France slowly became part of medical practice. In France, law declared in 1941 and instated in 1943 marked change by judicially opening the hospital to paying patients.[34] These institutions had to equally keep medical records of the patients and regulate hospital fees and honorariums.

Until the twentieth century, charitable donations were the major source of operating budgets for hospitals.[35] Hospitals and healthcare had been organized with charitable and

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[27] Smith, "The social transformation of hospitals and the rise of medical insurance in France, 1914-1943," 1056.
[28] As did the number of private clinics. Ibid., 1075.
[29] Rapport de Henri Boissard. 18 mai 1927. Casier 152A Vol 2. 6-58. AHUS.
[30] Jacalyn Duffin, "Private practice and public research: The patients of RTH Laennec," in *French medical culture in the nineteenth century*, ed. Ann La Berge and Mordechai Feingold (Amsterdam and Atlanta: Rodopi, 1994), 139-140.
[31] However, the medical insurance law of 1928 opened hospitals to wider populations, albeit Inspector Sarraz-Bournet did not seem to recognize or feel that this was important. In 1928, employees with a work contract were attributed social insurance for illness, maternity, invalidity, old age and death.
[32] The Assistance publique, he stated, had but timidly cracked the door of hospitals ajar to paying patients in 1926. Rapport de M Sarraz-Bournet du 8 décembre 1932, p. 2. (56 pages) 103 AL 1064. ADBR
[33] Lindsay Granshaw and Roy Porter, eds., *The hospital in history* (Routledge, 1990), Introduction.
[34] Dècret n° 43-891 du 17 avril 1943 portant règlement d'administration publique pour l'application de la loi du 21 décembre 1941 relative aux hôpitaux et hospices publics; Philippe Vichard, "La loi hospitalière du 21 décembre 1941: origines, conséquences," *Histoire des Sciences Médicales* 41, no. 1 (2007): 61-70.
[35] Faure, "Splendeur et misère des petits hôpitaux en France aux XIXe et XXe siècles," 156.

bequeathed money, religious functions and/or public administration.[36] In turn, the hospital had relatively few operating costs.[37] Medical doctors did not receive a salary from the hospital and the auxiliary personnel were predominantly, if not entirely, religious personnel who were outfitted, board and fed by the hospital.[38] In 1847, Olivier Faure states, over 16% of hospitals in France operated with less than 10 000 FRF.[39]

The *Assistance Publique* in Paris was created with the law of 10 January 1849. It was responsible for sanitation and social assistance for the indigent population of Paris, including hospitals. The shift in French hospitals from *maison de pauvres* to places of medical care was articulated around World War I, which "revealed the necessity of improving operation rooms, labs and clinics."[40] The national public hospital expenses quadrupled between 1902 and 1930. Increased costs were due to transforming them into clean, spacious, and modern establishments with the latest medical technology, and the subsequent opening up of the hospitals to middle-class patients. The growth in number, size and function of hospitals echoes a change in what these medical institutions offered and how they were run: they became financial institutions with growing costs and more complex administration. And while the population remained static, the number of patients treated rose from 775 434 in 1912 to 1 220 000 in 1939; the number of hospital beds from 231 517 in 1912 to 305 000 in 1939.[41] Hospitals became institutions of medical care and of medical technologies, which both defined different financial management systems.[42]

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[36] In 1662, Louis XIV established a *Hôtel-Dieu* and a hospice to receive the poor, old, homeless and orphans in all major cities in France. In 1794, hospitals were nationalised (*le décret du 23 Messidor de l'an II*). In 1796, hospitals were made municipal (*la loi du 16 Vendémiaire de l'an V*) with municipal administration naming an administrative commission consisting of 5 citizens, a president and a secretary. Such administrative commissions ran civil hospitals in France until 1970.
[37] In the USA: Marc A. Rodwin, *Medicine, money, and morals. Physicians' conflicts of interest* (New York and Oxford: Oxford University Press, 1993), 11.
[38] Olivier Faure, *Genèse de l'hôpital moderne. Les Hospices civils de Lyon de 1802 à 1845.* (Lyon: Presses universitaires de Lyon, 1982), Chapître 2; Jacques Tenon, *Mémoires sur les hôpitaux de Paris* (Paris: De l'imprimerie de Ph.-D. Pierres, 1788), Chapître 4.
[39] Precisely, he states that 32% of hospitals had less than 20 beds and over half operated with less than 10 000 French FRF. On the other hand, 8.2% of hospitals assumed 70% of national hospital budget. Faure, "Splendeur et misère des petits hôpitaux en France aux XIXe et XXe siècles," 155.
[40] Smith, "The social transformation of hospitals and the rise of medical insurance in France, 1914-1943," 1059. cites the board of directors of the Paris *Assistance Publique* AAP D-346/2, *Cent ans d'Assistance Publique à Paris* (Paris, 1949), p. xxi.
[41] Ibid., 1076.
[42] Reiser, *Medicine and the reign of technology*; Howell, *Technology in the hospital*.

5.1.2 German academic hospitals and *Krankenkassen*

In Germany, the hospitals received all classes of patients.[43] In 1883, the Health Insurance Act [*Krankenversicherungsgesetz*] was passed by the German Reichstag and came into effect on 1 December 1884. Hospitalization could hereafter be ordered for treatment by German health funds.[44] This was the first national compulsory sickness insurance law.[45] It covered employees from all classes of the population.[46] The range of benefits included the services of general practitioners, specialists and hospital care without restriction on the choice of doctors. The plan was managed administratively by *Krankenkassen* or insurance societies, which were organised by localities (as was the case for Leipzig, for example), by industries, or by large firms. Payments were combined fee for service and levied contributions.

5.1.3 A hospital-medical school complex: *Hôpital civil de Strasbourg & Faculté de Médecine de Strasbourg*

The hospital in Strasbourg is exemplar of the changes that are described in the general evolution of hospitals at the turn of the century.[47] For example, the number of beds rose from 750 in 1870 to 1300 in 1901 to 1977 in 1914.[48] Shortly after World War I, the Strasbourg hospital upgraded rooms, private quarters for the first class patients were created, and automobiles and ambulances were made available for immobile patients.[49] This hospital had become a place that anyone could, and everyone did, go when they were in ill health. The availability of technologies and therapeutic apparatus, as well as the luxury of the first class rooms, was publicized in a 95-page booklet with pictures of the rooms, the machinery (in the kitchen, as well as in therapeutics), and the architecture.[50] The technologies highlighted and illustrated included: ambulance cars, waiting rooms, terrasses for air and sun baths, bathing facilities, operating rooms, private hospital rooms and dining rooms, collective hospital rooms (10-20 beds), thermoluminous baths, volcanic baths, carbo-gas baths, salt baths, sand baths,

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[43] Smith, 1057 cites Edouard Herriot, mayor of Lyon, on the eve of the First World War.
[44] This was however a contentious issue. Hospitals were often of poor quality and patients did not have financial means to be away from their home and job. Sylvelyn Hähner-Rombach, "Hospitalization: A contentious issue for patients and health funds in Baden, 1893-1914," *Medical History* 48 (2004): 329-350.
[45] Nick Bosanquet, "Health economics: Finance, budgeting, and insurance," in *Companion encyclopedia of the history of medicine*, ed. W. F. Bynum and Roy Porter, vol. 2 (London and New York: Routledge, 1993), 1373-1390.
[46] Bonah, "La profession médicale à travers l'histoire."
[47] Joel D Howell, "Hospitals," in *Companion to medicine in the twentieth century*, ed. Roger Cooter and John PIckstone (London and New York: Routledge, 2003), 503-518.
[48] Denis Durand de Bousingen, *Hôpital civil de Strasbourg. Itinéraires historiques,* 15.
[49] *Hospices civils de Strasbourg. Les hôpitaux et cliniques réunis.* (Strasbourg: Ch. Schuler & L. Minck, 1923).
[50] *Ibid., 4.*

hammam, mecanotherapy apparatus, hot air and vapour respiration apparatus, radiodiagnosis, radiotherapy, as well as central heating facilities, steam turbine, hot water pumped through underground tunnels, mechanical bakery, refrigeration compressor, steam laundry, vast steam irons, etc.[51] This booklet echoes a shift in the location of medical care generally perceived in interwar Strasbourg, indicating the establishment of the focus and identity of health care: medical care. This hospital was where large and expensive technologies and apparatus were grouped and this is thereby where patients increasingly went to be treated.

In parallel to this, the cost of a day in the hospital was rising. In Strasbourg, it doubled between 1921 and 1929.

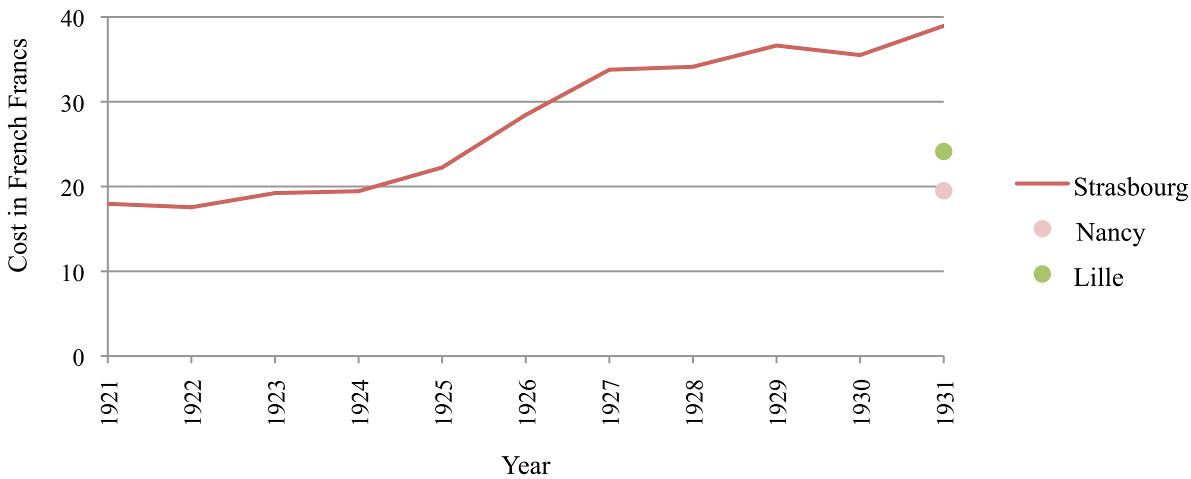

Figure 5.7 Cost per patient day, Strasbourg, 1921 to 1931.

The overall financial development is reflected in the cost per patient per day. The Strasbourg hospital administration figures state that costs nearly doubled over the decade from 1922 to 1931.[52] This transition indicates the financial implication of the new medical care function of the hospital. The above graph shows the rising cost of hospital services in Strasbourg. The patient day is a unit indicating the cost per patient per day (*Prix de revient de journée hospitalier*). The red line traces the rising costs in Strasbourg. For comparison, the

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[51] In contrast, a 1959 31-page publication edited for the *Semaine Nationale des Hopitaux*, concentrates on the financial evolution between 1860 and 1960 and looks to abolish misunderstandings on the financial resources of the hospital, which in fact depended solely on the patient hospital fees (often paid by *Assurance maladie*). The description of the facilities is divided into two categories: medical and social. Photos illustrate the new 2 and 4 bed rooms, as well as radiology and surgical services. The kitchen and laundry set up remains unchanged from that of the 1923 publication. See: *Les Hospices civils de Strasbourg. Aujourd'hui et demain.* Edité par les Hospices Civils de Strasbourg. 1959.

[52] Data provided in: Rapport de M Sarraz-Bournet du 8 décembre 1932, p. 53. (56 pages) 103 AL 1064. ADBR.

pink and green dots are the costs in 1931 in Nancy and Lille.[53] In 1931, the cost of a day in the Strasbourg hospital was twice that in the Nancy hospital and exceeded that of the Lille hospital. In 1932, it was 32 FRF for medical wards and 37 for surgical wards. But although these were excessive in comparison to other French hospitals, the cost of living in Strasbourg was equally very expensive.[54] A 2 FRF cut had been considered by the administrative commission of the hospital, which would have resulted in a loss of 1 million FRF annually.[55]

Strasbourg's infrastructure was different than other hospitals in France, notably as the hospital clinics were inseparable from the medical school. It, however, was not so different than North American hospitals. The *Hôpital de Cliniques* constructed in Montpellier in the 1930s, for example, was described as a hospital "*à l'américain*."[56] This hospital consisted of clinics (ophthalmology, urology, dermatology, otorhinolaryngology, etc.) with rooms for all classes of patients, a radiology department, operating rooms, examining rooms, and labs. It was similar to Strasbourg's hospital, but it was identified as an American model, and not of a Strasbourg or Alsatian model. In fact, the Strasbourg medical institutions had been promoted by the Germans and figured in an exhibit at the Chicago International Exposition in 1893. It served a model for American hospitals and medical schools. And was re-imported to France.

Effectively the origin of Strasbourg's medical clinics during the German annexation is vital to this story. In the interwar period, not only were Strasbourg's hospital finances different than other French hospitals, but also the structure of Strasbourg's medical school was also different than that of other medical schools in France. These were interrelated. In 1927, Henri Bossard, Inspector for the *Ministère des finances*, compared the Strasbourg institutions to those of Paris. He traced the underlying financial arrangement of Strasbourg's hospital-medical school alliance:

> "[In Paris] Hospital buildings (amphitheatres and laboratories included) belonging to *Assistance Publique* are used by medical school clinic directors for teaching students. All the general expenses (water, electricity, gas, heat) are covered entirely by *Assistance Publique* without any contribution from the State. The medical school only sustains costs of pure scientific order (for example, purchase of laboratory apparatus).

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[53] Further study of these hospitals and of other hospitals' costs would be needed to make the comparison complete, but unfortunately this is beyond the scope of this thesis. For example, a potential source for this would be: P. Montel, *Etude sur les prix de journée des établissements hospitaliers* (Avignon, 1935).
[54] Rapport de Monsieur l'Inspecteur Général des Finances, Lébe-Gigun. 10 avril 1933, p. 10. 103 AL 1065. ADBR.
[55] Rapport de Monsieur l'Inspecteur Général des Finances, Lébe-Gigun. 10 avril 1933, p. 10. 103 AL 1065. ADBR.
[56] Smith, p. 1075.

The directors of the clinics work on the same terms as hospital physicians and as such are remunerated by *Assistance Publique* in the same way as the interns.

In Strasbourg, the situation is as follows: The majority of buildings dedicated equally to teaching and to treating patients are State property. Physicians exercising in these buildings are paid by the medical school and do not receive anything from the hospices, the same as interns who are also receive paid from the University budget. The fees paid by patients treated here go exclusively to the Hospices, notwithstanding the Hospices requests from the State – and receives – contributions that not only reimburse general expenses for maintenance of the locations used for teaching (within which laboratories and amphitheatres incidentally occupy a very limited space) but that also corresponds to a portion of the general maintenance expenditure of the clinics, including personnel salaries."[57]

Unlike other French medical schools or hospitals, the Strasbourg institutions were entangled. Little, if anything, has been written on this gnarly situation. To untangle this, let us return to 1872 and to the origin of an alliance, which incidentally, began as the municipal hospital refused to be an affiliate of the German medical school. The source of the difference between Strasbourg's medical institutions and those elsewhere in France is Strasbourg's history: the annexation of Alsace-Lorraine to Germany in 1871 and the creation of a large university and a model medical school in 1872.[58]

Entangled materially

Access to patients was a prerequisite in establishing a German medical faculty in Strasbourg in 1872, as such access was necessary for its teaching and research imperative.[59] The *Hôpital de Strasbourg*, since its founding, had been a local institution, funded privately and managed autonomously. Various agreements had allowed members of the French medical faculty to have clinical wards for teaching and research, but the presence of the professors had barely been tolerated and they had been subservient to the hospital administration. German professors were initially refused access to the hospital. In 1872, an agreement was reached in which they were granted very limited temporary access to wards on the condition that the

[57] Rapport de Henri Boissard. 18 mai 1927. Casier 152A Vol 2. 6-58. AHUS. (My translation.)
[58] An *Ecole de médecine libre* operated in Strasbourg between 1871 and 1872; in 1872 the *Reichuniversität* was inaugurated in Strasbourg and the French *Faculté de médecine* was transferred to Nancy; in 1877, the university became the *Kaiser-Wilhelm-Universität*. See Bonah, *Instruire, guerir, servir. Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXe siècle*.
[59] Bonah, "For patients' well-being or for science?," 6. cites Billroth, 1876, 36-42.

university quickly build separate hospitals for clinical research and teaching.[60] A completely independent university hospital was subsequently built next to the municipal hospital, and to ensure sufficient *Krankenmaterial* or diseased material (i.e., patients) for teaching, it was open to the (rural) residents of Alsace, and not (just) the municipality of Strasbourg (whose poor residents went to the hospital). There was a second category of material needed for research and teaching in the medical faculty, *Leichenmaterial* (cadaveric material). Friedrich von Recklinghausen, as mentioned in Chapter 2, underlined the importance and abundance of *Leichenmaterial* available to him.[61]

Entangled architecturally

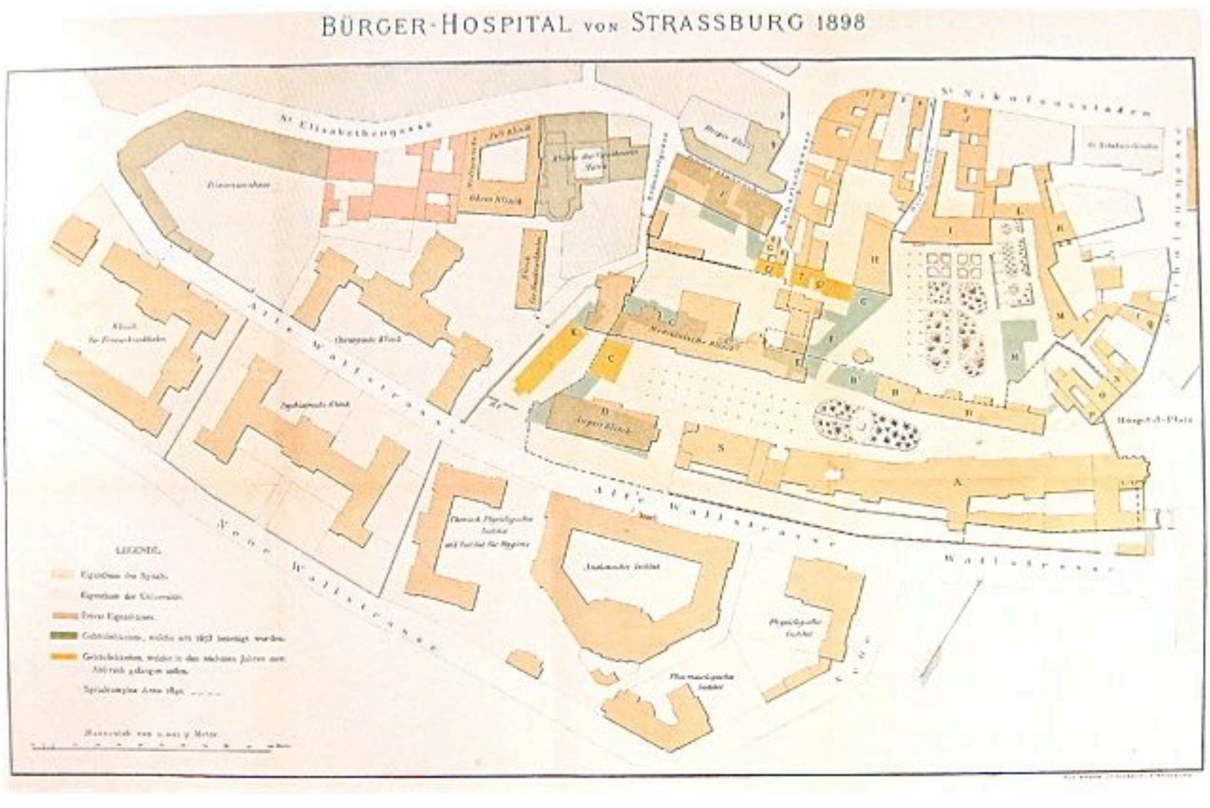

Figure 5.8 The medical school and hospital grounds in 1898.

[60] Ibid., 7-11.
[61] Bonah, “Formation, recherche et pratique médicales en France et en Allemagne pendant la deuxième moitié du XIXeme siècle,” 598; 617.

Figure 5.9 Postcard photograph of Strasbourg's university and medical school in 1885.
A general view of university buildings at the *Porte de l'Hôpital*. Bird's eye view taken from the staircase of the cathedral.[62]

Before the German annexation, Strasbourg's French municipal hospital had principally received indigent patients. In 1886, the first of Strasbourg's new medical school clinics opened.[63] Strasbourg's muncipal hospital [*Hospices civils; Bürgerspital; Hôpital civil*] established in the middle ages, struggled to remain independent, but the authority of the hospital lay in the hands of an administrative council that was made up of university, municipal, and regional representatives, as well as the hospital administrators.[64] From 1872 to

[62] Source: Héran, *L'histoire de la médecine à Strasbourg*, 434. He cites "archives historiques FMS".
[63] These were the gynecology and psychiatry clinics. These were followed by the ophthalmology clinic in 1891, the dermatology clinic in 1887, the medical A clinic in 1901, pediatric clinic in 1910, maternity clinic in 1911, the neurology clinic in 1912, medical B clinic and surgical B clinic with medicinal baths and radiology services in 1914, with the ORL clinic begun in 1913 left unfinished until after the war. Scientific institutes were under construction at the same time: the physiology institute in 1884, the bio-chemistry in 1886, pharmacology in 1887. As well as technical and economical services in 1909.
[64] Note that the Hospices had previously housed services run by the medical school or *services cliniques*, in addition to non-medical school services or *services ordinaires*. In 1821, there were 30 beds used for teaching. In 1855, of a total of 1167 beds: 455 beds in 32 rooms were cared for by nine professors and 218 beds in 10 rooms were cared for by two non-professoral doctors. In 1869, 257 beds were purely hospital and 500 were for teaching. In 1895, the non-university clinics counted 267 of 1509 beds or 17.7%. The university clinics were, however, limited to indigent and non-residents of Strasbourg for patients. Denis Durand de Bousingen and Albert Bronner, "Du Bürgerspital aux Hospices civils de Strasbourg," in *L'Histoire de la médecine à Strasbourg* (Strasbourg: La Nuée Bleue, 1997), 288.; Eric Schwartzentruber and Jacques Héran, "Les 'services alsaciens' de l'Hôpital du Reichsland," in *L'Histoire de la médecine à Strasbourg* (Strasbourg: La Nuée Bleue, 1997), 447. Bonah outlines the contentious situation: Bonah, "For patients' well-being or for science?."

1918, a portion of the *Bürgerspital* was university-run and a portion was non-university with employees who were not medical school personnel.[65] The latter services, located in the oldest buildings of the hospices, were known as *Nicht klinische Abtheilungen*, or non-clinics, meaning non-university clinics by those associated with the medical school and *Elsässische Abtheilungen*, or Alsatian services, by the population.[66] During this period the status of the hospital [*Satzungen für das Bürgerspital*] was that of a municipal institution.

The years immediately following World War I encountered significant reorganization challenges for the Strasbourg municipal hospital and the medical school. Following the return of Alsace-Lorraine to French sovereignty with the Armistice of 11 November 1918, the *Kaiser-Wilhelm-Universität* was abandoned in December 1918 and the *Université de Strasbourg* was inaugurated in November 1919. The *Faculté de Médecine* moved into the German medical school and appropiated the scientific institutes, research laboratories and medical school clinics. Though these were teaching clinics, they treated, for the most part, hospitalized patients. The physicians that treated these hospitalized patients did not receive a salary from the hospital. They were paid by the medical school and had teaching responsibilities.[67] The clinics were divided into three services: third class for (poor) patients not required to pay full fees for their hospitalization or whose costs were covered by *Caisses d'assurances*, while second and first classes were for the professors' private clientele, whom they treated in the clinics and not in private doctors' offices.

The Strasbourg medical school was described, in 1920, as "a series of Institutes that share a mutual contribution to medical research and to health care."[68] The medical school did not echo other French faculties; for example it had a disproportionate number of specialised clinics and general clinics compared to other faculties.[69] Raymond Poincaré, President of

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[65] However, three professors of the previously French medical school took positions here, shunning offers made by the German medical school. Despite these not being teaching clinics, they were visited by local and foreign medical students. Schwartzentruber and Héran, "Les 'services alsaciens' de l'Hôpital du Reichsland," 448.

[66] Auguste Wackenheim and Jacques Héran, "Une institution de prestige, la Faculté de médecine de l'Université d'Empire," in *L'Histoire de la médecine à Strasbourg* (Strasbourg: La Nuée Bleue, 1997), 370-371; Schwartzentruber and Héran, "Les 'services alsaciens' de l'Hôpital du Reichsland."

[67] Interns were also paid by the medical school until 1936, when they became hospital employees. Christian Bonah, "Périphérie et centre. L'internat à Strasbourg et à Paris aux XIXe et XXe siècles," in *Ordre et désordre à l'hôpital. L'internat en médecine (1802-2002)* (Paris: Musée de l'Assistance Publique-Hôpitaux de Paris, 2004), 145-157.

[68] "la Faculté de Médecin se compose en réalité d'une série d'Instituts qui se prêtent un mutuel concours pour la recherche scientifique et les soins à donner aux malades, mais qui jouissent néanmoins d'une certaine autonomie et independence au point de vue de leur gestion et de leur organisation." *Travaux de l'Université de Strasbourg pendant l'année scolaire 1919-1920. Rapports présentés par le conseil de l'université et par MM. les doyens des facultés*, 59.

[69] *Travaux de l'Université de Strasbourg pendant l'année scolaire 1921-1922. Rapports présentés par le conseil de l'université et par MM. les doyens des facultés*, 5.

France, had expressed the view that universities should be allowed room to adapt to regional singularities.[70] In a letter of 30 July 1919, the Director of post-secondary education [*Directeur de l'Enseignement supérieur*] for the Ministry of public instruction, Alfred Coville, expressed a similar sentiment.[71] The dean of the medical school, Georges Weiss, recognised in 1919 that a consequence of keeping German-founded structures was the favourable conditions for the recruitment of "elite" personnel, as they bequeathed an "impulsion" to research to the newly established French medical school.[72]

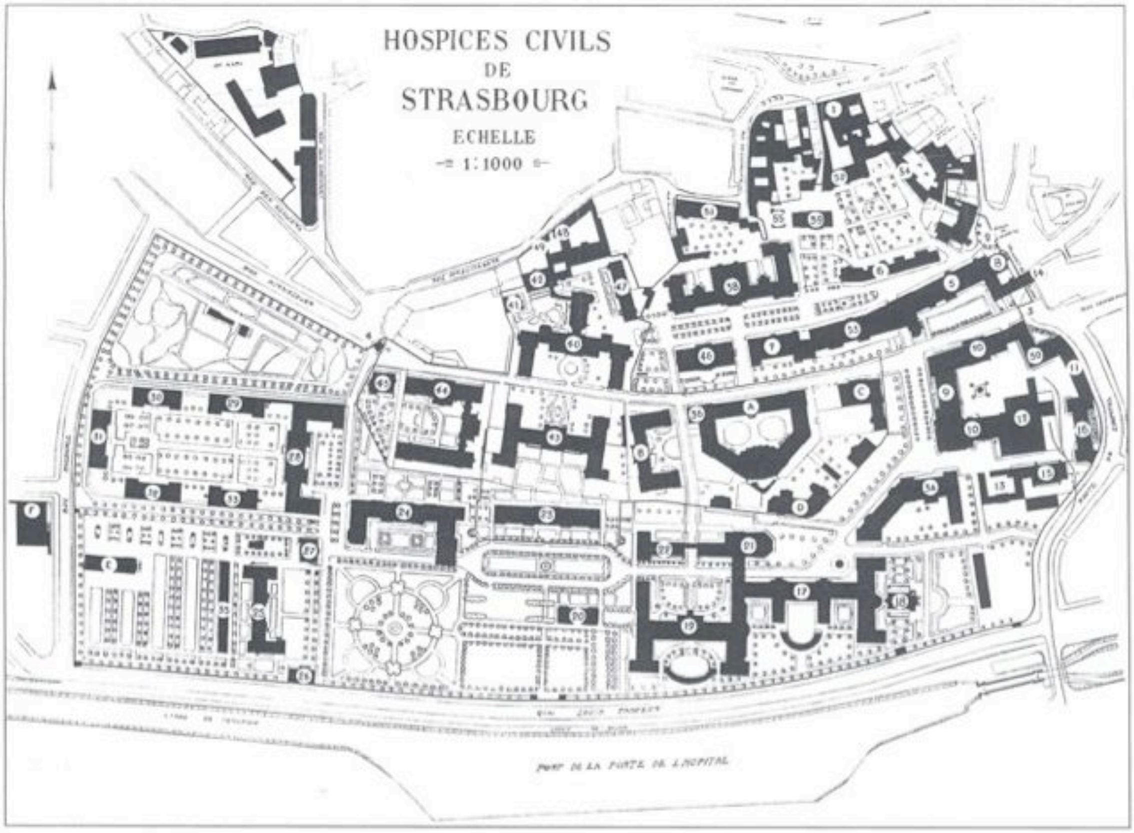

Figure 5.10 Map of hospital and medical school in the early 1920s. [73]

[70] Ibid., 2.
[71] Ibid.
[72] Ibid.
[73] Source: Héran, *L'histoire de la médecine à Strasbourg*, 550 cites "archives historiques FMS."

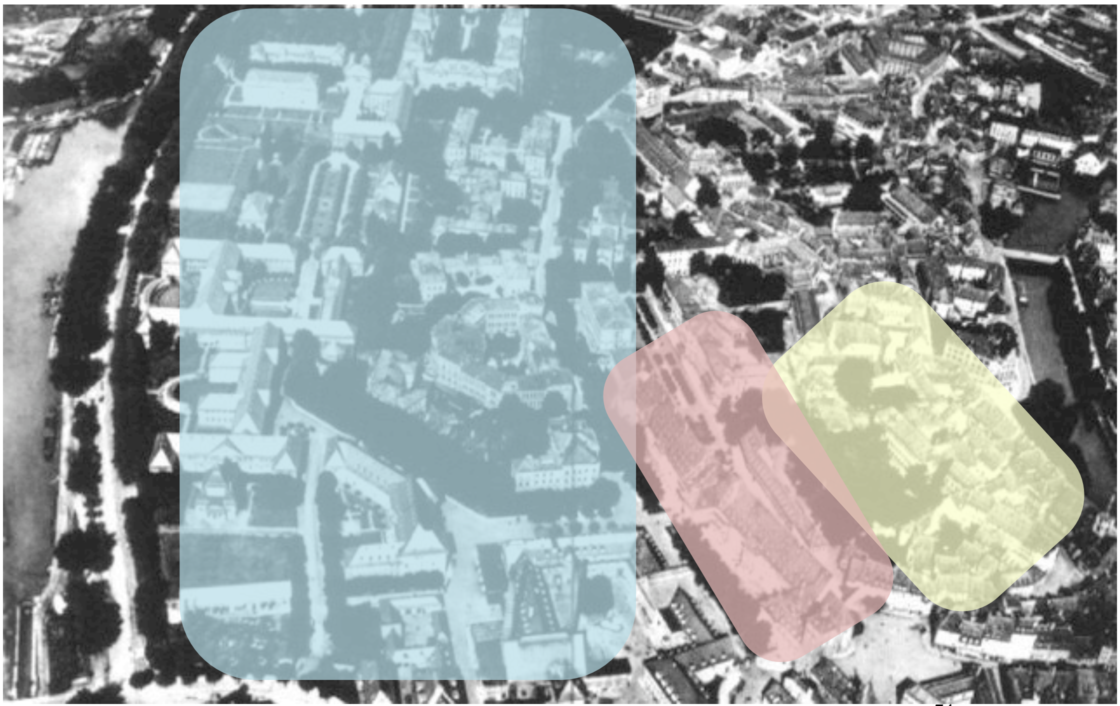

Figure 5.11 Aerial photograph of the hospital and medical school grounds. [74]

The three different coloured areas of the above map indicate three periods of construction of the hospital-medical school complex. The yellow area or that on the far right dates to 1840-1872; the pink area or that in the middle is the hospital and pharmacy dating to 1395-1800; and the blue area or that the far left is the hospital and medical school dating to 1872-1918. The hospital and medical school consisted of numerous buildings side by side without any territorial distinction, as the various maps on the previous pages show.

Physically the medical school and the hospital buildings were not only located on the same land, but they shared the same heating and water system. In 1919, when the hospital and the medical school were confronted with distinguishing their property and medical care terrain, it was one thing to decide who cared for which beds or which wards, however, it was quite another to decide how to divide utility bills. The hospital and medical school were not only entangled materially and architecturally, their physical entanglement lead to a financial entanglement.

[74] Source: Jean-Marie Le Minor, *Les hôpitaux de Strasbourg*, Mémoire en Images (Editions Alan Sutton, 2005), 10 (original source not named).

5.2 Strasbourg medical school clinic labs

5.2.1 Conventions and contentions or Engtangled financially

Despite the hospital being municipal and the medical school state-run the covering of utilities and maintenance costs meant that the two institutions were tied financially from the German annexation. The financial facet of the medical school and hospital hybrid was regulated by a series of agreements signed between the hospital and the medical school. The first was dated to 30 October 1872. It established that professors were under the authority of the hospital. Upon the construction of the first university clinic, the gynecology service, a contract was signed on 30 October 1886. This contract served as model for successive clinics. It defined material and maintenance conditions of the university clinics, labelled *Mehrkostenabrechnung*. This financial settlement of shared services was referred to as an invoice for supplmentary expenses, *Mehrkosten*. The heating, lighting, gas, water, and other maintenance expenditures were paid initially by the hospital and the university debursed their share annually. The division of costs in 1909 is listed below. For each new clinic that opened, a similar agreement was signed. Modifications of the model contract were made for each clinic.

Cliniques **(clinics)**	**Hospices civils share of expenses**	**University share of expenses**
Médicale A	46 064.39 Mks	49 683.20 Mks
Chirurgicale A	31 116.53 Mks	27 184.09 Mks
Psychiatrique	13 234.58 Mks	29 962.72 Mks
Gynécologique	14 600.42 Mks	30 035.43 Mks
Ophtalmologique	5 952.66 Mks	11 597.82 Mks
Otorhinolaryngologique	5 521.73 Mks	5 924.06 Mks
Dermatologique	13 048.84 Mks	5 591.36 Mks
Total	129 539.15 Mks	159 978.68 Mks

Figure 5.12 The division of expenses between university and hospital for each clinic, 1909[75]

The organisation of practical matters, such as who would pay the heating bill for a building used both by the medical school and by the hospital, was not simple or affirmative in the post World War I years. Further, calculation of what was owed between February 1919

[75] Table reproduced from "Mémoire de la Commission Administrative des Hospices civils sur les rapports entre les Hospices civils et le Faculté" p. 5. 2 janvier 1933. Carton: Convention 1935 ULP Faculté. AHUS

and May 1920 brought to light a disproportion in their distribution. In 1920, a committee [*Commission Technique Consultative*] was created by the *Commissaire Général de la République* to pre-define the terms of a convention to replace the *Mehrkosten* and in 1921 this committee set out to liquidate standing debts. The university-hospital accounts were (considered) so impossibly complicated that a contract based on flat rates [*contrat forfaitaire*] was recommended in order to end endless discussions and muddled calculations. The state paid a fixed sum to the hospital for the upkeep of the teaching facilities of the *Faculté de Médecine*, room and board and medical care for employees, as well as water, heat, lights, maintenance of roads and landscaping. That is, the hospital covered employee salaries, heat, light, power, and water for the eight shared services: *Clinique médicale A, Clinique churigicale A, Clinique gynécologique et obstétricale, ancien Clinique de Dermatologie, Clinique opthalmologique, Clinique neurologique, Clinique psychîatrique, and Clinique Oto-rhino-larynologique.* And the university could continue to use the *Clinique médicale B, Clinique churgicale B, nouveau Clinique de Dermatologie, Clinique infantile* for teaching. Excluded from the convention were the maternity and chronic illness services which were uniquely hospital services, while the *Clinique dentaire* was university service and the scientific institutes, *Anatomie normale, Anatomie pathologie, Embryologie, Physique biologique, Hygiène et bactériologie, Physiologie, Physiologie chimique, Pharmacologie*, were university run. In 1920, it was decided that the university would pay 50% of maintenance or 500 000 FRF per year. The university, as all universities in France, was fully financed by the State and this funding came from the Ministry of Public instruction. The convention was signed on 10 January 1922 and validated for 5 years. Additional conventions were signed to include other all other clinics.[76]

However, the situation did not correspond to other schools in France and thereby met with some difficulties, even conflicts, in managing finances. The medical school was funded by the Minister of Public instruction and the Hospital by municipal subventions. The public instruction budget did not usually cover expenses related to clinics or healthcare.[77] There were no teaching clinics at the Paris medical school, for example. In Paris, Lyon, Nancy and other cities, the hospital provided care, organized out-patient consultations, collected hospital and

[76] 1922 Convention. Casier 50/1. AHUS (reproduced in Appendix.)

[77] In Strasbourg resident [*internes*] and non-resident [*externes*] doctors of the hospital were appointed through an entrance exam [*concours*]. The residents received a salary from the medical school and the hospital provided them with food, board, and laundry services. The non-residents did not receive any material payment. Questionnaire de la Direction de l'Instruction Publique d'Alsace et de Lorraine. 16 juin 1933. Dossier: Covention 1935. Documents antérieurs à la Convention du 28 oct 1935. Carton: Decanat. AFMS. Note: In 1933, the residents numbered 41 and the non-residents 59.

consultation fees when there were any [*les prix de journée et les recettes*], provided buildings and hospitalized patients for teaching to the medical school.[78]

Year	University contribution	HCS expenses	Percentage
1909	159 978 Mks	129 539 Mks	54.1 %
1920	500 000 FRF	986 383 FRF	49.3 %
1927	500 000 FRF	2 313 028 FRF	21.6 %
1928	770 000 FRF	3 294 077 FRF	23.4 %
1929	650 000 FRF	2 459 194 FRF	26.4 %
1930	500 000 FRF	2 671 791 FRF	18.7 %
1931	500 000 FRF	2 817 033 FRF	17.7 %
1932	1 088 481 FRF	2 965 279 FRF	36.7 %

Figure 5.13 The division of expenses between university and hospital, 1909-1932[79]

The Strasbourg hospital received lump sums for materials and maintenance. Salarial wages were equally shared by both sides, that is there were both hospital and medical school personnel working side by side, each responsible for hospital or medical school related tasks. In return, services were neither defined as acts nor tarified. To cover their portion of the costs, the *Hospices civils de Strasbourg* received municipal funding and patient fees. In the interwar period, the fees for patients (*malades)* were allocated by the *Caisse Locale Générale de Malades*, as well as, fees for residents (*pensionnaires*) from the *Assistance Publique locale.*

In Strasbourg, out-patient clinics were managed by the medical school from 1919 to 1935. The professors of the medical school could, also, receive patients (1st and 2nd class) that paid with honorariums (*honoraires*) like a private practice. The majority of consultations were assured by the *Caisses d'Assurances sociales.* The indigent patient, uninsured by a *Caisse d'assurances sociales* did not exist and if exceptional cases were presented, they were treated gratuitously.[80] In 1937, for example, paying patients represented 31% of hospitalized patients, patients covered by social insurance 39% and those by public assistance 30%.[81] That is, professors were earning honorariums from about one third of patients and the hospital was being paid fees by social insurance and public assistance for the remainder.

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[78] Medical school professors, senior registrars [*chef de cliniques*], and assistants were equally appointed by the hospital.
[79] Table reproduced from "Mémoire de la Commission Administrative des Hospices civils sur les rapports entre les Hospices civils et le Faculté" p. 8. 2 janvier 1933. Carton: Convention 1935 ULP Faculté. AHUS
[80] Rapport de M. Essig. 6 mai 1926-12 fév 1934, p. 85-93. Dossier: Conventions avec les Hospices: Cessions des Cliniques. 103 AL 1074. ADBR.
[81] Observations concernant les différents constatations faites par M. Delletrez, Inspecteur des Finances, dans son rapport sur la gestion des Hospices Civils de Strasbourg 1950. Cote 465D. ADBR.

The *contrats forfaitaires* were to be renewed on 1 January 1927. Meetings of the *Commission Administrative* and the *Administrative centrale* began in January 1926 and talk centred on the constant difficulties engendered by the set-up. There was a scarcity of funds available to the *Faculté de Médecine*. In addition to lack of funds, complications were attributed to the complicated legal system. In 1926, the dean of the medical school, Georges Weiss, proposed a solution that he described as simple and efficient: the transfer the ownership of all university clinics to the *Hospices civils*. Weiss described the financial situation as "complicated."[82] Weiss, in an attempt to conform to other French systems, requested that the *Faculté de Médecine* be freed of its financial responsibility to the hospital.[83] In 1926, the hospital renounced the 1922 convention and the maintenance bills went unpaid for the following eight years. This was a culmination of the tension between the two distinct, but entangled, institutions.[84]

The administrative discussions of the medical school-hospital interactions centred on the continuously rising costs of running the clinics, rising above and beyond the fixed sum that the university was to pay to the hospital.[85] In 1935, a new contract [*convention hospitalo-universitaire*] established that the *Faculté* would manage the medical science institutes and laboratories while the clinics would belong to the *Hôpital Civil*.[86]

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[82] He highlighted heating costs. For example, the state paid the heat for a number of buildings (*Institut de physiologie, Institut d'anatomie, Institut de pharmacoloie, Institut d'embryologie, Institut de Chimie biologique, Institut d'Hygiène et de Bactériologie, Clinique Médicale A, Clinique Chirurgicale A, Clinique Ophtalmologique, Clinique de Dermatologie ancienne, Clinique psychiatrique, Clinique neurologique, Clinique obstétricale, Clinique d'Oto-rhino-laryngologique, Clinique dentaire*) and the hospital for others (*Clinique Médicale B, Clinique Chirurgicale B, Clinique de Dermatologie nouvelle, Clinique Infantile*). 26 janvier 1926 : lettre de la Faculté de Médecine (Weiss) au président. Casier 152A Vol 1. 23-39. AHUS.

[83] A dispute over who would pay the bills ensued. This was not the only occasion on which the conventions were threatened. In 1963, a new convention was signed; this established a fixed rate for the analyses at the rate of reimbursement by Sécurité Sociale (designated by the letter B). The laboratories continued to be run independently by the Institutes, until 1974, when a new convention was signed. The Hôpital Civil had become the Centre Hôpitalier Régional and would appropriate a percentage of the laboratory profits (i.e., 24.5% in 1985). But as financial difficulties increased, the hospital agreed to reduce their entitlement (i.e., it was reduced to 20% in 1986). This was a delicate matter. The Faculté threatened to renounce the convention. In 1988, a new convention was signed; the hospital would be entitled to 11.6% and the Faculté would create centralised accounting to assure the payments for the analyses. The financial difficulties continued to be a subject of debate and the *laboratoires conventionnés* were assigned hospital status in 2004 and 2005.

[84] A number of Parisian inspectors and mediators came to Strasbourg, the first, deputy finance inspector Henri Bossard, came to Strasbourg from Paris to investigate the situation on the request of the *Président du Conseil de la Faculté de Médecine*. *Rapport de M. Boissard. Sur les conditions de renouvellement du contrat passé le 10 janvier 1922 entre l'Etat et les Hospices de Strasbourg. Paris, le 18 mai 1927.* Ministère des Finances, Service de l'Inspection Générale. Casier 152A II. AAHCS

[85] Rapport de M Sarraz-Bournet du 8 décembre 1932, p. 53. (56 pages) 103 AL 1064. ADBR

[86] In 1935, the government paid 820 000 FRF *per annum* for the running of the *Faculté de Médecine de Strasbourg*. This sum was insufficient to cover all material costs. The income of the *poli-cliniques* and radiology services contributed to paying the bills (for 1934, the total came to around 250 000 FRF). It was suggested that it was the income from radiology and *poli-cliniques* services that contributed to running the medical school

5.2.2 Where do the medical school clinic labs fit in?

Why is this alliance important for tracing and exploring the history of these laboratories? This was an alliance based on historical circumstances. These historical circumstances and administrative documentation are a means of catching sight of laboratories that were hidden, physically and figuratively, in corners and basements. It was also the structure within which, and because of which, the medical school laboratories provided laboratory services to the hospital.

In the Strasbourg hospital and medical school administrative archives, evidence of laboratory services in the medical institutions was not significant, but it was not negligible either. In 1926 some of the medical school clinics prepared a description of their facilities.[87] These descriptions mention two laboratories at the *Clinique Ophtalmologique* for microscopic research; a laboratory for experimental surgery and two other laboratories at the *Clinique Chirurgicale A*; a laboratory in each ward of the *Clinique Médicale A* in addition to a bacteriology lab, a chemistry lab, and a teaching lab; a room for microscopic investigation at the *Clinique Psychiatrique*; a research lab at the *Clinique Gynécologique*; and a large histopathology laboratory at the *Clinique Dermatologique*. These were listed as existing in hospital facilities. The list does not include laboratories for research at the medical school, such as those of the scientific institutes. The question of hospital-medical school property traces a distinction between clinic laboratories as laboratories for patient diagnosis and monitoring and laboratories as scientific laboratories for research.

A letter addressed to Mr. Oster, secretary of the administrative commission of the hospital, reflects that the division of hospital and medical school lab work was not always respected. In this 1924 letter, Professor Delpech questioned what laboratory employees should be doing and, more interestingly, who they were working for.[88] Delpech expressed his concern that a university laboratory employee was spending four hours or more each afternoon performing blood and urine assays for private patients of the medical professors; tasks he claimed were void of scientific interest.[89] Oster explained that the central laboratory

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laboratories, thus attracting a number of excellent professors. Administration centrale ; séance du 12 juillet 1935. Casier 152A Vol III. 156. AHUS.

[87] Clinique opthalmologique, n.d.; Clinique chirurgicale A, 23 février 1926; Clinique médicale A, n.d.; Clinique psychiatrique, n.d.; Clinique gynécologique, n.d.; Ancien clinique dermatologique, 13 avril 1926. Casier 152A Volume 1. AHUS

[88] I have found no trace of who Prof Delpech was.

[89] M. le Prof Delpech à M. Oster, sécretaire général de la Commission Administrative des Hospices civils. 11.11.1924. Dossier : HC – Administrative Centrale; Contrat Forfaitaire Volume III; Université [1924]. AHUS.

of the clinic *Médicale B* employed two lab workers: Becker paid by the university and Schmidt by the hospital. The latter received equivalent to a nurses' salary and was employed to provide services to the hospital, and notably to contribute to the fabrication of insulin with Léon Blum.[90] Oster also mentioned that laboratory services for routine blood and urine tests were usually performed in side rooms of the wards and use of the central lab was purely a question of convenience.[91]

Equivalently, the tasks and responsibilities of lab workers were always not clear cut. There are a variety of examples of employees executing laboratory services for the hospital and for the medical school clinics prior to 1919, some of them were doing more than lab work.[92] Marie Lutz had begun working as a laboratory technician [*laborantine*] as early as 1904 at the *Clinique médicale B*.[93] Emma Ebersold, a nurse began working at the *Ecole départementale d'accouchement du Bas-Rhin* in 1916 and filled a range of activities from nursing to perfoming lab tests for the gynaecology ward.[94] Miss Meisch was hired in 1910 for *Maschinenschreiberin und Photographiekraft* at the *Clinique Infantile*, but worked predominantly as radiologist and laboratory technician, performing deskwork only on occasion.[95] These employees were working under medical professors. The professors interests were three fold: research, teaching, clinical care. Where these three goals and activities were undertaken in shared spaces by the same people, the distinctions were expectedly ambiguous.

The January 1922 convention established between the medical school and the hospital to regulate their relationship did not include any clauses or references to laboratory services

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[90] Léon Blum was extracting insulin from bovine pancreas from 1923. He began this entreprise after a visit to Toronto in October 1922 where he met with Frederik Banting and Charles Herbert Best. The insulin production was artisanal and was conducted in the basement of the *Clinique Médicale B*. He was amongst the first to produce insulin in France, if not the first. The insulin produced was for the Strasbourg clinic, as well as for well-to-do patients around Europe. The scale and motivation of this production would be interesting to pursue further. See: Héran, *L'histoire de la médecine à Strasbourg*, 517; Cassier and Sinding, "'Patenting in the public interest': Administration of insulin patents by the University of Toronto"; Michael Bliss, *The discovery of insulin* (Chicago: University of Chicago Press, 2007). As well as, archival materials from the University of Toronto: Walter Fletcher to J. J. R. Macleod, 19 February 1923. Collection: University of Toronto. Board of Governers. Insulin Committee; Walter Fletcher,"Insulin. Large supplied in Great Britian," *Times* (London), 19 July 1923. Collection: Banting; A. Calmette to the Insulin Committee, 22 October 1923. Collection: University of Toronto. Board of Governers. Insulin Committee; "Miss Collier's recovery" undated newspaper clipping. Collection: Banting.

[91] M. Oster à M. le Prof Delpech. 08.12.1924. Dossier : HC – Administrative Centrale; Contrat Forfaitaire Volume III; Université [1924]. AHUS.

[92] Twohig mentions multi-tasking employees, notably nurses, who were given clerical and laboratory responsibilities. Twohig, *Labour in the laboratory*, 93.

[93] 10 avril 1921. Acta betreffend Spital wart – und Dienstpersonel. Fach 3 n° 3 (1890-1927). Civil-Hospizien Strasbourg. AHUS.

[94] 24 novembre 1923. Acta betreffend Spital wart – und Dienstpersonel. Fach 3 n° 3 (1890-1927). Civil-Hospizien Strasbourg. AHUS.

[95] 27 juillet 1927. Acta betreffend Spital wart – und Dienstpersonel. Fach 3 n° 3 (1890-1927). Civil-Hospizien Strasbourg. AHUS.

(see Appendix for full text of this convention). But this is not to say that the lending of laboratory services by the medical school to the hospital was negligible or non-contentious. The letter cited above indicates this. Again, references to personnel are useful. The 1922 convention personnel list included employee categories that indicate employment of laboratory workers by the hospital: "*Garçon de laboratoire, stérilisateur, infirmier major";* and *"Radiologiste (fém), laboratantines, manipulatrices."*[96] Of this first category there was one employed in the (new) dermatology clinic, one in the psychiatry clinic, one in the (new) dermatology out-patient clinic. Of the latter category there was one employed in the medical clinic A, one in the gynaecology clinic, and one in the (old) dermatology clinic. These 6 employees figured among 204 auxiliary employees, such as nurses (male and female), ward servants (male and female), midwives, seamstresses, cooks, laundresses, concierges, etc. This description of clinical laboratory services and employees in Strasbourg witnesses and locates a clinical laboratory presence.

It was essentially in 1935 that the medical school service laboratories were clearly defined as medical services operating between hospital and medical school. At this time the medical school clinics became hospital clinics. The 1935 convention stipulated that the *Faculté de Médecine* would be responsible for laboratory activity for the hospital: "The university upholds propriety of the Institutes and maintains the laboratories imbricated in the new hospital structure, by strict allocation of the clinic laboratories to the medical school, the laboratory appartus remain property of the medical school."[97] This indicates that the *Faculté de Médecine* was responsible for the lab activity somewhat by default, as they were the proprietors of the lab equipment and laboratory know-how. Then from 1935, lab tests [*analyses et examens de biologie*] performed for hospitalised patients were routine activity of the laboratory.

In 1936, the hospital requested that the laboratories inform them how much they charged, so that laboratory fees could be set "for once and for all."[98] Each of the clinics provided a list and a description of how they charged for their laboratory services.[99] The

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[96] 1922 Convention. Casier 50/1. AHUS. (reproduced in Annex.)
[97] 1935 Convention. Casier 50/1. AHUS. (reproduced in Annex.) (My translation.)
[98] Lettre au MM. les directeurs des cliniques gynécologique, infantile, chirurgie B, chirurgie A, dermatologique, maternité, otorhinolaryngologique, psychiatrique du Directeur des Hospices civils. 6 février 1936. Dossier concernant le tarif des examens des laboratoires. Casier 153F. AHUS. (My translation.)
[99] Prof. Ambard (Cl Médicale A) à M le Directeur, 5 février 1936; Prof. Leriche (Cl Chir A) à M. le Directeur, 10 février 1936; Prof Pfersdorff (Cl Psych) à M. le Directeur, 12 février 1936; (Cl Neuro) à M. le Directeur, 19 février 1936; (Cl Médicale A) à M. le Directeur, 20 février 1936; Prof. Rohmer (Cl Infant) à M. le Directeur, 21 février 1936; Dr. Kuhn (Ecole d'Accouchement) à M. le Directeur, 8 février 1936; Prof. Reeb (Cl

different clinics did not charge the same fees for the same analyses, though a large number were 10 or 20 FRF. There is indication that some of the rates were set by *Caisses* according to what they would reimburse for laboratory work.[100] There were, however, three patient types for which fees differed. First, private patients hospitalized in the clinics were charged rates according to their financial situation. These patients paid the clinic director directly. Second, patients who were covered by the *Caisses*. Third, the third class patients who paid the hospital and were not covered by *Caisses*. It is important to note that not all the clinic laboratories made a distinction between different types of patients. However, not all the clinic laboratories charged for their services. For example, the *Clinique neurologique* considered that lab work was included in the hospital fees.[101] The *Clinique infantile* also did chemical and bacteriological work for free and used reactants, stains, and other material purchased with research funding.[102]

d'Accouchement), le 10 novembre 1936. Dossier concernant le tarif des examens des laboratoires. Casier 153F. AHUS.

[100] Prof. Ambard (Cl Médicale A) à M le Directeur, 5 février 1936. Dossier concernant le tarif des examens des laboratoires. Casier 153F. AHUS.

[101] (Cl Neuro) à M. le Directeur, 19 février 1936. Dossier concernant le tarif des examens des laboratoires. Casier 153F. AHUS.

[102] Prof. Rohmer (Cl Infant) à M. le Directeur, 21 février 1936. Dossier concernant le tarif des examens des laboratoires. Casier 153F. AHUS.

HOSPICES CIVILS DE STRASBOURG

ANNEXE N° 4

Tarif des Examens de Laboratoires

arrêté par la commission administrative dans sa séance du 22 septembre 1936 N° 7, et complété par délibérations du 22 décembre 1936 N° 7 et du 1er juin 1937 N° 11.

Les examens non compris dans ces tarifs sont gratuits.

EXAMENS	Malades hospitalisés de IIIe classe	Malades privés et malades non hospitalisés
Glycémie	gratuit	20,—
Urée	gratuit	20,—
Suc gastrique	gratuit	20,—
Sang	gratuit	30,—
Chlore du sang	10,—	20,—
Réserve alcaline	10,—	20,—
Sérine et globuline du sang	10,—	20,—
Chlore dans le liquide céphalorachidien	10,—	20,—
Sucre du liquide céphalorachidien	20,—	50,—
Bilirubine dans le sang	20,—	50,—
Métabolisme basal	20,—	50,—
Cholestérine dans le sang	20,—	50,—
Electrodiagnostic	20,—	50,—
Electrocardiogramme	30,—	60,—
Résistance globulaire	30,—	60,—
Hyperglycémie provoquée	40,—	80,—
Examen histologique	50,—	100,—
Calcium dans le sang	50,—	100,—
Examen histologique de grossesse	50,—	100,—
Réaction de Aschheim-Zondeck	50,—	100,—
Examen biologique de grossesse	60,—	120,—
Albumine du sérum	60,—	120,—
Graisse du sang	60,—	120,—
Médulligramme	60,—	120,—

Pour tous renseignements s'adresser aux laboratoires des différentes cliniques de l'hôpital civil.

Les analyses faites à l'Institut d'Hygiène et de Bactériologie, au laboratoire de sérologie de la clinique des maladies cutanées ou à d'autres laboratoires hors de l'hôpital, sont à payer directement à ces derniers suivant un tarif spécial.

Als. — 3481

Figure 5.14 Laboratory fees that were paid to the medical school clinic laboratories, 1937.[103]

Following the submissions of the individual fee charts, the administrative commission of the hospital and the directors of the clinics signed an agreed common fee chart that was distributed from September 1936, similar to that shown here.

In June 1937 a global fee of 4 FRF per patient and per day was charged to the *Caisse Local Générale de Malades de Strasbourg-Ville* for accessory services including radiological examinations, laboratory examinations, special medications, medicinal baths, and blood transfusions.[104] This was collected by the hospital and then distributed to the service provider within the medical school complex. There were not enough funds collected in 1937 and the hospital administration asked that these services be reduced for members of this *Caisse*.

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[103] Source: Dossier concernant le tarif des examens des laboratoires. Casier 153F. AHUS.

[104] Le Directeur Général des Hospices civils de Strasbourg à M. le Doyen de la Faculté de Médecine. 25 juin 1937. I.3207. AFMS.

Monetarizing medical services

The agreements initially concerned only the laboratories in the clinics. However, they were not the only service providers in the hospital-medical school complex. One service discussed by the administrative council was radiology. A glance at where radiology stood is further indicative of where other medical services stood: hospitalised patients went to the medical school out-patient clinics for X-rays but as they were hospitalised patients the reimbursement of fees went to the hospital. This was settled via a form of "retrocession." The medical school professor or clinic reimbursed the hospital for the plate, the barium meal, and 35% of the difference between the real cost and the charged fees. For example, in 1928, the plate was billed at 50 FRF but it cost 11 FRF, the professor owed 11 FRF + 35% (50 - 11 FRF) = 24.65 FRF to the hospital and 25.35 FRF was profit.[105]

Seven years later, after the 1935 convention was in effect, the radiology service was described as being composed of five medical school services within five clinics *clinique médicale A, chirurgicale A, médicale B, chirurgicale B,* and *infantile*. The hospital protested that the hospital covered the electricity, personnel, etc. bills up to 180 000 FRF per year without any compensation, despite the radiology services earnings being "substantial enough." They suggested taking over the activity with the argument that it was not a scientific activity. If it was a hospital service, the radiologists would not be paid for services performed for hospitalised patients, but could be paid for external or private patients.[106]

Once earnings were enough to attract attention, administrative council sat up, took notice, and sought to ensure that they were not providing a free locale for a lucrative activity. As long as medical services were not making substantial profits, sideline for-profit services either went unnoticed or were accepted. These were dealt with on an individual level by making arrangements as they went along. There were no guidelines for medical services and procedures were adapted for clinic laboratories and then for radiology service.

[105] Séance de la Commission administrative du 9 mai 1928. Casier 152A volume I. 186-7. AHUS.
[106] Carton « convention 1935 ULP Facultés ». AHUS; 130AL1063 ADBR, p. 18.

5.3 Strasbourg medical school institute labs

There were laboratories in Strasbourg's medical school clinics and they were providing services beyond teaching and research in the interwar period. The laboratory of the *Institut d'Anatomie Pathologique*, a scientific institute of the medical school, was also providing services beyond teaching and research. The agreements between medical school and hospital concerning clinical laboratories did not apply to institute laboratories. There were however, in 1934, two institutes that were providing services and receiving income for this: *Institut d'Anatomie Pathologique* and the *Institut d'Hygiène et de Bactériologie*.[107] The *Institut d'Hygiène et de Bactériologie*, under the direction of the chair of hygiene and bacteriology Amedee Borrel, housed the *Laboratoire Régional de Bactériologie* from 1919.[108] The regional bacteriology service under the *Ministère de l'Hygiène*, was located in the medical school, in which teaching and research activities were under the *Ministère de l'Instruction Publique*. Here lab work involved biology and epidemiology analyses, preventative and prophylactic actions, in addition to bacteriology and serology analyses for the hospital. The crossover of practical and scientific work were touted as complementary services.[109] On hand know-how and intellectual expertise in these two institutes were the root of a supply of laboratory services. In this section, the service activity and the (corresponding) singular financial organisation of the *Institut d'Anatomie Pathologique* are explored.

5.3.1 The financial management of the *Institut d'Anatomie Pathologique*

The *Institut d'Anatomie Pathologique* was part of the *Faculté de Médecine* and, like the other scientific institutes, functioned as a centre for teaching and for research. The finances were managed by the institute director: Pierre Masson, Chair of pathological anatomy from January 1919 to December 1927, Charles Oberling, *Chef de travaux* from January 1927 to September 1928, and Louis Géry Professor from October 1928 to 1953. At the medical school in Strasbourg, the directors of the clinics and the institutes acted simultaneously as directors of medical establishments coordinating and managing work with hospitals and practitioners, heads of research, and bursar, all the while taking care of elementary and mundane tasks within their institution.

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[107] Liste des laboratoires de la Faculté de Médecine avec indication de ceux qui affectuent des examens et des analyses pour le compte des particuliers. 12 June 1934. Dossier: Cour des Comptes. AFMS.
[108] In 1937, this became the *Laboratoire départemental de bactériologie*.
[109] Henri Monteil, "Un conflit à épisodes: l'affaire du Laboratoire régional de bactériologie," in *L'Histoire de la médecine à Strasbourg* (Strasbourg: La Nuée Bleue, 1997), 675.

At this institute, the director also acted as prosector of the *Hospices civils de Strasbourg*.[110] The basis of this agreement dated to the German annexation, and issued from a longer tradition of having medical school anatomists autopsy those deceased in the hospital. The autopsy activity, as a professional service supplied to the hospital, might be considered secondary to teaching and research. The dean of the medical school recognized the professional activity as exceptional for the medical school stating in a 1921 report, "the pathological anatomy service is one of the most important at the medical school, not only from a scientific point of view, but also from a professional point of view, as it [was] responsible for all autopsies at the hospital."[111] The dean later, in 1927, emphasized that "the service was not only materially heavy, but it carried great responsibility due to autopsies and histology examinations that were often necessary to decide on serious surgical intervention."[112]

It might additionally be considered as a source of income. Autospies were performed on a routine basis for those deceased in the hospital in exchange for a fixed annuity. That this service was remunerated meant that there was a regular entrance of money into the institute. The annuity was initially set as cost recovery in 1907 at 1500 Marks for the hospital clinics.[113] From 1919, the annual rate was 1875 FRF.[114] In 1924, while the morgue was being renovated and expanded, Masson requested a raise. Masson estimated that when the sum was set (in

[110] Interrogation de Pierre Masson. 13 mars 1937. Dossier: Cour des Comptes. AFMS. (Masson refers to *Landeshaushalts-Etat für Elsass-Lothringen für das Rechnungsjahr 1918 pages 76/7*).

[111] "Il ne faut pas oublier que le service d'anatomie pathologique est un des plus importants de la Faculté aussi bien au point de vue scientifique qu'au point de vue professionel, car c'est lui qui est chargé de toutes les autopsies de l'Hôpital." Georges Weiss, "Rapport de M. Weiss, Doyen de la Faculté de Médecine, sur la situation et les travaux de la Faculté pendant l'année scolaire 1919-1920," *Rapports Présentés par le Conseil de l'Université et par MM. les Doyens des Facultés* Travaux de l'Université de Strasbourg pendant l'Année Scolaire 1919-1920 (1921).: 61. (My translation.)

[112] Doyen de la Faculté de Médecine à M. le Recteur. 4 juillet 1927. Dossier Professeur Louis Géry. Boîte G2. AFMS. (My translation.)

[113] Professor Hans Chiari, director of the pathology institute (Recklinghausen's successor) from 1906, requested a budget raise and that the hospital administration contribute to it. Until 1907, the institute covered the costs in its usual budget and it was beginning to weigh on them. In 1907, Chiari were estimated material (microscope, microscope accessories, microtome, reagents, disinfectant, gloves, sponges, handtowels, water and ice) at 1500 Marks/year and the salary for an aid at 1080 Marks/year, thereby requesting 2580 Marks for the autopsies and histology examinations performed for the hospital (non-university) clinics. This implies that autopsies of cadavers from university clinics were considered to be part of the institute's responsibility and thereby included in their usual budget. This was granted for 1908. Hans Chiari, 10 Februar 1907. Fach 35. N° 9 Leichendienst Prosecktor. 1899-1928. AHUS.

[114] Before 1919, an autopsy and histology service was in place. This service was performed for the hospital and for the medical school teaching clinics. The hospital paid a fixed sum, 1500Marks, per annum. The costs of the activity for the medical school were included in the institute's budget. After 1919, the autopsy and histology service continued. From 1919, all of the clinics were university owned and run. The hospital paid 1875 FRF for the autopsy activity.

1907) it was three times the actual costs of the autopsy activity.[115] Masson estimated that the prosector merited financial remuneration. In 1923, the actual costs were 2978 FRF. From 1924, the sum paid was raised to 3000 FRF. This income source was just enough to cover material costs and was remitted to the institute. Although it was a source of income, the income did not exceed the expenditure, and thereby was not a profitable enterprise. However, in addition to material costs, at least one person, *préparateur*, was employed by the hospital and at the disposal of the pathological anatomy institute.[116] The prosecture activity was, as underlined in earlier chapters, a source of research and teaching material, i.e. *Leichenmaterial*. This was a non-monetary income in the form of raw material.

It was not exceptional for medical school professors in Strasbourg to have a source of income other than their university salaries. The professeurs and directors of medical school clinics accessed funding from the *Caisses d'Assurances sociales* and recieved paying patients in the same manner as other practitioners in Strasbourg on a *pro-rata* basis. This system gave professors freedom to manage clinic (*policliniques)* revenue. It was further a means to increase a university salary and a selling point for attracting renowned professors to Strasbourg.

Pierre Masson and Louis Géry received financial income for histopathological examination of specimens for private clientele. This income was not unlike that of professors practicing medicine. Whether this income was invested in the institute or whether it was pocketed was for the director to decide. For example, Géry is said to have bought his collection of Hannong faience with his earnings.[117] That this lived on and was passed along a half century after Gery's retirement is perhaps indicative of a certain animosity towards Géry and his management of the laboratory income and indicative of the lab effectively earning a remarkable income. Such management was normal for the period and related to the characters of laboratory directors: some directors were known for being rigorous and giving their assistants a yearly fixed sum; others would dangle a carrot and maybe give a Christmas bonus, making it known that it was out of their pocket.[118]

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[115] It is not stated whether Masson was looking to increase the rate as a recognition of what the pathologist was doing and to pay him for his time. Pierre Masson au Doyen. 17 mars 1924. Fach 35. N° 9 Leichendienst Prosecktor. 1899-1928. AHUS.

[116] Funding provided for an aid in 1908. In function in 1928 and in the early 1950s, M. Schmittbiehl "agent des Hospices mis à disposition en contre-partie aux services rendus en matière d'autopsie". 28 Jan 1954. 18/2 vol 2. 138 AHUS.

[117] Professor JM Vetter in an interview related that he does not know if this is true. Line 175. Entretien Prof Jean-Marie Vetter – 17 mai 2004.

[118] In contrast to Géry, Louis Fruhling altruistically reinvested all earnings in the institute and in research. Line 180-183. Entretien Prof Jean-Marie Vetter – 17 mai 2004; Philippe, "Louis Frühling."

The payment system in place for laboratory examinations was under the discretion of the clinic and institute directors. There was nothing regulating the manner in which the accounts were managed and an informal system - into the pocket and out of the pocket of the director - dominated. Reconstructing how the system functioned is thus rather complicated. Due to a series of inquiries by the *Cour des Comptes* some of these informal practices may be followed. The *Cour des Comptes*, a French institution established in 1807 by Napoleon, which may be considered the equivalent of a National Audit Office, is the jurisdiction assuring a posteriori control of the financial management in the public sector.[119] The jurisdictional and administrative control of the *Cour des Comptes* occurs after the execution of the financial operations; preventive measures being exercised by public officials of the ministry of finance.

Coming from a system with an established norm, French fiscal and education inspectors sent to Strasbourg were confronted with a system located geographically within the same national territory and subject to the same general legislation as the rest of France, but that did not adhere. Financial audits or inquiries, which would have been otherwise unproblematic and prompt, required grappling to trace and understand who paid for what. Incidentally, inspectors, agents and representatives of the *Ministère des Finances* were called upon on numerous occasions between 1920 and 1939. These visits generated eleven lengthy reports and memoires tracing Strasbourg's medical institution organisation.[120]

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[119] Loi du 16 septembre 1807 rélative à l'organisation de la cour des comptes, Bulletin des lois, 4e S., B. 160, n° 2792, ("La Cour sera chargée du jugement des comptes; des recettes du Trésor, des receveurs généraux de département et des régie et administration des contributions indirectes; des dépenses du Trésor, des payeurs généraux, des payeurs d'armées, des divisions militaires, des arrondissements maritimes et des départements; des recettes et dépenses; des fonds et revenus spécialement affectés aux dépenses des départements et des communes, dont les budgets sont arrêtés par l'empereur."); Décret impérial contenant organisation de la cour des comptes, le 28 septembre 1807. Bulletin des Lois n° 2801, p. 148. (The team of (initially 80) référendaires were divided amongst 3 Chambres: "La première Chambre sera chargée du jugement des comptes relatifs aux recettes publiques. La deuxième, du jugement des comptes relatifs aux dépenses publiques. La troisième, de juger les comptes des recettes et dépenses des communes dont les budgets sont arrêtés par nous.")

[120] The reports: 18 mai 1927 Rapport de Henri Boissard, Inspecteur-adjoint. Casier 152A Vol II, 6-58. AHUS (also 103 AL 1066 ADBR); 1928 Rapport de M. Essig sur les conventions avec les Hospices. 103 AL 1074 ADBR; 19 avril 1928 Remarques du M. Weiss, Doyen de la Faculté de Médecine de Strasbourg au sujet du rapport de M. l'Inspecteur des Finances Essig. 103 AL 1074 ADBR; 29 octobre 1929. Historique des rapports entre les Hospices civils de Strasbourg et la Faculté de médecine de Strasbourg. Casier 152A Vol 1, 319-321. AHUS (also Casier 152A Vol III, 177-179); 8 décembre 1932 Rapport de M. Sarraz-Bounet. 103 AL 1064 (also 103 AL 1066; 103 AL 1070; 103 AL 1071). ADBR (also mentionned in Dossier 18/2 vol II. 166. AHUS); 2 janvier 1933. Mémoire de la Commission Administrative des Hospices civils sur les rapports entre les Hospices civils de Strasbourg et la Faculté de médecine de Strasbourg. 103 AL 1063. ADBR; 10 avril 1933. Rapport de M. l'Inspecteur Générale des Finances Lébe-Gigun. 103 AL 1065 ADBR; 16 mai 1933. Recteur d'Academie, Directeur de l'Instruction publique au M. le Doyen de la Faculté de Médecine de Strasbourg.1U N° 1997. AFMS; 28 juillet 1933. Rapport du Doyen de la Faculté de Droit et des Sciences Politiques, Jospeh Duquesne. 103 AL 1067 (also 103 AL 1065) ADBR; 1934 Rapport/Dossier du Conseiller référendaire à la cour des comptes, M Baudouin. AFMS; 1937 Rapport/Dossier du Conseillier référendaire à la cour des comptes, M.

The *Cour des Comptes* inspectors [*conseillers référendaires*], Baudouin and Rives, like a number of others before them, were confronted with a system that did not fit into French institutional categories.[121] Before they could make recommendations or allegations, they sought to understand how this system compared or fit with what they knew in Paris and other French medical schools. Once the differences were understood, then they set about understanding the local administrative practices.

The inquiry into the pathological anatomy institute followed studies of the hospital-medical school financial difficulties and unpaid debts in the years preceding the 1935 convention. It was perceived that some medical school institutes were being paid for services, which was permitted, but that they were managing their income with private bank accounts, which was not permitted.

In July 1933, the directors of the medical school clinics had provided written confirmation that they would close their bank accounts and dispatch their revenue through university accounts; thereby engaging to make all income traceable. Anatomopathology and the other medical science institutions were not listed amongst those responding to the dean's inquiry.[122]

Masson's manner of proceeding, depositing income into a private bank account, he claimed was that instructed by the dean of the medical school, Georges Weiss, on the basis of what was usual in the pre-war period when the autopsy service was accessory to the professorship.[123] Further, not expecting to have to justify the laboratory accounts, Masson did not keep any accounting documents.[124] Apparently, in 1924 a legislative regulation required that all medical school laboratory incomes be deposited and managed by a university account named *compte des particuliers*. The title of the account indicated that the funds paid into it

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Rives. AFMS. In addition to: 1949 rapport de M. J. Callot, Doyen. AFMS; 1952 rapport du Ministère des Finances. AFMS.

[121] Their titles were *Conseiller Référendaire à la Cour des Comptes*. A short aside to define the Cour des comptes: The *Cour des comptes*, a French institution established in 1807 by Napoleon, which may be considered the equivalent of a National Audit Office, is the jurisdiction assuring an *a posteriori* control of the financial management in the public sector. The jurisdictional and administrative control of the *Cour des comptes* occurs after the execution of the financial operations; preventive measures being exercised by public officials of the ministry of Finance. Loi du 16 septembre 1807 relative a l'organisation de la cour des comptes, Bulletin des lois, 4e S., B. 160, n° 2792; Décret impérial contenant organisation de la cour des comptes, le 28 septembre 1807. Bulletin des Lois n° 2801, p. 148.

[122] Those that responded included: Sorrel (Chir A), Reeb (Gyn), Stoltz (Chir B), Pautrier (Maladies cutanées), Canuyt (ORL), Ambard (Méd B), Rohmer (Infantile), Pfersdorff (Psych). AFMS

[123] Rapport de l'arrêt du 12 mars 1937 de la Cour des comptes, Troisième Chambre, signé par Pierre Masson le 22 décembre 1937, page 1 et page 2. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

[124] Rapport de l'arrêt du 12 mars 1937 de la Cour des comptes, Troisième Chambre, signé par Pierre Masson le 22 décembre 1937, page 2. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

were not from public or university sources, but from external sources or individuals. Apparently the government regulation was not followed until the 1930s when the *Cour des Comptes* filed an inquiry into the matter. This is the only trace of the 1924 legislative and regulatory clauses in the archival records.[125] When Oberling was acting director, he followed Masson's example, as well as Weiss' instructions.[126] Oberling declared: "Not having been informed of the new legislative measures and regulations instituted in universities in Alsace in 1924, I believed I was managing the accounts of the *Institut d'Anatomie Pathologique* properly by doing as I had seen my mentor, Professor Masson, do."[127] Whether or not this official directive was publicized and thus known has been impossible to determine. Géry did not indicate if he knew about this particular 1924 legislation. He held a private bank account for the laboratory income, as had Masson. Géry transferred the funds from it to the *compte des particuliers* in July 1934, which incidentally already contained income from the anatomopathology laboratory.[128] In the inquiry made by the *Cour des Comptes* in 1937, the dean of the medical faculty, André Forster, reported that there had been a meeting in 1919, at which financial operations of the laboratories were set. Unfortunately, there is no trace or minutes of this assembly. At this time, the *Ministère de l'Instruction publique* claimed to not have authorized an entirely autonomous management of the laboratories and had suggested that revenue continue to be attributed to the *compte de particuliers* as it had under the German regime.[129]

Before this inquiry, income was sent directly to the laboratory and the director deposited it into the bank account or placed it in a cashbox in his office. The instauration of a *compte des particuliers* at the medical school, inserted a detour in the transmission of the funds, but also introduced their traceability. That is, previously money passing in and out of the laboratories had been invisible.[130] With the 1935 convention, the clinics became property of the hospital, while the laboratories remained property of the medical school. From July

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[125] Rapport de l'arrêt du 12 mars 1937 de la Cour des comptes, Troisième Chambre, signé par Charles Oberling le 8 novembre 1937, page 1. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

[126] Rapport de l'arrêt du 12 mars 1937 de la Cour des comptes, Troisième Chambre, signé par Charles Oberling le 8 novembre 1937, page 1. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

[127] Interrogation de Charles Oberling. 13 mars 1937. Dossier: Cour des Comptes. AFMS. (My translation.)

[128] Rapport de l'arrêt du 12 mars 1937 de la Cour des comptes, Troisième Chambre, signé par Louis Géry le 8 juillet 1937, page 1. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

[129] Rapport concernant le laboratoire d'Anatomie Pathologique FMS. AFMS.

[130] The first regulation implemented from 1930 concerned the clinics and out-patient clinics, with receipt books kept and managed by the medical school. This did not concern the scientific institutes.

1935, all income generated by these laboratories had to go through the medical school accounts via the *compte des particuliers*.[131] A list of laboratory examinations and their prices were established for the laboratories located in the clinics. The science institutes did not figure in this list.

All clinics, out-patient services and institutes had financial freedom, albeit with salaries, maintenance and upkeep paid by the university, that is by the state via the minister of public instruction. Within their clinics, medical school professors could receive and treat private paying patients. By analogy, medical school professors could provide laboratory services to private paying clientele. When the lab technician Rohfritsch mentioned in the introduction esteemed being deprived of the bonus pay he was accustomed to, he complained to and sought mediation from the dean of the medical school his employer, as well as, Géry's superior in the medical school hierarchy. Albeit, the dean did not have clout on such a financial issue. The name of the account in which private or individual incomes were received was *compte des particuliers*, the name indicates that this was money for individuals. These were the profits of institute and clinic directors who had taken the initiative to propose laboratory services and had encountered demand for their services. This was the case for the *Institut d'Anatomie Pathologique,* for which the demand for histopathology examinations was described in the previous chapter.

There were two systems of financial management involved here. In the first, hospital exchanges with the medical school had not been individualized as acts, but as costs covered by a lump sum [*forfait*] intended to cover expenses of material and personnel that were shared between the two institutions. In the second, beyond research and teaching and beyond medical care, a laboratory could supply services to private paying patients and their doctors. They created and entered a private medical market with monetarized and codified expenses, prices, and exchanges. The production of knowledge and know-how had been paid for through university budgets as integral to the research and teaching mandate. Development, distribution and provision of the service was further initiated and financed through hospital connections. The incoming funds only had to cover immediate expenses, the remainder was profit.

[131] Procès verbale conseil de la Faculté de Médecine le 4 juilllet 1935, AFMS.

5.3.2 The financial accountability of the *Institut d'Anatomie Pathologique*[132]

The year 1935 was a turning point in financial management of the pathological anatomy institute. It was the year they were called upon to justify their financial situation. It was equally the year of the new convention regulating the medical school and hospital relations and finances. In the years leading up to the convention, the financial difficulties that the medical school was facing led to local and national accounting agents taking interest in where money was coming in and going out of the medical school. The *policliniques* calculated and deposited 25% net of their receipts to the medical school each month.[133] But not all *policliniques* had patient income and some requested financial subvention to pay their (clinical) laboratory staff.[134] Facing financial crisis, the medical school tried to clarify what activities and expenses were directly related to the research and teaching mandate, and what could be identified as external or annex. A distinction was made between clinical laboratory services for patient diagnosis or monitoring and research laboratory activities for scientific research.[135] The pathological anatomy, as a scientific institute and a scientific laboratory, slipped through the crack and its service activity was not immediately perceived.

The directors gouverned the institute, its activities, employees and finances.[136] Any revenue generated by the institute and its laboratory went directly to the institute for labour (in addition what was paid by the university or hospital), materials, instrumentation, books, etc.[137] The fully autonomous status ceased with the 1935 legislation prohibiting personal and individual bank accounts within the university, requiring all money to be centralized through the university accountant [*agent comptable*]. Afterwards, the money flowed through the hands

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[132] Accountability refers here to the idea that the institute directors were held accountable for the activity and finances they produced.

[133] *Policlinique* patients were issued paper receipts [*des carnets de souches*] and all payments were centralized. I believe this was a system where after the nurse or sister had approved the administrative registration of a patient to be examined at a policlinique would give them a *ticket sorti d'un carnet à souches.* Le Doyen Ancel. le 1 juillet 1930. DEC. Cum & Opérations, Régie & Gestion fin des Laboratoires d'Instituts et de Cliniques. AFMS.

[134] « M l'Adjoint Meyer : Les professeurs nous disent qu'ils doivent payer les laborantines. Il y a quatre policliniques qui ne perçoivent rien des caisses de malades. » Séance de la Commission administrative du 9 mai 1928. Casier 152A vol I. 189. AHUS.

[135] "*Les Hospices civils demandent que tous les services d'électrothérapie et laboratoires particuliers exigeant dans les services le paiement de taxes de la part des malades hospitalisés, soient gérés d'après la règle suivie dans tous les hôpitaux par eux, sauf lorsque ces laboratoires sont destinés principalement à des buts d'ordre scientfiques. En contre-partie les Hospices civils assumeront tout les dépenses nécessitées pour le fonctionnement de ces services d'électrothérapie et de ces laboratoires.*" p. 319. "Mémoire de la Commission Administrative des Hospices Civils sur les rapports entre les Hospices Civils et la Faculté de Médecine" 2 janvier 1933. Carton: Convention 1935 ULP Faculté. AHUS

[136] Jean-Marie Vetter called it a "gestion personelle" and contrasted with a "gestion paternalist" that took over in the 1960s following the Debre reform. Line 12-19. Entretien Prof Jean-Marie Vetter – 17 mai 2004.

[137] Oral history reveals that in the 1950s and onward, there were numerous laboratory employees paid directly by the institutes' directors, known as the *hors-statuts.* Entretien Prof Jean-Marie Vetter – 17 mai 2004.

of the university to be returned to the institutes and their directors in the form of credit; the directors then used the credit as they deemed necessary and continued to manage their institutes unrestrained.

Cour des Comptes take an interest

In July 1934, the accounting agent of the university [*Le Receveur des Droits universitaires*] confirmed that the acting director of the *Institut d'Anatomie Pathologique,* Louis Géry had deposited the funds on hand and the funds in the Institute's bank account into the university account, a total sum of 19 641.40 FRF.[138] What is interesting about this deposit is that it followed an "extremely urgent" request by Mr. Raillard, the paymaster general of the Bas-Rhin for a copy of the bank statements for the period from 1 January 1930 to 31 May 1934 for the *Anatomie Pathologique* laboratory.[139] The request was made, along with the request for bank statements for the *Clinique Dentaire* and the *Institut d'Hygiène et de Bactériologie* laboratory, and a list of other medical school laboratories that provided lab examinations and analyses for the *compte des particuliers* on behalf of Inspecteur Baudouin. He required them to complete his *Cour des Comptes* inquest.

In 1934, four laboratories at the medical school were earning income from lab work and were not depositing it in the *compte des particuliers*.[140] Two of these were public institutes, the serology lab was a public health lab and the bacteriology lab was a *départemental* lab. The other two were medical school labs that were accumulating service activity on top of their regular activities: the *Clinique Médicale A* and the *Institut d'Anatomie*

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[138] Confirmation sent to the *Trésorier Payeur Général*. Definition: Dans chaque département, le Trésorier-Payeur Général est le seul comptable principal de l'État - c'est-à-dire rendant un compte de gestion à la Cour des Comptes, après avoir intégré dans ses écritures celles d'un grand nombre d'autres comptables publics; il est chargé de percevoir ou de centraliser les impôts directs (recouvrés par les « percepteurs » - et un grand nombre de produits non fiscaux de l'État, et de suivre le contentieux de leur recouvrement. Il contrôle la mise en paiement des dépenses de l'État et pourvoit au règlement des créanciers. Il est le comptable du département considéré comme collectivité territoriale. Le Trésorier-Payeur Général assiste en outre la Cour des Comptes dans sa vérification des comptes des collectivités locales, et il joue aujourd'hui un rôle important de conseiller financier du Préfet de Région en matière d'économie et d'investissements régionaux. Il a gardé de ses origines historiques le droit de tenir des comptes de dépôts de fonds comparables à des comptes bancaires (« comptes de fonds particuliers »). Source : www.granddictionnaire.com

[139] M. le Trésorier Payeur Général à M. le Receveur des Droits Universitaires le 12 juin 1934. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

[140] Liste des laboratoires de la Faculté de Médecine avec indication de ceux effectuent des examens et des analyses pour le compte des particuliers. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS. Note: two of these were further public institutes, the serology lab under Public Health and the bacteriology lab being a county lab.

Pathologique. Baudouin then insisted that these latter two institutions close their individual bank accounts and put all funds in the medical school bank account.[141]

Eighteen months later, the *Cour des Comptes* issued an injunction requiring the directors of the *Institut d'Anatomie Pathologique* between 1924 to 1934, (1) to pay in any outstanding balance to the university paymaster; (2) to produce documents justifying the expenses and incomes of the laboratory; (3) to justify thte approval of their budgets.[142]

The accounts for 1924 to 1926 were provided by Pierre Masson, who held the chair of Pathological Anatomy and had been the director of the *Institut*. Masson moved to Montreal in 1927. For the period from 1 January 1927 to 30 September 1928, the *Institut* was under the direction of Charles Oberling. Oberling had been *chef de travaux*. Louis Géry was the second to Masson, but took a position in Paraguay in 1927 and 1928. So Oberling took the reins while Masson and Géry were absent. Géry returned in October 1928 and he provided the remaining financial details. In 1928, Géry, who had been *chef de service* under Masson, was promoted to professor and took on the direction of the Institute.

About the account records

The "financial reports" presented of the *Cour des Comptes* inquiry were in fact much less complete or exact than usual or official financial reports.[143] Before looking into these reports, it should be mentioned that there are a number of potential inconsistencies between the information provided by the three pathologists. The income and the expenses are indicative of a changing activity within the laboratory; a change due, in part, to the changing directors. However, there is no trace of official record keeping system on a higher administrative level, i.e. within the medical school.[144] The chair of each institute was the director who managed all administrative tasks.

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[141] M. Baudouin à M. le Trésorier Payeur Général le 3 juillet 1934. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

[142] Arrêt du 12 mars 1937. 3e Chambre de la Cour des comptes. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

[143] Typically a published financial report contains: Operating and financial review; Directors' report; Balance sheet; Income statement; Statement of changes in equity; Notes to the financial statements; Cash flow statement; Auditors' report. In fact, the *Institut d'Anatomie Pathologique*, especially in the interwar period, was not a company and therefore it is not surprising that its financial reporting was non-existent. Alan Griffiths and Stuart Wall, *Applied economics* (Harlow: Financial Times Prentice Hall, 2007), 32. They speak here of financial reports required in the UK and used to provide information to investors and other stakeholders (e.g. suppliers) to make informed decisions about their financial relationship with the company.

[144] There is one document that mentions a *Régistre de comptabilité des examens privés* for April 1932 to November 1935. It indicates that the registers were up to 50 pages long each year. I have not other trace of these registers. I do not know if they were internal to the pathological institute or to the medical school. Source:

Masson, Oberling and Géry all state that they could not provide receipts to justify their account records: Masson stated "Unfortunately, after such a long period, I have not found the documents in full, and I apologize to the *Cour* to not be able to justify the earnings and expenses that appear in my accounts."[145];

Oberling stated: "Given that the period for which accounts have been requested dates to ten years ago, I have encountered great difficulties in furnishing receipts. While some details escape my memory, for others, supplies paid for directly or amounts received for the sale of collections, it has been impossible to obtain legally recognized documents, either because the supplier cannot be found or because the bills have not been kept."[146];

Géry stated: "Sums were most frequently received or paid directly [*main à la main*]; I have kept all the bills that I obtained."[147]

These explanations (or excuses) elucidate the status of this financial information. The manner in which the accounts were managed reflects that this account was exclusive to the *Institut d'Anatomie Pathologique.* The one slim mention of accounting registers in the file indicates that the details provided are not the full accounts of the institute, but are extracts.[148] The institute's income was not overseen or influenced in any way by the medical faculty or the university before 1935. The obligation to present documents to the *Cour des Comptes*, an entity that existed to audit public finances *a posteriori*, might raise the question of the scale of this service activity such that it warranted an audit from a government agency. However, it seems that this was not a question of scale but of following regulations.

In 1934, Mr Boudouin, counselor of the *Cour des Comptes* instructed the pathological anatomy laboratory to close its two personal accounts.[149] Subsequently, the *Institut d'Anatomie Pathologique* laboratory service payments were directed through the *compte de particuliers*.[150] The *Cour des Comptes* stressed the use of this account as the only means of

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Relevé du registre de comptabilité des examens privés. 1932-1935. 27 Mai 1938. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

[145] Arret du 12 mars 1937 par le Cour des Comptes sur les gestions de 1927 à 1934, à l'égard des conditions dans lequelles le Professeur P. MASSON a géré le Laboratoire d'Anatomie Pathologique de la Faculté de Strasbourg. AFMS. (My translation.)

[146] Arret du 12 mars 1937 par le Cour des Comptes sur les gestions de 1927 à 1934, à l'égard des conditions dans lequelles le Professeur OBERLING a géré ce laboratoire. AFMS.

[147] Arret du 12 mars 1937 par le Cour des Comptes sur les gestions de 1927 à 1934, à l'égard des conditions dans lequelles le Professeur L. GERY a géré ce laboratoire. AFMS.

[148] Relevé du registre de comptabilité des examens privés. 1932-1935. 27 Mai 1938. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

[149] M. Baudouin, Conseiller Référendaire à la Cour des Comptes à M. le Trésorier Payeur Générale du Bas-Rhin, 3.07.1934. AFMS; M. le Doyen à M. le Professeur Géry, 25.07.1934. AFMS

[150] Conseil de la Faculté de Médecine de Strasbourg. Point IX de l'ordre du jour : Déliberation au sujet de la comptabilité des laboratoires faisant des examens pour le compte de particuliers. 7.11.1935. AFMS

legally receiving revenue for laboratory (and other medical school) services. That the laboratory forewent this route and managed their earnings privately resulted in their being subject to *Cour des Comptes* investigation.

The account details submitted to the *Cour des Comptes* told the financial inspectors how much money the institute had in its accounts and justified that it was accounted for. The inspectors wanted justification of the individual financial management [*la gestion particulière*] of the pathological anatomy laboratory.[151] The account details stated that they had sources of income and that they had expenses. The account details they filed did not mention any contribution from the medical school toward material expenses. These were the financial transactions that concerned the activity the institute conducted with individuals [*particuliers*] outside the medical school.

The transactions concerned the "*fonds particuliers de l'Institut d'Anatomie Pathologique à administrer sous la gérance de son Directeur*."[152] The director may have considered any income for private work to be his own personal earnings. The numbers presented in this report are those supplied retrospectively and it is possible that, for example, what Géry recorded as private lab examinations, Masson did not keep record. Although the remunerated laboratory service was not exactly the same as the honorariums received by medical doctors for medical consultations, the idea of the supplement to the university salary is comparable.

The records: Income

These records provide account details for the years from 1924 and 1934. Prior to this, until the 1920s, the only known income source of the *Institut* was the autopsy activity performed for the *Hospices civils*, which in principle was not profit but cost recovery.[153] Between 1924 and 1934, the laboratory received income for the prosecture service.[154] For the prosecture activity, the *Institut d'Anatomie Pathologique* received 4 yearly payments of 750 FRF from the

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[151] M. le Doyen, 8.07.1938. Dossier: Enquête faite par Rives. DEC. Cour des comptes. Rives. AFMS.
[152] "capital specific to the *Institut d'Anatomie Pathologique* to be managed by the director of the Institut." Arret du 12 mars 1937 par le Cour des Comptes sur les gestions de 1927 à 1934, à l'égard des conditions dans lequelles le Professeur P. MASSON a géré le Laboratoire d'Anatomie Pathologique de la Faculté de Strasbourg. AFMS.
[153] This is the only known income source to my knowledge and according to secondary sources. I did not, however, delve into the archives concerning the German pathology institute. The prosecture activity, however, from 1907 involved autopsy and histology examinations. I found trace of histopathology examinations in the last stages of writing up this dissertation (May 2011). This is something that requires further study of German archival sources.
[154] Comptes: 1924, 1925, 1926, 1927/8, 1929, 1930, 1931, 1932, 1933, 1934. Dossier: Cour des Comptes. AFMS.

hospital, that is 3000 FRF annually. This represented between 70 percent of the institute's income in 1924, but only 5 percent in 1934. The institute's income sources expanded much beyond the prosecture service in this ten year period.

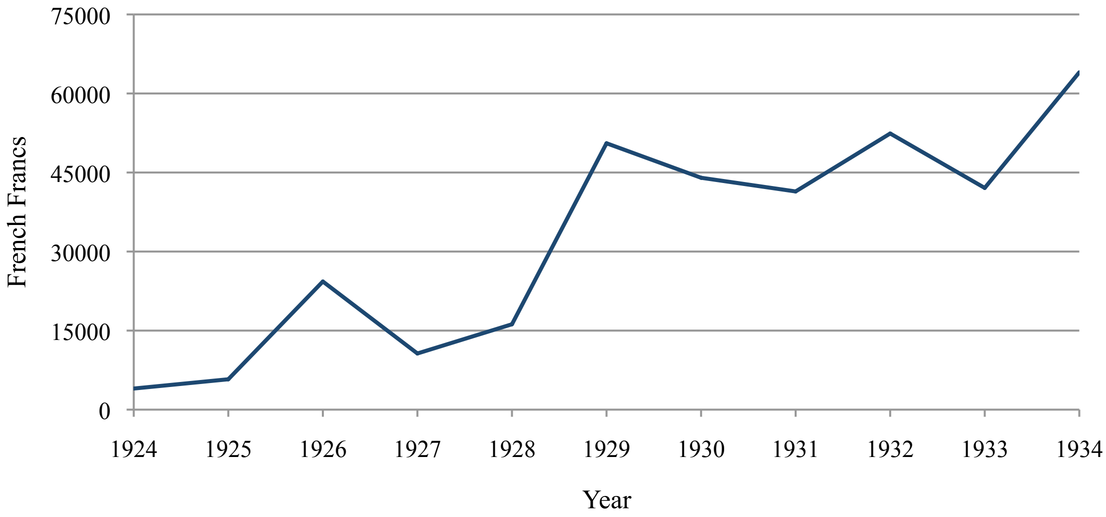

Figure 5.15 Gross income. *Institut d'Anatomie Pathologique (compte des particuliers)*, 1924-1934. The income for each year.

The rise in the gross income, depicted above, is a substantial sixteenfold increase. Something was obviously being exchanged for a significant monetary value. This, however, is put into perspective if the net income is considered. To calculate the net income, the expenses were subtracted from the income.

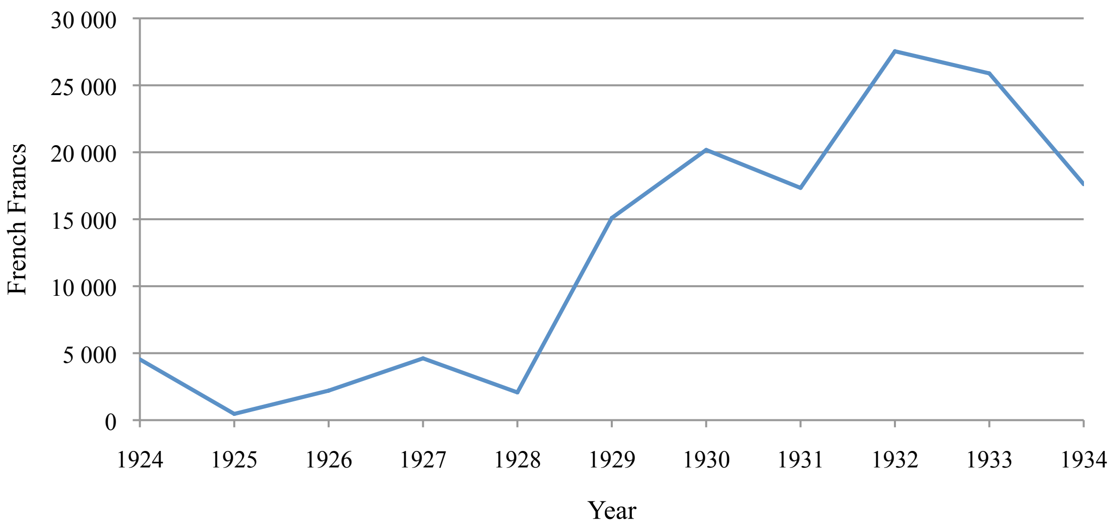

Figure 5.16 Net income. *Institut d'Anatomie Pathologique (compte des particuliers)*, 1923-1934. The expenses subtracted from the gross income. This was amount in the account on 31 December of each year.

The sixteen-fold increase was from a gross income of 4004.64 FRF in 1924 to 64 016.43 FRF in 1934. However, the net income increase fluctuated between a low of 466.03 FRF in 1925 to a high of 27 540.50 FRF in 1932. This first brief consideration of income impels two questions: First, 64 000 FRF seems to be a lot of money for a university laboratory to be making, where did this income come from? Second, between 1929 and 1934, the net income was half of the gross income, where was the income going? To answer these questions, the different income sources and expenses have been divided into categories. Breaking down the sources of income and the major expenses illustrates what was happening in the *Institut*.

First, where was the money coming from? There were five distinct income sources:

1) Histopathology examinations for private clients [*Examens privés*]
2) Prosecture service for HCS [*Hôpital Civil pour prosecture*]
3) Histopathology diagnosis and monitoring for CAC [*Centre anti-cancéreux*]
4) Histopathology slides [*Vente de coupe histopathologique*]
5) Bank interests [*Intérêts*]

These income sources were very clearly labelled, with the exact terms used in the records indicated here in brackets. The categorization was straightforward. There are equally a few entries in the account records that were not identifiable or that did not fit into any of these categories, and as such, appear in a sixth category, 6) Other. For example, this includes a subvention for publications in 1926 of 1000 FRF and in 1933, an entry titled "*Remise*" for 800 FRF.[155]

[155] I could not find what this was referring to.

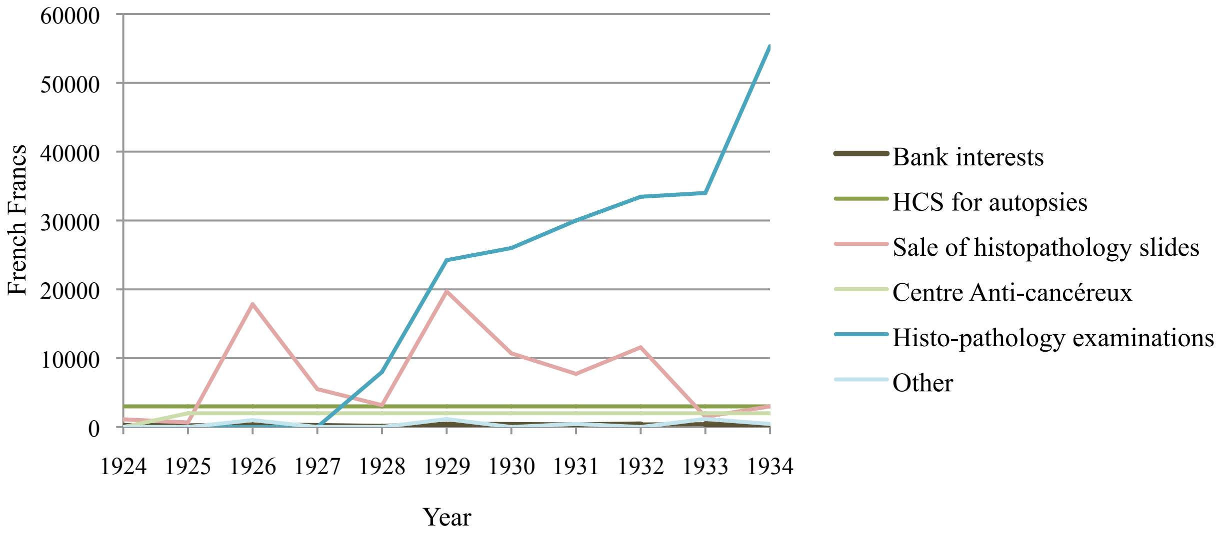

Figure 5.17 Income sources. *Institut d'Anatomie Pathologique (compte des particuliers)*, 1924-1934.

The prosecture payments were fixed sums of 3000 FRF per annum between 1924 and 1934. The *Centre Anti-cancéreux* equally paid fixed sums of 2000 FRF per annum starting in 1925. Following the creation of the regional cancer centre in 1924, it is not surprising that a financial agreement was instilled for the lab work that the pathology institute did for the centre. However, this unchanging sum does not align with the very significant rise in histopathology examinations performed in light of cancer treatment outlined in Chapter 4.

There are two other sources of income, mentioned in the introduction to this chapter. The sale of histopathology slides and examinations performed for private clientele. Histopathology slides were sold between 1924 to 1934. The sums perceived varied between 665 FRF in 1925 and 19 693.20 FRF in 1929. These were sold regularly to medical students, to medical professors in Strasbourg, to the CAC, to *Laporte*, and to the *Université de Montréal*. The four peaks at 1926, 1929, 1930, and 1932 in the pink line of the graph above correspond to large sales to the *Université de Montréal* in 1926 and 1929, and further large sales in 1930 and 1932 for which the clients are not indicated. The preparation of slides for students was something that the institute could and did do from, and likely before, 1924.[156] They had the material on hand. It came from autopsies or from surgical samples. Laboratory technicians had the ability to prepare the slides, and were paid overtime when they did. This was a small laboratory side activity that everyone in the laboratory profited from. This was

[156] At Johns Hopkins, a collection of about three to four hundred sections was rented to each student for the year. MacCallum, "The pathological laboratory of The Johns Hopkins University and hospital," 176.
In the histology institute, students used slide collections that were stored in the practical teaching laboratory.

not a consistent or a rising activity. At times relatively little was earned and at others this was a rich resource. The large sales that were prepared and sent to Montreal were a result of Pierre Masson being director of pathology at the *Université de Montréal*. He negociated the sale of an initial collection of slides before he went and brought them with him.[157] Masson went to Montreal in 1927, but quite exceptionally, remained chair of pathological anatomy in Strasbourg until 1946. That his departure was acknowledged as an official mission with the *Ministre des Affaires Etrangères* of France is not insignificant.[158] It was the Minister of Foreign Affairs that authorized him to maintain his professorship in Strasbourg. That is, he occupied the chair of pathological anatomy in Strasbourg *in absentia*; as *Professeur en congé*. There were exceptional circumstances at play. French university faculty members could maintain their status in France for five years while abroad, on the condition that someone could replace them in their absence. It was, however, upon his own initiative that the *conge* status was applied for and obtained.[159] Further, the *Université de Montréal* dismissed university regulation in order to grant two French citizens full professorship in 1931.[160] Dr. L. J. Dalbis, biologist and histologist, also moved to the *Université de Montréal* medical school from France; he also accumulated his professorship at St. Stanislas in Paris with that at the *Université de Montréal*.[161]

Masson's mission was initially approved for a five year term, beginning on 1 January 1927. In 1929, Masson was requested by his Strasbourg colleagues to return to Strasbourg or to give his resignation in order for a successor of "necessary authority" to be named. Apparently after his first year as director Géry was not considered apt for the position.[162]

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[157] Masson requested that the Université de Montréal pay the transportation cost of his own collection of 10 000 histopathology slides. In addition, a sum of 540 CAD was given to him for instruments and microscope preparations for students and packing. P. Masson à Monsieur le Doyen. Strasbourg, le 28 octobre 1926. (82) Côte E38. 2596. 90/7/2/1. Pierre Masson. AUM; M. le Doyen à Monsieur le Professeur Pierre Masson. Montréal, le 6 décembre 1926. (76) Côte E38. 2596. 90/7/2/1. Pierre Masson. AUM.

[158] Arrêté interministériel du 23 Décembre 1926. Dossier administratif de P. Masson. Archives de la Faculté de Médecine de Strasbourg.

[159] Correspondance Pierre Masson à L. de L. Harwood, 1 Aout 1926. Cote E38, 90/7/2/1, Pierre Masson, 99. Archives de l'Université de Montréal; Correspondance Pierre Masson à L. de L. Harwood, 16 Septembre 1926. Cote E38, 90/7/2/1, Pierre Masson, 93. Archives de l'Université de Montréal.

[160] Extrait des minutes d'une séance spéciale du Conseil de la Faculté de Médecine de l'Université de Montréal tenue le 22 octobre 1929. Cote E38, 90/7/2/1, Pierre Masson, 31. Archives de l'Université de Montréal.

[161] G. M. Rémillard and B. Zifkin, "Wilder Penfield et les neuropsychiatres Montréalais de 1928 à 1946," *Association des neurologues de Québec*, n.d., http://www.anq.qc.ca/histoire_penfield.htm; Pierre Masson, "La médecine française au Canada," in *Septième Bulletin des Etudes Françaises* (presented at the 3eme Centenaire Ville-Marie, Montréal 1642-1942, Montreal: Collège Stanislas, 1942), 81-88. (Dalbis was instrumental in recruiting and finalizing negotiations with Masson in the months before his arrive. Correspondance M. le Professeur L.J.Dalbis le 24 août 1926. Cote E38, 90/7/2/1, Pierre Masson, 97. Archives de l'Université de Montréal.

[162] Correspondance Pierre Masson à L. de L. Harwood, 18 Mars 1927. Cote E38, 90/7/2/1, Pierre Masson, 36. Archives de l'Université de Montréal.

Masson used this moral dilemma to negotiate with the *Université de Montreal*. In 1929, Masson used the benefits, including job security and retirement funds, of his position in Strasbourg to argue for additional financial benefits in Montreal. In 1931, he received there a salary of $12 000 and was guaranteed a retirement pension.[163] Masson was granted a landing in Canada in November 1931.[164] Masson was rather entrepreneurial in negotiating his position, but also in having one institute finance purchases from the other.

There is less direct evidence of Masson's hand in the creation of the histopathology diagnosis service in Strasbourg. Masson was a pathologist on the *Commission du Cancer* that implemented the CAC guidelines requiring diagnosis to be a histopathology diagnosis. Masson believed that pathologists should be acknowledged as medical specialists:

> "The histopathologist is both histologist and medical doctor. There is no medical specialty that requires as much diligence, as much theoretical and practical knowledge. Physician, the histologist must be paid for the services he provides."[165]

He also sought to do laboratory examinations for diagnosis for hospital and private clientele upon his arrival in Montreal.[166] Not only was he a professor at the *Université de Montréal*, but Masson was head of pathological anatomy service of some Montreal hospitals. Masson had negotiated a position in Montreal, with Dr. G. Archambault and Dean of the medical school Dr. Louis Harwood, in which he would spend the mornings as the director of the *Hôpital Notre-Dame* pathology laboratory and the afternoons at the *Université de Montréal.*[167] Each would pay 5000 CAD for a total salary of 10000 CAD in 1927. He further collected service fees for histodiagnoses performed for other (not hospitalized) patients, minus a small fee to reimburse laboratory costs. Masson not only had absolute control of autopsy, but also of surgery, samples for research and teaching purposes. At the medical school, Masson performed laboratory work, directed and monitored the pathology museum, and taught regular courses.[168] He demanded a lot in terms of salary and diagnosis remuneration, as well as rights to tissue samples.

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[163] Contrat entre l'Université de Montréal et le professeur Pierre Masson. Cote E38, 90/7/2/1, Pierre Masson, 80. Archives de l'Université de Montréal.
[164] Correspondance Office of the Deputy Minister of Immigration and Colonization to Dr. T. Parizeau, Vice-Dean and Director of Studies at the University of Montreal, 5 November 1931. Cote E38, 90/7/2/1, Pierre Masson, 26. Archives de l'Université de Montréal.
[165] Masson, *Tumeurs & Diagnostics histologiques*, Postface.
[166] M. le Doyen (?) à Monsieur le Professeur P. Masson. Montréal, le 24 août 1926. (101-102) Côte E38. 2596. 90/7/2/1. Pierre Masson. AUM.
[167] Convention entre l'Hôpital Notre-Dame de Montréal et le professeur Pierre Masson, Decembre 1926. Cote E38, 90/7/2/1, Pierre Masson, 107-108. Archives de l'Université de Montréal.
[168] Convention entre l'Université de Montréal et Pierre Masson, Decembre 1926. Cote E38, 90/7/2/1, Pierre Masson, 26. Archives de l'Université de Montréal.

After arriving in Montreal, he realized that there were not enough examinations to fill his mornings, and further he was lacking tissue samples from children, chronically ill and elderly patients. He therein looked to other hospitals in Montreal, and became the director of the anatomopathology laboratories for four hospitals: *Notre-Dame, Hôtel-Dieu, Hôpital des Incurables* and *Sainte-Justine*; the first two as sources of general medical and surgical material, the latter two for infantile, tuberculosis and cancer pathologies.[169] He delegated assistants to manage the laboratory work at each hospital, but visited the labs each morning himself.[170] The interaction between the hospitals and the medical school was presented by Masson as indispensable for both diagnosis in the hospitals and collection of material for the medical school.[171]

Any earlier involvement in a diagnosis service in Strasbourg, however, is absent from the account records. With Masson's Montreal activities in mind, it is highly improbable that a diagnosis activity in Strasbourg began after his departure. It is more likely that Masson initiated it, but did not declare the income from these examinations in these account reports. If so, he likely did not declare it because he considered it his personal honoraries and not those of the institute. Géry, however, did declare the histo-diagnosis income.

The records: Expenditures

Interpreting the sources of expenses listed in the account records was not as straightforward as the income. The sources, nevertheless, have been divided into four categories:

1) Personnel
2) General operation costs
3) Other services or products
4) Director

There were entries labelled as overtime and as *Dépenses de personnel, Rémuneration du personnel, Etrennes au personnel*. These were easily put into the Personnel category. This

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[169] Correspondance Pierre Masson à L. de L. Harwood, 10 May 1927. Cote E38, 90/7/2/1, Pierre Masson, 46. AUM; Le Docteur Pierre Masson (1880-1959) (Doc 25) .Cote P22/N. 247. Dossiers biographiques de médecins et de l'histoire de la médecine au Québec. Pierre Masson. AUM.
Masson carefully kept histopathology slides and embedded pieces, such that the Hôpital Sainte Justine accumulated an "inestimable" collection, pieces of which were foci of numerous publications. Jacques Gagnon. "Pierre Masson, MD 1928-1959." Les Annales de Sainte Justine. (Doc 20) Cote P22/N. 247. Dossiers biographiques de médecins et de l'histoire de la médecine au Québec. Pierre Masson. AUM.
[170] Correspondance du Doyen de la Faculté de médecine Albert LeSage à Qui le droit. 4 July 1942. Cote E38, 90/7/2/1, Pierre Masson, 24. Archives de l'Université de Montréal.
[171] Correspondance Pierre Masson à L. de L. Harwood, 10 May 1927. Cote E38, 90/7/2/1, Pierre Masson, 46. Archives de l'Université de Montréal.

included payment to a medical illustrator in 1927. This category could equally be titled human capital as this was payment to employees that contributed to the institute's activities. In this category the (frequent) sums paid for the transportation of cadavers or other material, listed as *Corvée porte-chaise*, have also been included.

The second category, General operation costs, includes what can be characterized as functioning costs. It includes the purchase of laboratory materials such as paraffin, distilled water, and other laboratory material, paper, books, typewriter ribbon, postage, and other administrative material. These may have been costs for activities outside research and teaching responsibilities, whose costs were covered by the medical school budget, but they may have been used to complement the medical school budget.

Thirdly, Other services or products refers to items purchased above the smaller material needed for laboratory work. These include furniture, renovations, instruments and other items that might be considered extras. It might be deduced that these were the things the institute was able to purchase or finance only because it had income of its own. For example, in 1934, a powerful microscope was purchased for 12 870 FRF.

The Director's cut was income that the director earned because of the additional sources of income. Géry was the only of the three directors to list this in the account records.

Additionally, another category titled Unknown was added to group all expenses, which did not fit into the above categories. Many of the expenses were labelled with the name of the company or the person that they were paid to. It was not possible to determine what some of these companies or people did.

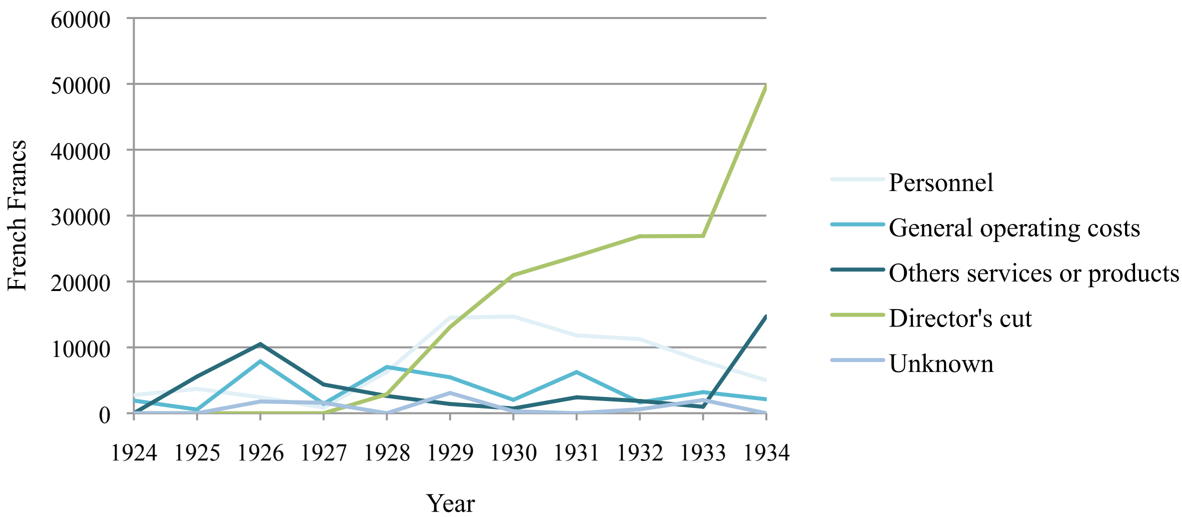

Figure 5.18 Expenditures. *Institut d'Anatomie Pathologique* (*compte des particuliers*). 1924-1934.

The largest expense was the cut that the institute director claimed in personnal expenses for private histopathological examinations. This was only inscribed in the accounts from 1928 and Géry's time as director.

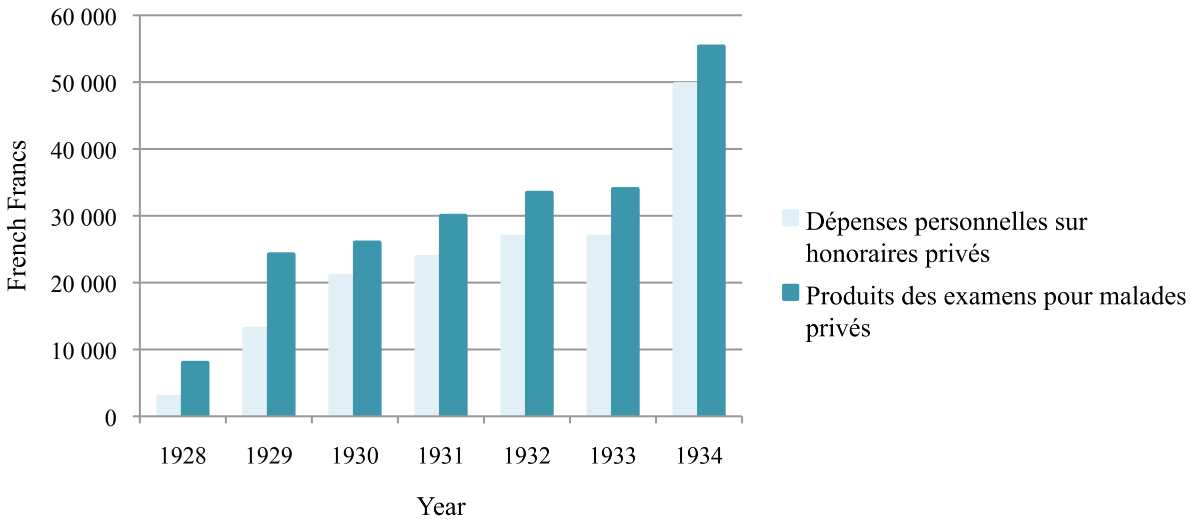

Figure 5.19 Amounts made and amounts earned by director for histo-diagnosis, 1928-1934

Not only did Géry declare how much the histo-diagnosis activity brought in, he also declared how much he claimed as his share. In the account records for the years that Géry was acting as director, there was a line in the expenses described as *Dépenses personnelles sur honoraires privés*, or personal expenditure from private honorariums. This was not personnel, as in employees, it was his personal portion. He inscribed it as an expense, although it was only an expense in that it paid time he spent making the examinations. In the above histogram, his personal portion is represented in pale blue. The income of the diagnoses for private clientele are in dark blue. Géry took home between 30% in 1928 and 90% in 1934 of the income from the histo-diagnosis activity. As mentioned in the chapter opening, he was making much much more than a university salary with this activity. The amount he inscribed in the accounts as personal expenditure could also be called profits. He did not claim all of the incoming honorariums. Unfortunately, there are no indications of how he calculated, if he calculated, how much was his.

There were, expectedly, costs for performing these examinations. Some of these appear in the accounts, such as paraffin, glass slides, distilled water, postage, etc. Some of the companies that could not be identified might have been supplying other materials, like alcohol or chemicals for preparing stains. However, in response to Rohfritsch's complaint Géry argued the scientific interest that this activity had. The *Institut d'Histologie* received 8 000 FRF in 1924 for research and teaching from the university budget.[172] The *Institut d'Anatomie* received 20 000 FRF in 1924.[173] Whereas the histology institute was smaller than the anatomy or the pathological anatomy institute at that time, it might be estimated that the *Institut d'Anatomie Pathologique* received a similar amount as the anatomy institute. In any case, if they received enough to cover all of the institute's expenses, including those of the histo-diagnosis examinations, then Géry might have considered these to be research and teaching expenses. If this was the case, then profits did not return to the institution that footed the bill, that is the medical school or the state. There was a certain ambiguity about the nature of activity.[174] It is clear, however, that the income from diagnoses was rising, but the material costs were not.

A description of the cumulative evidence from the financial inquiries by the *Cour des Comptes* highlights several points of interest. The overall account balance shows a general budget averaging around 4000 to 5000 FRF a year between 1923 and 1928.

Providing an increased supply of slides, however, required personnel and (overtime) work. Whether this was paid for or not was the essence of the salary dispute between Géry and Rohrfritsch at the beginning of this chapter. Income from the additional work could potentially, but not necessarily, contribute to top-up technician salaries for overtime hours. Whether additional work was remunerated was entirely at the discretion of the institute director. The diagnosis activity depended partially on the medical school that provided the material framework of the laboratory, but the income was not re-invested in the institute.

Defining laboratory fees

The laboratory of the *Institut d'Anatomie Pathologique* prior to 1934 was being paid for histo-diagnoses of private patients and a fixed sum per year for the non-paying patients of the CAC. They were not being paid for providing diagnostic services to the hospital. The hospital participated in material and salary expenses for activities in the institute via the prosecture service. This changed in 1935.

The fees for histopathology examinations performed by the *Institut d'Anatomie Pathologique* were negotiated between the medical school council and the pathology director

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172 Bouin, "L'Institut d'Histologie de l'Université de Strasbourg," 142.
173 Forster, "L'Institut d'Anatomie de l'Université de Strasbourg," 135.
174 In contrast, Louis Frühling who succeeded Géry in 1957 invested all histo-diagnosis income into the institute, funding instrumentation and renovations.

from 1935, upon the implementation of the 1935 convention and the requirement of having medical and laboratory services paid into the *compte de particuliers*. The fee for an anatomical pathology examination was herein set at 20 FRF. Payments were to be deposited into the medical school account and an equivalent sum transferred, in the form of credit, to the budget of the *Institut d'Anatomie Pathologique*.[175] This was not applied to third class hospitalized patients, for whom biopsies were examined free of charge.[176] The initial fee set at 20 FRF in 1935 rose quickly in the post-war era, from 80 FRF in 1949 to 500 FRF in 1952.[177] However a strong contrast arises when putting these prices alongside the fees published in the *Bulletin Officiel*.

Setting a fee schedule for services was indicative of an established medical service.[178] The attributing of fees indicated that the service was subject to tarification. That is, a unit of information was transactable against a unit of currency. This was established, in part, in response to the insurance and social assistance administration, and through the hospital administration. They for example, requested to only deal with the hospital and not with the individual laboratories.[179]

In addressing the question of the existence and regulation (or lack of) laboratory fees, administrative documents have provided details on the circulation of bills and notes, that is, the circulation of money within and between the hospital and the medical school. Not only is it revealing of where laboratory activities sat within this medical complex, it also helps

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[175] Extrait du procès-verbal la séance du 7 novembre 1935 du conseil de la Faculté de Médecine. Dossier: Enquête faite par Ch. Rives Conseiller Référendaire à la Cour des Comptes. Carton: DEC Cour des Comptes. Rives. AFMS.

[176] Until 1937, the lab performed histopathology examinations free of charge for 3rd class patients. M. Le Doyen à M. le Directeur Général des Hospices Civils. 27 avril 1937. AFMS.

[177] The rise in these sums could be put into perspective by considering the general economic situation at the time. In remaining within the scope of this thesis, however, I have not explored these post-World War II era figures any further.

[178] A schedule of lab fees were published as early as 1928 in the UK, following the formation of a Group of Clinical Pathologists within the framework of the British Medical Association and the recognition of the right of pathologists attached to a hospital or medical school to charge fees for private work. This was the first undertaking of an accurate costing of laboratory procedures. At this time and in this case, it was claimed that remuneration should not be an issue. W. D Foster, *A short history of clinical pathology* (Edinburgh and London: E. and S. Livingstone, 1961), 134.

[179] "*Il en est de même des laboratoires tels que ceux de sérologie et de la clinique médicale B, qui, pour des examens faits à des malades hospitalisés établissent et encaissent directement des factures payées, soit par le malade lui-même, soit par un organisme d'assurances sociale, une commune ou la Préfecture. Dans l'intérêt d'une administration claire et pour éviter les réclamations qui se font de plus en plus fréquentes de la part des organismes d'assurances sociales et des communes qui, en envoyant un malade à l'hôpital civil, ne veulent traiter qu'avec les Hospices civils et non pas avec tel ou tel laboratoire particulier, la comptabilité de ces laboratoires, qui ne remplissent pas de buts scientifiques, devrait dorénavant être faite par les Hospices civils.*" Memoire de la Commission Administrative des Hospices civils sur les rapports entre les Hospices civils et la Faculté de Médecine, p. 20

explain how laboratories at the medical school were able to uphold a financially productive activity.

5.3.3 Other pathology laboratories

There were other laboratories at the Strasbourg medical school with diagnostic expertise similar to the laboratory of the *Institut d'Anatomie Pathologique*. One of them was the laboratory in the dermatology clinic, under the direction of the chair of dermatology, Professor Lucien-Marie Pautrier.[180]

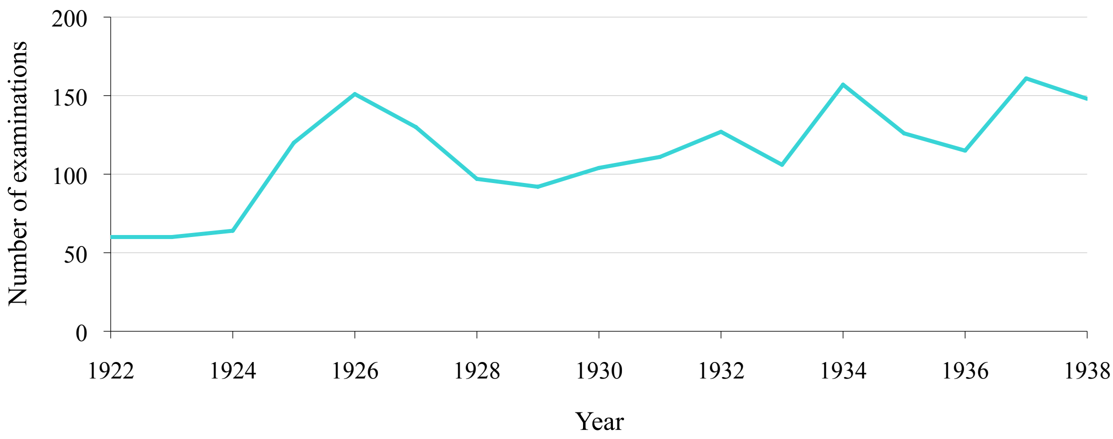

Figure 5.20 Histopathology examinations at the *Clinique Dermatologique*, 1922-1938

The number of examinations performed in the dermatology clinic at the *Laboratoire d'Histopathologie Cutanée* amounted to between 50 and 150 per year. Compared to the examinations performed at the *Institut d'Anatomie Pathologique*, this rise is neither significant, not continuous. A peak of 150 examinations ws reached already in 1926 and for the subsequent twelve years the number of examinations oscillated between 100 and 150. They were performed on tissue samples from patients at the dermatology clinic for diagnosis and for research. The majority of examinations were performed and the reports were written by Frederic Woringer, *assistant* of the dermatology clinic, in charge of the laboratory in the 1930s.[181] A few, those that would appear in academic publications, were examined and written by Pautrier. Woringer had studied pathology under Masson before joining the

[180] Bernard J. Cribier, "Lucien Marie Pautrier (1876-1959): The man and the myth of the microabscesses," *Dermatopathology: Practical and Conceptual* 7, no. 2 (2001): 135-147; Bernard J. Cribier, "History: Frederic Woringer (1903-1964) and Woringer-Kolopp Disease," *The American Journal of Dermatopathology* 27, no. 6 (2005): 534-545.

[181] Cribier, "History," 534.

dermatology clinic in 1927. The format of the reports was nearly identical to that in the *Institut d'Anatomie Pathologique* logbooks, albeit there was a lengthier description of the clinical case history, as well as a photograph corresponding to each case inserted in the logbooks. This witnesses a close connection to their own clinical practice.

From the 1930s, Woringer also set about re-organising the slides that were prepared for examinations. They had been stored chronologically, the oldest slides followed by the most recent ones. He set about categorizing them alphabetically, such that (and still today) students could easily look at all the cases of *mycosis fungoides* or any other skin disease. This categorization was possible, because the number of slides was manageable.

Figure 5.21 Wood cabinet of slide collection for teaching, *Institut d'Anatomie Pathologique*.[182]
This cabinet is similar to that in the *Institut d'Histologie* with slides for teaching. This is an example of slides labelled and stored by disease.

The slides remaining in the pathological anatomy institute are, for the most part, arranged chronologically according to the examination number they were assigned. There are a few exceptions and some boxes are labelled by disease. These were either slides set aside after diagnosis, or they were additional slides prepared from embedded pieces after diagnostic examinations had been performed for study by students or researchers. In addition to these,

[182] Photo: T. Close-Koenig

representative slides were classified by disease in the wood cabinets in the insitute hallway, pictured above.

The histopathology laboratory of the *Clinique Dermatologique* did not pursue a diagnostic activity beyond that required by their own patients. There was, however, a period in which bacteriology tests for the *Hospices civils* were performed in the expansive laboratories of this clinic. They did not receive any compensation for the task.[183] Nor did they keep any records.

There was also an ocular pathology laboratory founded in 1937 in the *Clinique Ophtalmologique*.[184] It can be expected that this laboratory, like that of the dermatology clinic, performed diagnostic examinations for their clinic.

The situation may have been different in the laboratory of the *Institut d'Histologie.* Like the pathological anatomy institute, this institute was a teaching and research institute. The chair of histology and director of the institute was Professor Pol Bouin, a renowned histologist. The fixative, Bouin's fluid mentioned in Chapter 3, used commonly to fix and store tissue samples carries his name. The *Institut d'Histologie* was created in 1919.[185] It was assigned some rooms on the main floor of the anatomy building, alongside the *Institut d'Anatomie normale* between 1919 until 1927. Bouin was internationally recognized for his research on histo-physiology and experimental endocrinology. He, like Masson, published a referential manual, titled *Eléments d'Histologie*, and founded an academic journal *Archives d'Anatomie, d'Histologie et d'Embryologie*. In 1925, the Rockefeller Foundation contributed to the medical school and to Bouin the sum of 1 000 000 FRF for a new building.[186] The institute continued to be funded by the Rockefeller Foundation until 1940.[187] This institute is not remembered for having done diagnosis work.[188] This was quite precisely how Bouin organized the institute: "No one practices or has the intention to practice medicine. It is a formal condition for joining the staff of my laboratory."[189] The activities were concentrated wholly on research and teaching. There were however some histology examinations done for diagnosis in 1938. Max Aron, a histology professor, requested authorization to perform

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[183] M. Krohmer, Direction des Hospices civils à M. le Ministère de la Santé et de la Population, 7.06.1946. Dossier 18/2 Volume 1. AHUS.

[184] I have no further data on this.

[185] Bouin, "L'Institut d'Histologie de l'Université de Strasbourg"; Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 237-244.

[186] Christian Bonah, "Pol Bouin's research school in Nancy and Strasbourg, 1900-1940," Manuscript, 2003.

[187] There is a full file in the Rockefeller Archives on this: RF 1.1 500A 8.85 RAC.

[188] According to private communication with Nelly Boehm-Burger, Professor at the *Institut d'Histologie*. Spring 2011, as nothing mentioned in Jean-Marie Le Minor's historical accounts of the institute.

[189] Bouin, "L'Institut d'Histologie de l'Université de Strasbourg," 141.

diagnostic examinations for the *compte des particuliers*.[190] It was agreed that these analyses were too few to disturb the usual routines of the laboratory; they would not continue to perform these examinations if they did and would find another place to do the examinations. It was further agreed that the income earned would contribute to remunerate employees [*petit personnel*]. There is no trace of the activity exceeding this small scale.

The pathological anatomy laboratory was a place of expertise and as such, it might be suggested, was tranformed into a space that offered a medical service. From scientific knowledge and know-how, this service became part of commercial exchange, like a commodity and in a newly emerging market. The histopathology expertise and knowledge represented a barrier of entry to the histopathology diagnosis market.[191] The market emerged within the changing therapeutic landscape of cancer. The pathological anatomy laboratory had accumulated knowledge learning that granted it significant market power on this front. Not only, as Cunningham stated, did the laboratory made the tests, but the tests also made the laboratory.[192]

However, there was more to the equation. The dermatology clinic, and even more so, the histology institute also had expertise. The difference, or the additional factors, are arguably related to the historicity of the institute and the well-worn path between the pathological anatomy institute and the hospital and clinics established through gross pathological examinations, autopsies and the anatomo-clinical method. The entrepreneurial role played by Masson and Géry is undeniably another element in understantding howthe profitable service activity emerged in the institute.

The pathological anatomy laboratory was quite successfully offering a commercial diagnosis service. They were producing something that was sellable on a market. In fact this was not “something”, this was knowledge and information that was codified and distributed on a piece of paper, as argued in Chapter 4. This was a service, because it encompassed the full process of receiving tissue samples, transforming them into stained slides, interpreting, inscribing, and distributing diagnosis or prognosis. This was a laboratory service because the process was performed in a laboratory and employed laboratory techniques.

The creation of a commercially viable activity might be broken down into four steps. The first step concerned the creation of technical know-how and scientific knowledge, as

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[190] Extraits des déliberations du conseil de la Faculté. Séane du 13 janvier 1938. Dossier: Cumum & Operations Régie & Gestion Fin des Laboratoires d’Instituts et de Cliniques AFMS.

[191] On barriers of entry: Geroski, *The evolution of new markets*, 75-76; Paul Geroski, Richard J. Gilbert, and Alexis Jacquemin, *Barriers to entry and strategic competition* (London: Routledge, 2001).

[192] Cunningham, “Transforming plague,” 218.

described in Chapter 3, whoses production was integral to and through research activities of a scientific institute in a medical school. The second step consisted in diffusing the knowledge through teaching to professionals of medicine and stabilizing the procedure so that it was reproducible. The third step, described in Chapter 4, concerned the codification of the service act and the creation of a demand for it. This was produced in pluri-disciplinary research and treatment setting of the French cancer centres. The fourth step consisted in the commodification of this know-how and knowledge when it became valuable for someone outside the medical school and when its production engendered costs that someone was willing to cover. As shown in Chapter 5, the CAC made an annual contribution to the institute to cover costs for some of the work it was requesting. The value of diagnoses, however, extended beyond this and became something exchanged for honorariums and fees, which appear in the accounts as examinations for private patients. As such, it had not only undergone commodification, but also commercialisation.[193]

Like the buildings and finances, the Strasbourg medical school laboratory services were an entangled situation. A commercial service had emerged in a public university; that is a private commercial service in a public institution. Furthermore, this was a service supplied to medical practitioners and patients; that is, in a milieu where traditionally remuneration, via honorariums, stood in the place of market dynamics and competition. If medicine had become monetarized and a medical market emerged during the first half of the twentieth century, this new marketplace had a peculiar and ambiguous configuration where individual and public health interests met with liberal market dynamics. Here the goods and services exchanged concerned human health, for which commodification and commercialization played out differently than classical economic dynamics of other sectors involving commercial goods and services.

[193] Note that in French, the term "marchandisation" means commodification and commercialisation.

5.4 In the broader context: Commodification and Commercialisation

5.4.1 A factory in a medical school?

The laboratory of the *Institut d'Anatomie Pathologique* was raking in an income, much of which went to the director of the institute. The pathological anatomy institute was repeatedly described as a particularly active institute: "The *Institut d'Anatomie Pathologique* was a hotbed of activity where the lights were out after midnight and from seven thirty in the morning, clinic professors were attending autopsies of their patients."[194]; "a buzzing beehive"[195]; "a hive of activity."[196] These three quotations are from writings after Masson's death in 1959. These were the retrospective impressions and memories of Masson's colleagues; Oberling who had worked and trained with Masson and that would act as temporary director in 1927 and Morin who came to Strasbourg from Montreal and studied with Masson.

Additionally, in 1924, the institute was described as "a true pathological anatomy factory."[197] This was a contemporary description by an unknown author in the *Gazette médicale de Strasbourg*.

Not only were (some) pathologists, assistants, and technicians working long hours, but the institute was described as a factory, a place that was producing something. How much truth is there in this rhetorical characterisation? A factory is a place of production. This was a scientific institute of a medical school. In addition to the scientific production expected of a research institute, e.g. academic publications, the institute laboratories produced histopathology slides and histopathology examination reports. As such, this was a place of production. A factory is further a place of the commercial production of goods, in which economies of scale and economies of scope are considered and calculated.

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194 Oberling, "Pierre Masson (1880-1959)," 429. My translation. (Reflections: This institute was located amongst a campus of hospital clinics; as such, these did not completely close but were occupied by patients and a minimum of staff twenty-four hours a day. The institute was one of five scientific institutes on the 'campus.' These expectedly functioned during regular workday hours. The reference to the constant activity and long hours may have been relative to other institutes. The early morning hours concerned the autopsy activity. The director arrived at eight o'clock and so the autopsies were registered and begun by the autopsy assistants and clinic professors, perhaps at a time convenient for the interested professors. The late evenings were notably assistants and students performing research in the only free moment they had from their full day of routine and pedagogical activities. It may be deduced that these long hours were held because activity concerned patients (and post-mortem reports) and went beyond scientific research and teaching.)

195 "*une ruche bourdonnante*" from Ibid.

196 "*une fourmilière*" from Morin, "In memorium professeur Pierre Masson 1880-1959," 13.

197 "*une veritable usine d'anatomie pathologique"* from E. G., "Le Professeur P. Masson," 380.

In his study of Pavlov's physiology "factory," Daniel Todes defines factory as a "social enterprise involving substantial capital investment, a specially designed workplace, a relatively large workforce, a developed division of labour, and a productive process that involved managerial decisions."[198] In accordance with this definition, it cannot be argued that the *Institut d'Anatomie Pathologique* laboratory was a factory. Firstly, it did not involve substantial capital investment, per se. The construction and equipment of the building was publicly funded. The investment was great but it was in the aims of developing research and teaching and not of developing a for-profit activity. The workforce was important, although not necessarily relatively large. There were at most 13 employees involved in the interwar period. However, this was a specially designed workplace for histopathology examinations. A workplace designed for histopathology research had all the elements of one designed for histopathology diagnosis. As did the division of labour. Further the director had managerial responsibility, making decisions, such as what to remunerate or not to remunerate as in the Rohfritsch example. What Todes completely neglects in his analogy is the fact that a factory is, first and foremost, a place of production.

The allusion to a factory in the *Gazette médicale de Strasbourg* was figurative, referring to a rich research and post-mortem activity. Although the institute was producing something: histopathology slides and histopathology examination reports the institute was not a factory. Through this, the director touched considerable additional earnings. Were these his personal earnings with which he could top up his salary? Or was this service product profit? Indeed pathology laboratory analysis was as much a pathologist's private activity as it was a laboratory service. However, the director was not the only one to contribute to and earn something from the activity. It might be qualified on the scale of cottage industry. This was not, strictly speaking, production from a home, but it was in the workplace of and employed existing pathologists and technicians. From 1924, the wider activity expanded and technicians became more and more involved as division of labour developed. Here it may be more appropriately identified as a small business. Small business are privately owned and operated, with a small number of employees and relatively low volume of sales.

The set-up and the scale were such that medical school laboratories were initially able to provide favours to colleagues and perform occasional analyses and examinations. This

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[198] Todes, *Pavlov's physiology factory*, xiv-xvii. quote from p. xiv. Todes identifies a number of leading laboratory scientists presiding over enterprises following this definition. Including Justus von Liebig and Felix Hoppe-Seyler in chemistry, Carl Ludwig and Michael Foster in physiology, Robert Koch and Louis Pasteur in bacteriology, and Paul Ehrlich in immunology.

however, could not continue as costs accrued. The services, which had been rendered commodifiable in their format and via codification, became commercialised and exchanged for fees. But the lab never became as commercial as the private commercial labs that would later open in Strasbourg. Pathologists continued to do research, identifying, analyzing and collecting rare cases. This is reminiscent of collections. The institute, despite significant change in its focus and activity, continued to collect and classify. Even if differentiated and specialized, the commercial service activity forms a continuum with the earlier pathological anatomy practices.

The major difference amounts to the fact that the lab examination had become an economic entity. The institute produced medical material - slides and embedded specimens - and paper technologies - (duplicated) written examination reports, bound laboratory logbooks, accounting registers, etc. These were all involved in exchanges. First these exchanges were transactions in which material and knowledge were currencies. When value was no longer balanced, money entered exchanges and they became commercial. But what was attributed value?

5.4.2 Commodification: Creating & recognizing value

The study of economic dynamics in the field of healthcare is not simple, nor straightforward. Economists Victor Fuchs and Richard Zeckhauser question whether health is a commodity like any other.[199] Fuchs and Zeckhauser focus their discussion on the idea that price is a fundamental variable in economics but that health is considered to be priceless. In a less theoretical light, one can clearly recognize that although health itself may be priceless, healthcare and medical services ensue costs and have price tags.

Body parts and body by-products have long been subject to commercialization.[200] For example, in the seventeenth and eighteenth century Strasbourg, human fat from the medical

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[199] Victor R. Fuchs and Richard Zeckhauser, "Valuing health - A 'priceless' commodity," *The American Economic Review* 77, no. 2 (1987): 263.

[200] This is presently a popular topic in sociology and anthropology often taking an ethical viewpoint, which I only wish to mention in passing here. See Mitchell, "$ell"; Remigius Nnamdi Nwabueze, *Biotechnology and the challenge of property: Property rights in dead bodies, body parts, and genetic information*, Medical law and ethics (Aldershot: Ashgate, 2007); Goodwin, *Black markets*; Stephen Wilkinson, *Bodies for sale: Ethics and exploitation in the human body trade* (London and New York: Routledge, 2003); Sharp, *Bodies, commodities, and biotechnologies*; Andrews and Nelkin, *Body bazaar*; Gold, *Body parts*; Scheper-Hughes and Wacquant, *Commodifying Bodies*; Campion-Vincent, *Organ theft legends*; Henk A Have, Antoon van Welie, and Stuart F Spicker, eds., *Ownership of the human body : Philosophical considerations on the use of the human body and its parts in healthcare* (Dordrecht: Kluwer Academic Publishers, 1998); Mitchell, "Owning shit: Commodification and body wastes"; Sharp, "The commodification of the body and Its parts."

school anatomy dissections was *materia medica* in Strasbourg pharmacies.[201] The re-use of anatomical remains was not so uncommon, as illustrated by anthropodermic bibliopegy or the binding of books with tanned human skin practiced notably from the seventeenth century and throughout the eighteenth and nineteenth.[202] (It is not clear, but it can be expected that the skin was not acquired gratuitously.) These practices might be situated alongside the commercialization of human body parts, albeit pre-mortem: wigmakers bought hair; maternal milk was collected and sold; human faeces were dried and used as fertilizer called *poudrette*.[203] These, however, were conventional products; their extraction did not require medical or anatomical intervention, and they were not sold in medical contexts.[204] The commercialization of body parts was adjacent to medicine, as were many medical services and structures. Although the commodification and commercialisation in pathological anatomy described here is related to and stems from transforming body parts, it is not the body part that is commercialised. Rather it is knowledge that materialises in the form of laboratory reports. In laboratory diagnosis, the specimen or tissue is not paid for, but a professional is remunerated to collect it, a laboratory structure and medical professionals are paid to transform and examine it, and finally there is a direct payment for the examination report, which in prinicple is to cover the costs of the material and personnel employed.[205]

In Karl Marx's theory, a commodity is something that is thought of in economic terms and could be potentially bought and sold. Commodification is the assignment of economic value to something that had not previously been considered in economic terms.[206]

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[201] Le Minor, *Les sciences morphologiques médicales à Strasbourg du XVe au XXe siècles*, 47. Le Minor cites *Pharmacopeia Argentoratensis* supplement: *Catalogus medicamentorum tam simplicium quam compositorum in officinis pharmaceuticis Argentinensibus usualium,* Strasbourg, 1725, 10; *Catalogus et taxatio medicamentorum tam simplicium quam compositorum quae in officinis pharmaceuticis civitatis Argentinensis prostant et prostare debent*... Strasbourg, 1759, 13-14.

[202] Carolyn Marvin, "The body of the text: Literacy's corporeal constant," *Quarterly Journal of Speech* 80, no. 2 (1994): 129-148.

[203] Emile Littré, *Dictionnaire de la langue française* (Paris: Hachette, 1863), poudrette, http://francois.gannaz.free.fr/Littre/accueil.php; Baud, *L'affaire de la main volée. Une histoire juridique du corps*, 213; Sandra Cavallo, *Artisans of the body in early modern Italy: Identities, families and masculinities* (Manchester: Manchester University Press, 2007).

[204] Sandra Cavallo has, however, explored the care of the body by medical and non-medical occupations. Cavallo, *Artisans of the body in early modern Italy*.

[205] I want to use the idea that the blood was not paid for and could not be directly paid for, as indicated in 1952 legislation, but that flourishing services around the collection, transformation and distribution of the blood developed.

[206] There is some difficulty in finding the exact definition of commodification. The Marxist sense of commodification is used in sociology, and not in economics. It is distinct from the meaning of the word in business theory. There is equally an ambiguity whether there is a distinction between commodification and commoditization, or not. I am using the first term. I use it as equivalent in meaning to French *merchandisation*. <u>Commodification</u> (Marxist political theory) is used to describe the process by which something which does not have an economic value is assigned a value and hence how market values can replace other social values. It describes a modification of relationships, formerly untainted by commerce, into commercial relationships. See

Commodification signals the conversion of use-values into exchange-values and heralds a change in production relations.

An abundance of novel tissue samples are of value to the research pathologist, whose activity depended on examination, identification and classification of tissues and lesions.[207] Value is a prerequisite of demand and of markets.

Value is a fundamental notion in economic theory. In the history of economic thought discussion revolved, in part, around whether prices were determined by the cost of production or by demand and supply. In the seventeenth century, John Locke illustrated that necessity did not always determine value:

> "The being of any good, and useful quantity in any thing, neither increases its price, nor indeed makes it have any price at all. …What more useful or necessary things are there to being, or well-being of men, than air and water? and yet these have generally no price at all."[208]

Although, today water does hold value in exchange, what is important is the distinction between what Locke calls intrinsic and marketable value. That is,

> "there is no such intrinsic, natural settled value in any thing, as to make any assigned quantity of it constantly worth any assigned quantity of another"[209]

These two notions, value in use and value in exchange, are major features in classical economic theories. Nearly a century later, Adam Smith, in his influential work *An Inquiry into the Nature and Causes of the Wealth of Nations* attributed the exchange value in a monetary economy a nominal price. He defined the natural price as including the profits and rent in the exchange value:

> "When the price of any commodity is neither more nor less than what is sufficient to pay the rent of the land, the wages of the labour, and the profits of the stock employed in raising, preparing, and bringing it to market, according to their natural rates, the commodity is then sold for what may be called its natural price."[210]

Smith further defined the market price of a commodity as a function of demand such that demand may lead the market price to exceed or to fall short of the natural price.

"commodification," *Oxford Dictionary of Sociology*, n.d., http://www.enotes.com/oxsoc-encyclopedia/commodification; Sharp, *Bodies, commodities, and biotechnologies*; Scheper-Hughes and Wacquant, *Commodifying Bodies*.

[207] Rheinberger, *Toward a history of epistemic things*.

[208] John Locke, 1691. Some Considerations on the Lowering the Rate of Interest and Raising the Value of Money, p. 41.

[209] Ibid.

[210] Adam Smith, *An inquiry into the nature and causes of the wealth of nations* (BiblioBazaar, LLC. 2008, 1776), 5-10.

Amongst the modern developments in economic theory, the marginal utility theory of value gained increasing credence. Amongst the early books of marginal economists, an economic problem concerning the allocation of a given stock of corn among its various alternative uses was the archetypal case in point. The uses, basic food such as bread, luxury food such as cakes, feed for animals, brewing beer, distilling spirits, were ranked in order of priority. The example of water was also common; the limited stock allocated to drinking, washing, bathing, watering plants and gardens, and so on. The theory of value therein was transformed to a theory of utility. The Austrian school of economists equally promoted a theory of value that was the inverse of that defined by Smith and other classical economists. They shifted the perspective to claim that, rather than the cost of production being the cause and the value being the effect; it was value that determined cost of production.

Alternatively anthropologist Arjun Appadurai, in an essay on commodities in social life, cites Georg Simmel's definition of economic value: "Value, for Simmel, is never an inherent property of objects but is a judgment made about them by subjects."[211] As such, judgment revolved around the desire for the economic object and the exchange was the source of value:

> "The difficulty of acquisition, the sacrifice offered in exchange, is the unique constitutive element of value, of which scarcity is only the external manifestation, its objectification in the form of quantity."[212]

In the case at hand, tissue samples were of value to pathology researchers. On the other hand, examination reports identifying these tissue samples were of value to medical practitioners. The value of a cancer diagnosis translated to a therapeutic path (and hope) and the value of exchange was a monetary sum that kept the laboratory machinery rolling.

Diseased tissues are not of value to patients. On the contrary, most patients rejoice at its riddance; that is, they toss it in the trash and move on. What value does tissue hold once removed from a body? To the patient, the tissues in question may have been causing pain and angst, in addition to medical bills.[213] But this was not rubbish.

Michael Thompson's rubbish theory "is concerned to say something about the relationship between the *raw*, whatever that might be, and the various kinds of *processed*" and

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[211] Arjun Appadurai, 1986 "Introduction: commodities and the politics of value" In Arjun Appadurai, ed. The social life of things. Commodities in cultural perspective (Cambridge: Cambridge University Press), p. 3 references Georg Simmel, [1907]1978, The philosophy of money (London: Routledge).
[212] Arjun Appadurai, "Introduction: Commodities and the politics of value," in *The social life of things: Commodities in cultural perspective*, ed. Arjun Appadurai (Cambridge: Cambridge University Press, 1988), 4. cites Georg Simmel, [1907]1978, The philosophy of money (London: Routledge), p. 100.
[213] In nations with public health care, it is the public that is equally burdened by costs.

in which he identifies the transfer between states of decreasing and rising value.[214] His examples focus on commercial value. But a parallel could be made with scientific value, as with scientific objects, or with any value genre. Consider value in use, for example. Extirpated surgical matter was (expectedly) discarded in the operating room. It might be considered rubbish. Rubbish has been defined by Thompson as that which was discarded or was located "in the wrong place."[215] To the patients, practitioners and surgeons, the extirpated pieces were rubbish: to the patients, they were in the wrong place as they were outside their body; to practitioners, they were in the wrong place as they were to be therapeutically discarded; to surgeons, they were in the wrong place as they were outside the body and thereby their job was accomplished. These pieces were discarded because their value in use had decreased to nil; they were to be destroyed.[216] However, these were the raw format. They were of value in use to pathologists for research and teaching. They were transformed into histopathology slides and to histo-diagnosis reports. The reports were of value in exchange to practitioners (as well as patients and surgeons).

In the terms used by Thompson, they were in a *region of flexibility* between the *transient* realm to the *durable* realm.[217] Further Thompson describes the region of flexibility as a zone where innovation and creativity arise, although access to innovation and creativity is not freely available to all members of society. Histopathology production quite literally tranformed transient tissue samples into durable microscope slides and examinaton reports. In redirecting the surgical remains from the garbage bin to the laboratory, pathologists attributed the remains with a new identity and new value.[218]

This process of transformation was equally the process of commodification. In the case that this was happening in a medical school whose focus was teaching and research, the production of a commodity was not an initial goal.

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[214] In *Rubbish Theory*, Thompson believes that the transient object gradually declining in value and in expected life-span may slide across into rubbish. It contiues to exist in a timeless and valueless limbo where at some later date, if it has not by that time turned or been made into dust, it has the chance of being discovered and successfully transferred to durability. Michael Thompson, *Rubbish theory. The creation and destruction of value* (Oxford: Oxford University Press, 1979), 77.
[215] Ibid., 92.
[216] "The way we act towards an object relates directly to its category membership. For instance, we treasure, display, insure, and perhaps even mortgage and antique vase, but we detest and probably destroy its secondhand mate." Ibid., 7.
[217] Ibid., 8-12.
[218] The morphological classification of tumours further transformed the remains into a material with a name and endowed it with information.

A by-product is a incidental product in the production of some other good and is not the primary product or service being produced.[219] A by-product can be useful and marketable or it can be considered waste. Sale of a by-product makes production more profitable than if it had to be thrown away.[220] This corresponds to the 1919-1924 phase or waiting period described above. The institute needed material for research and teaching. If they could conduct an examination for diagnosis and send a report in exchange for the material, they would.

However once making diagnoses became a goal in itself, then this was not a by-product, but joint production. Joint production is profitable only if both goods can be sold.[221] Joint production offers economies of scope, because producing the goods separately would require increased costs. They were able to get material, use it for teaching and research, which was an exchange not involving money directly, but through the state funding of the institute, *and* use it to generate diagnostic reports, which were exchanged for money. Joint production and the latching of the diagnosis service on the research and teaching service meant that collecting tissue samples was not longer a goal in itself. The tissue samples came pouring in and their collection was a side effect of the diagnosis service. The diagnosis activity, however, always remained tied to research and teaching interests, it never became fully or only commercial. The activity within the medical school laboratory maintained an artisanal approach in histopathology diagnosis and did not aim to fully maximize production.[222] Histo-pathologists were reluctant to over-codify lab results because that would imply missing the rare case and would close the circle on the circular knowledge production process, as described in Chapter 3. In the case study presented here, the diagnosis services cannot be separated from the research. Not only in the founding of the service, which ensued from research competences, but in the approach to the routine.

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[219] "by-product," *The Oxford Dictionary of Economics*, n.d., http://www.enotes.com/econ-encyclopedia/by-product.

[220] Animal or slaughterhouse waste are archetypal examples of by-products being transformed and marketed. Butchers' meat accounts for less than half of an animal and "gut was transformed into tennis racket strings, bristles became hairbrushes, hooves were boiled up into glue, scent was added to fat which was made into soap, bones were ground into fertilizer or made into knife handles, heads and offals were rendered into animal feedstuffs", as well as pharmaceuticals, such as hormones or insulin. Naomi Pfeffer, "How abattoir 'biotrash' connected the social worlds of the university laboratory and the disassembly line," in *Meat, Medicine and Human Health in the Twentieth Century*, ed. David Cantor, Christian Bonah, and Matthias Dörries, Studies for the Society for the Social History of Medicine (London: Pickering & Chatto, 2010), 65; On insulin: Bliss, *The discovery of insulin*.

[221] "Joint production," *The Oxford Dictionary of Economics*, n.d., http://www.enotes.com/econ-encyclopedia/joint-production.

[222] Line 226. Entretien Prof Jean-Marie Vetter – 17 mai 2004.

Masson had argued that histopathologists should be viewed as performing a medical act and thereby equivalent to medical practitioners. In 1923, he defined histo-diagnosis as "a medical consultation within which histologists have grave responsibilities, all the more as their expertise is requested generally as a last resort and to direct the therapy."[223] Seeking to be recognized for pathologists' role in medical practice meant first and foremost establishing professional expertise. Reminiscent of medical practice and medical consultation which were paid with honorariums, laboratory services sat between liberal professions' honorarium and pharmacists' protected market of drugs, remedies and therapeutic agents. Apothecaries had long fixed prices for their preparations. This continued as pharmacists and pharmaceutical industries received fixed prices for specific quantities of medication. Physicians, on the other hand, had nothing to sell. Their fixed fees were set through the intermediary of unions, corporations and collectivities, such as mutual insurance companies and *syndicat* movements.

Masson and his successors considered that diagnostic services for the hospital, the CAC, and other practitioners should be appropriately paid for. They were producing medical expertise. In the decade following the beginning of the histopathology activity, the diagnosis activity was providing general medical practitioners with information used in therapeutic decision making. The examinations remained part of medical practice and accordingly became quantified units with fixed prices, meeting insurance companies and social security requirements of quantification and tarification of the medical services that they were responsible for reimbursing. An economic framework for laboratory services emerged in 1946. The implementation of national social security was followed with *tarification à l'acte*. The meaning of a medical act equally changed. Acts became the units for which fees were assigned.

The French term *acte* as an *acte de laboratoire* or an *acte médical* is used for defining a segment of activity or a series of gestures.[224] An "act" is further the unit of measurement for medical fees. Adoption of the term medical or laboratory act makes pricing or calculation of costs a structurally or managerially defining element. As acts, the services became transactable and subject to actuarial monitoring and control.

The definition of an act and to which profession it belonged became a debate. In 1948, there were a number of medical acts that qualified medical auxiliaries could perform. These

[223] Masson, *Tumeurs & Diagnostics histologiques*, 722. (My translation.)
[224] The word act can be used similarly in English. It is, as such, the root of the words activity and action. However, an act is more commonly, in everyday language, associated with theatre or legal texts.

included taking blood samples.[225] In 1954, as the debate arose, Louis Frühling, director of the pathological anatomy institute in Strabourg, stated "A histological examination does not constitute a simple laboratory act, but a true medical act."[226] Shortly afterwards, in 1957, a state circular indicated that taking a blood or tissue sample was a medical act that could only be performed by medical doctors, surgeons, specialists, dentists or medical auxiliaries. Social security coverage of the examination costs was contingent on this.[227] But Goddard argued that if a medical act is by definition performed by a medical practitioner, then a laboratory act was not a medical act.[228] Rather it was the provision of a service.

To borrow Anne-Marie Mol's term, the laboratory act is also means for the "enactment" of the disease.[229] In her study of atheroscelerosis, there are multiple means of "enacting" the disease, amongst them the clinical symptoms identified in the out-patient clinic and the microscopic study of the cross section of the artery. Mol has identified the latter enactment as an "afterthought" rather than a "foundation" of the disease.[230] In the case of cancer diagnosis, the symptoms were only identified by the patient and the physician in advanced stages of the disease; there were no means of enacting the disease in the early stages and the clinic does not lead the diagnosis.[231]

The knowledge, training and expertise prerequisite to the laboratory examination process was a broad continuum. The term act associates the process with a unit. And as a finite unit, it becomes something subject to exchange, to fixed cost of production, to economic procedures, to transactions. Histopathology knowledge was produced and commercialized in laboratories. The resulting laboratory act became an economic unit.

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[225] Les actes médicales pouvant être executes par un auxiliaire qualifié. JO du 9 janvier 1948, p. 274. Full list: Ventouses sèches et scorifiées, injections sous-cutanées et intramusculaires, massages simples, pansements simples, sinapisations, injections vaginales simples, injections intraveineuses et prises de sang, sondage uréthral, sondage avec lavage vésical, alimentation par sonde, tubage gastrique, mobilisation manuelle, mécanothérapie, prise d'électrocardiogramme. Interestingly, la prise de tension artérielle was mentioned as an act only to be performed by a medical doctor.

[226] In attempting to negociate tarifs of histology examinations performed for the hospital, and requesting that they pay full fees and not receive a discount, as they had been. Louis Fruhling, 15 mars 1954. 18/2 vol 2 150. AHUS. (My translation.)

[227] Goddard, "Pharmacie et biologie," 11 Goddard cites Article 5 of "La circulaire N° 147 SS (22 décembre 1957) du MInistre du Travail et de la Sécurité Sociale adressée aux Directeurs régionaux de la Sécurité Sociale."

[228] Ibid., 10.

[229] Annemarie Mol, *The body multiple: Ontology in medical practice* (Durham and London: Duke University Press, 2002) She uses the term repeatedly. Her choice of the term is discussed on pages 32-36.

[230] Ibid., 37.

[231] Screening through pap smears and mammographies have been developed since this period. Clarke and Casper, "From simple technology to complex arena"; Löwy, "Breast cancer and the 'materiality of risk'"; Löwy, *Preventive strikes*.

Conclusions

The affiliation of the hospital and the university (i.e., the medical faculty) in Strasbourg has been traced to as early as the seventeenth century, when cadavers were delivered to the amphitheatre of the medical school. This was the first of a long line of relations, notably regulated with contracts and conventions from the late ninteenth century. The hospital-university affiliation during the twentieth century was based on the reformulation and reorganisation of institutions established during the German annexation of Alsace between 1871 and 1918. The university and medical school was one structure that was pared to fit French administration. It became a hybrid of French and German models. German laws and legislations in the field of healthcare and social insurance were also maintained after 1918; especially social security existing in Alsace-Lorraine since 1883 was maintained under the formulation of *droit local.*

This thesis presents a medical analysis laboratory starting to provide diagnostic services in an early twentieth century healthcare market, the thesis presents this as a history of practices and economic aspects. This archeology of how “medical laboratory sciences” came to “speak” to physicians implies two fundamental observations. First, it seems necessary to acknowledge that historians need to turn their attention to a type of laboratory that has attracted little attention: clinical laboratories. If these were distinct from research and teaching laboratories, they nevertheless emerged within (or in connection with) the former. Disentangling the two is often complicated at least in the early emerging phase of medical analysis examinations. Second, if these laboratories become service and routine oriented, providing lab work on a large scale for hospitals and practitioners and their patients, then they are essentially healthcare service industries. As such, they should be equally studied and analyzed along the lines of economic history. The challenge that this thesis has faced is that of integrating history of science and economic history. This has been done with the history of pharmaceuticals, pharmaceutical innovation and the pharmaceutical industry, but the study of clinical labs is harder to discern with early commercial dynamics being particularly difficult to pinpoint.

Defining and describing early clinical laboratories in interwar France is complex. The scholar intending to do so has to devise ways and find windows to access and recontruct innovative practices that were rarely presented in written and academic forms. In this thesis, access to a hidden activity, that of routine medical laboratories, is acheived by examining administrative and recordkeeping practices. Regulating bodies provide statutes and such which could be a first window into these laboratories. They especially allow a better understanding of the establishment and monitoring of norms and standards of medical laboratory analysis in commercial and industrial distribution, as well as, for public health measures. However, there were no regulating bodies involved before 1946. A second potential window is a census of documents mentioning laboratories in hospital or medical school administrative archives. These are useful for establishing or clarifying that clinical laboratories were indeed existant in the interwar period. But, in part due to the multiplicity of the term laboratory, they can hardly elucidate what was being done in these laboratories, i.e., research or routine work? and for whom? Thirdly, another way to gain access is by undertaking a case study of one medical school institute that popped up in the administrative documents as having a strong research activity, a long history of hospital service and a growing clinical activity: the *Institut d'Anatomie Pathologique*.

The close proximity, physically and practically, of the hospital and the medical school essentially resulted in a teaching hospital, not unlike that of the later *Centres Hôpitaux Universitaires* instituted in France with the *loi de Debré* of 1958. Crossing administrative archives with laboratory records has allowed the true scale and nature of this otherwise invisible facet of the activity to be revealed and detailed. In Strasbourg, the lending of medical school laboratories for examinations and analyses of hospital patient specimens was issue of complex arrangements between two institutions: the muncipal hospital and the medical school. How and when laboratories appeared on the horizon, the larger institutional structures are telling of the role in medicine and the form they took. Understanding the practices and nuances of this organization has involved examination of conventions established between the two entities, as well as archived correspondance, memorandums, and reports prepared in the negociation of each convention.

The *Hospices civils* did not have full laboratory facilities and the extensive laboratories that existed within each institute of the medical school were contracted by the Hospices civils. The medical school research and teaching labs performed examinations and analyses for the hospital. In the early years, the research laboratories lent time and personnel to this secondary activity. But as the diagnostic activity grew, the laboratories for diagnosis came to stand on their own and performed services for a much broader clientele base than just the hospital, albeit while remaining within the same institution as the research activity. The labs in these institutions thereby dedicated time to research *and* to diagnosis. Describing only the research ignores where research material came from and how it was sorted and classed. Describing only the research also ignores where some of the income came from and the financial perks that kept everyone working. Describing only the diagnosis ignores where the knowledge and expertise came from. Describing only the diagnosis ignores why, later, the laboratory did not fully embrace codification and profit maximization.

Underlying this was the fact that there was a system or an apparatus in which there was a market for something the medical school laboratories produced. In this thesis, the processes involved in producing knowledge and commercializing knowledge in the *Institut d'Anatomie Pathologique* in Strasbourg have been established and described. This laboratory's activities were shared between production and commercialization. The first part of the thesis has recounted the production of knowledge. The long durée history of pathological anatomy shows that anatomy research and teaching in Strasbourg produced knowledge in natural history and anatlytical ways of knowing and through paper technologies. Grand laboratories were built in the late nineteenth century by Friedrich von Recklinghausen and appropriated in 1919 by Pierre Masson. The third chapter provided technical aspects of histology and Masson's expertise. The technical practices of histology and histopathology produced means of identifying and differentiating stained cellular structures. Histopathologists, such as Masson, were versed in cancer differentiation. The second part of the thesis recounted the commercialization of knowledge. With the creation of cancer centres in France and with national guidelines for their organization, pathologists and histopathology were anchored in cancer treatment. This did not only mean that pathologists were involved in cancer centre's activities. It meant that there was a demand for their knowledge and expertise. This demand was not instantaneous, but developed over the interwar period. Between 1919 and 1924, this was an internal service notably to colleagues from the hospital and medical school. With the regional cancer centre opening in 1924 the service expanded to the regions of the cancer centre's jurisdiction. Once knowledge was codified and transferrable to paper, it became a commercial resource. Tissue samples and money came into the institute, slips of paper went out. As a medical school institute, the pathology institute was remunerated to in fact furnish its collections, its research and its students with pieces of interest.

In pathological anatomy, (material, social and laboratory) practices brought together different types of information or knowledge that was embedded within bodies and body parts. In research, intellectual knowledge was sought and embedded. In teaching, embedded information was relayed. In diagnosis, embedded information was recognized. Teaching, training and research were typical responsibilities of universities and other academic institutions for higher education. In the case study at hand, research, teaching, and diagnosis services shared the same medical school facilities, but entailed differing finalities. Pathological anatomy materials were common to and manipulated for each of these practices. The procuration, accumulation, and transformation of body parts and materials can be presented as an economic activity, in part, because they were integral to a number of variety of exchanges or transactions. Materials and products were exchanged for different finalities; that is, in response to different demands and thereby on different markets or in different types of economies. Some exchanges were non-monetary and others were commercial sales or monetary exchanges. These exchanges formed the crux of an academic moral economy and a healthcare commercial economy.

Archives have disclosed two financial sources of the medical school pathological anatomy lab that lie outside the usually perceived and analyzed higher education ministry endowment for research and teaching defining a scientific institute's budget. First, in the interwar period the *Institut d'Anatomie Pathologique* was managing a wholly commercial activity as it prepared and sold histopathology slides. Second, during the same time the Institute developed a commercial service activity for histopathological laboratory analysis. The pathological anatomy laboratory entering a clinical laboratory service market involved two steps. The first one involved transforming body parts into knowledge and diagnosis information used in medical practice. The second step concerned the fullfledged commercialization of the service, implying the monetarization of a healthcare service with the establishment of prices, units and profits.

Commodification in the context of this thesis is understood as the assignment of economic value to something that had not previously been considered in economic terms. Knowledge produced in a medical science laboratory was not something of immediate use, i.e. it did not have value in use. Once the knowledge, either as knowledge or in a codified communicable form, was of value to someone outside that scientific setting, then the status of the knowledge shifted and it became a commodity. Even if it is not exchanged for profit, its value in use, and eventually the fact that its production engenders costs or requires labour, qualifies the commodification process. In bio-medical disciplines, bio- and human materials are generally put, at times contestedly or unwittingly, in commodification schemes. Such bio-materials were effectively central to exchanges in pathological anatomy. It is essential to understand that although these materials were of value to pathologists, and in this sense were (research) commodities, they were not the focus of large scale economic exchanges. The most financially successful exchange did not involve the body parts materially. Although they were exchanged, what was sold was an immaterial form: their description in histopathology terms. Words. These words, invented and defined in knowledge production, classification, and codification were not only tools of communication, they were little motors of life as they coordinated therapeutics of cancer. These words were keys. Not only were they keys in the sense of a lexicon, but they literally opened doors, notably the doors of cancer centres to cancer patients. Histopathology provided the pluridisciplarity of cancer a grammar of cancer therapy. By holding these keys, pathologists were put in a position of power. In the words of Geroski and of Chandler, histopathology held significant market power for a service issued from accumulated learning, on a market with an undeniable barrier to entry.

A second principal argument of the thesis concerns the question how economy and exchange of laboratory exams and services participated in the commercialization and monetarization of healthcare. Located between the honorarium of a physician and the price of a therapeutic product or remedy, laboratory analysis represents a hybrid service product with characteristics of each of these. The historical genesis of these services and products highlights the ambiguous origin of this diagnostic service located within medical school research and teaching laboratories. At the same time the growth of the service activity contributed to legitimizing money and fees in the medical school pathological anatomy lab. The economic history of the pathological anatomy lab has established how and when the lab integrated and institutionalized a commercial enterprise.

The national and international campaign on hygiene and in particular on cancer provided a context and use of histopathology examinations outside medical school research, thereby creating a demand for them. It was with this demand that histopathology examinations were commodified. Once these examinations were service products, their market had two operating modes: with public healthcare institutions a "forfait" service contract was issued and with private paying patients units or acts that were delivered for a given price. The more lucrative service of providing diagnoses to private patients became a commercial service. The paper testimonies mobilized as sources throughout the thesis are characterized with the financial data or accounts produced for a *Cour des Comptes* inquiry. The financial status of the histopathological examination service was initially ambivalent and costs were insignificant. That is, in the beginning additional costs were integrated in the research budget of the institute and lab reports were returned to hospital practitioners as a favour and in return for specimen provision. At the same time, in this phase – identified as the waiting phase in economic theory concerning the emergence of new markets – a lasting demand for histopathological examinations developed from surgeons and medical practitioners. When the diagnosis activity multiplied to the point that it required several lab technicians and receptionists, costs needed to be covered differently. The two public institutions that initially collaborated with the pathological anatomy lab, the hospital and the CAC "bought" the diagnosis service for lump sums. The two parties agreed to cover costs. These two long term "clients" provided a stable and continuous financial basis for the service activity that developed. Another market developed with the appearance of private paying patients in hospitals and out-patient clinics. The institute increasingly provided a private paying service to medical practitioners outside Strasbourg. The income that this private clientele market generated was significant. In the early 1930s, the institute's director professor Géry nearly quadrupled his university professor salary with the diagnosis activity.

Once supply and demand had created a medical market for histopathology examinations the question of the remuneration of physicians involved, pathologists' honorariums, and the price of services provided needed to be settled. However, it was not immediately given a price, they were paid with honorary payments. In 1935, these laboratory examinations became defined or definable as an act, something that could be pared down to a unit of time, expertise and money, not only for private paying patients, but for the hospital as well. In this context, tarification and accountability through these units was a way of managing rising costs of the hospital and to settle recurring financial disputes between the hospital and the medical school laboratories and between university clinics and out-patient consultations. Concurrently, it opened the floodgates of commercial medical services. If laboratory examinations quantified as acts increased – and they did significantly after 1945 – this meant that laboratory service activities could and would become very profitable for those providing them.

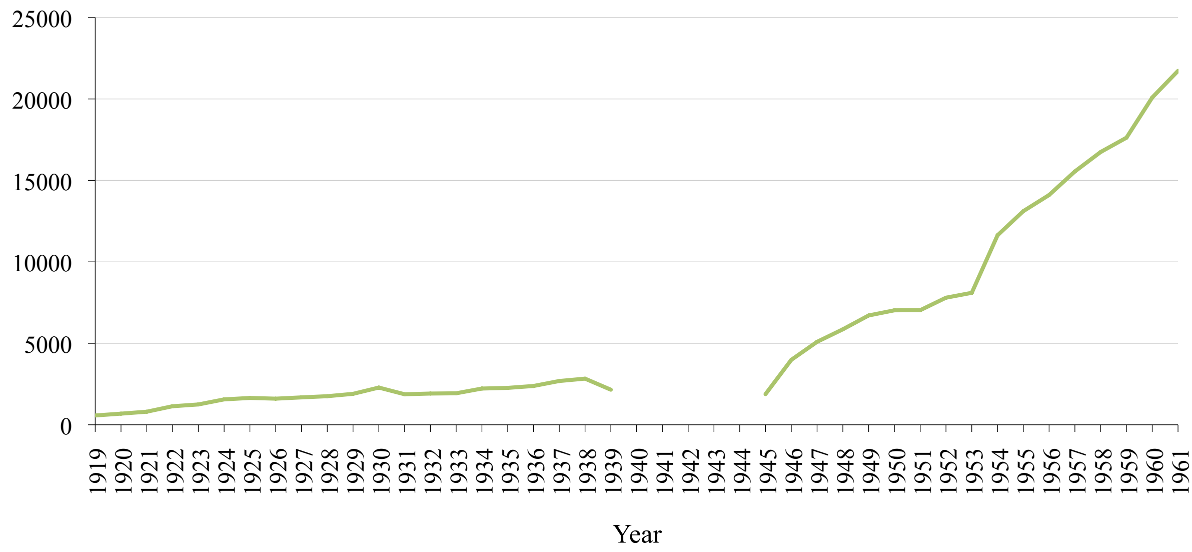


Figure 6.1 The number of histopathology examinations at the *Institut d'Anatomie Pathologique, 1919-1961*

Considering that the number of laboratory acts increased tenfold between 1945 and 1960, as the graph above indicates, means that what was initially seen as a way of managing care became a gold mine for practitioners, specifically pathologists in this case study, and more generally the medical school and the university. Once numbers of examinations increased, either with growing numbers of patients receiving treatment or with numbers of exams per patient multiplying, it inscribed difficulties in financing health care and medical services through insurances or social security.

Exploring what slips through the cracks of institutional and economic categories, not only fills gaps in historical landscapes, but additionally, and expectedly, reveals more lacunes. The terrain explored in this thesis has glimpsed the workings and influence of social and health insurance systems. The unexplored state of economic questions and of payment systems in medical practice (ex. who set fees, when, who paid for what) deserve fuller attention, and although relevant here and addressing them would have permitted me to push financial questions of laboratories further, they were beyond the scope of the thesis. There is much to be explored about their role in negotiating and imposing administrative structures and price charts on priceless services. This might be taken up with further study of the hospital archives that mention *caisses* and corresponding records in the archives of the *Bas-Rhin.*

Somewhat unexpected, is the tale of Pierre Masson and the link between pathological anatomy in Strasbourg and Montreal. A preliminary exploration of archival material in

Montreal has revealed Masson's rich contribution to Montreal's medical centres. It has equally unturned just how much he himself earned. An estimate of Masson's salary is astounding. Using a conversion rate indicated in the *Cour des Comptes* files, Masson's salary of 10 000 CAD in 1927 corresponded to a salary of 350 000 FRF in Montreal.[1] He also maintained his position as chair in Strasbourg and his salary, and additionally managed a private histodiagnosis service in Montreal. Recall, as indicated in the introduction to this chapter that top ranking professors were earning 22 000 FRF in France in 1925. Time has not permitted further exploration of this. His Montreal salary is so outrageous that there is either a mistake or an interesting story to be told. This leads to questions of Canada's turn to European medical scientists for guidance and at the financial sources they had to ensure this. Further study could trace how histodiagnosis services emerged in French Montreal in light of international interactions, in light of equivalent structures at McGill and English Montreal, and in light of centralized laboratories funded by health insurance and Canadian medicare.

Through this thesis a black box has been opened, it suggests and supports a shift in perspective of the history of science and medical activities. This may be used as a starting point or approach for further studies. Although neither science nor medicine were commercial entreprises per se, money did have a role in their everyday activities. Economies and economic logic reveal not research, material, and work dynamics that are otherwise invisible, but they question the normative notions. In order to further generalize the conclusions of this thesis, more case studies in history of science and history of medicine with this approach are needed.

Betwixt is an archaic word for between. Betwixt and between means to be in a midway position, neither one thing or the other. The market for clinical laboratory work was not quite like any other market. It was scientific. It was medical. It was commercial. It was selling words or numbers, and not even very many of them. It was all of these things, but it was not any of them. It does not wholly fit (classic) models of scientific, medical, or commercial entreprises. In this thesis, the laboratory at the *Institut d'Anatomie Pathologique* was betwixt and between. The institutional settings were betwixt and between medical school and hospital. The practices were betwixt and between knowledge production and commercialization.The exchanges were betwixt and between academic moral economies and

[1] There were two sales of slides recorded in the institute accounts that indicate 100 CAD =3545 FRF and 100 CAD = 3415 FRF.

commerical economies. The products were betwixt and between material and intellectual. The income was betwixt and between honorariums and prices.

APPENDICES

Appendix 1

Timeline of Conventions betweeen Hospices Civils de Strasbourg and Faculté de Médecine de Strasbourg

8 Oct 1870	German annexation
30 Oct 1872	Agreement between the *Hospices civils* and the university on the material maintenance of the clinics
15 Mar 1886	Agreement includes the psychiatric clinic
30 Oct 1886	Contract signed between the *Hospices civils* and the university setting material maintenance of new gynecology services
6 Feb 1891	Contract signed between the *Hospices civils* and the university setting material maintenance of *Clinique médicale A* and the old *Clinique de Dermatologie*
10 Mar 1892	Contract signed between the *Hospices civils* and the university setting material maintenance of *Clinique otologique*
23 April 1897	Convention establishing *Mehrkosten*
22 Dec 1909	Contract signed between the *Hospices civils* and the university setting material maintenance of *Clinique infantile*
11 Nov 1918	Armistice
11 Dec 1918	George Weiss is sent to Strasbourg (Professor at the Fac de Méd in Paris; Alsatian origin)
9 jan 1919	George Weiss is officially appointed temporary administrator of the *Faculté de Médecine de Strasbourg*
28 june 1919	*Traité de Versailles*
15 oct 1919	George Weiss is elected dean of the *Faculté de Médecine de Strasbourg*
22 nov 1919	Inauguration of the *Université de Strasbourg*
10 Jan 1922	New convention signed between the *Hospices civils* and the university. The university pays 500 000 FRF annually to the *Hospices civils* (estimated 50% of expenses). The university further contributes 50% of surplus electricity, gas and cold water expenditure.
25 July 1922	Convention specific to the *Policliniques* (out-patient clinics). (38 200 FRF: 25 000 for personnel, 10 200 for hot water and steam, 600 for cold water, 2400 for electricity paid annually.)

24 July 1923	Agreement concerning medical and surgical instruments and X-ray plates. The renewal of instruments covered by the *Hospices civils* and the plates at the expense of the clinics
19 Nov 1923	*Centre Anti-Cancereux Paul Strauss* opens (17 beds)
3 Dec 1923	Contract for the animal pavillon and the teaching pavillon of *Clinique médicale B*. (2500 FRF to be paid annually.)
4 Dec 1923	Contract for the *Nouvelle clinique dermatologique*. (33 600 FRF paid annually. Divided 2/5 FMS & 3/5 HCS.)
17 Dec 1923	Linking all buildings to the heating plant of the *Hospices civils* divided 2/3 – 1/3 between FMS and HCS
8 Jan 1924	Convention concerning the *Institut de Physiologie*. (20 400 FRF annually)
11 Mar 1924	Convention concerning the *Institut d'Hygiène et de Bactériologie* (11 750 FRF paid by the *Faculté de Médecine*; 23 500 FRF for the *Direction départemental de l'Hygiène*.)
5 avril 1928	*Loi en France – des assurances sociales* (in place Feb 1930)
1 oct 1928	L'ecole des sages femmes becomes part of the university
1932	New pavillon at the *Clinique Dermatologique* (no new beds).
1 oct 1932	Stolz, Reeb, and Canuyt found *Centre de transfusion sanguine d'urgence*
28 oct 1935	Convention "hospitalo-universitaire" between the FMS and HCS
1 mai 1936	The *Hôpital orthpédique Stéphanie* is attached to the HCS
18 oct 1936	New CAC opens (18 new beds).
1936	*Clinique privé diaconat* – new OR blocks
1931-1935	*Clinique privé adassa* – modernized
1937	Edmond Redslob creates the *Laboratoire d'Anatomie Pathologique Oculaire* in the *Clinique Ophtalmolgique*

Appendix 2

Conventions and Contracts

2.1 Convention du 10 janvier 1922[1]

Entre Le Directeur général de l'Instruction Publique et des Beaux-arts en Alsace et Lorraine, agissant au nom et pour le compte de Monsieur le Commissaire Général de la République, d'une part,

Et Monsieur Laurent MEYER, agissant au nom de la Commission Administratives des Hospices Civils de Strasbourg, et pour l'exécution des délibérations prises dans les séances des 22 novembre 1921 et 10 janvier 1922,
d'autre part,

A été rappelé et arrêté ce qui suit:

§1. Origine de la Convention.

Le 30 octobre 1872, un accord intervint entre les Hospices Civils et la Faculté de médecine de Strasbourg pour fixer les conditions matérielles du fonctionnement des cliniques universitaires; à peine quelques-unes de ses dispositions demeurent en vigueur; un contrat fait le 30 octobre 1886, à l'occasion de l'ouverture des services de gynécologie, devait servir de type à la réglementation successive des tous les autres par voie, soit de changements aux stipulations originelles, soit de combinaisons nouvelles, de telle sorte qu'après le retour de l'Alsace à la France, les Hospices Civiles ont excipé, pour chaque clinique presque, d'un statut spécial et, par suite, fournirent au sujet de chacune, une «Mehrkostenabrechnung» particulière.
Les décomptes définitifs des «frais supplémentaires» afférents aux années 1913 à 1918, tardivement produits de février 1919 à mai 1920, ont fait état souvent de décisions unilatérales et de simples projets de contrats, comme si les unes et les autres pouvaient avoir force juridique. L'improportionnalité est ainsi apparue, pleine de dangers, de la répartition des charges entre l'Université et les Hospices. Sur la proposition du Directeur Général de l'Instruction Publique et des Beaux-Arts, une «Commission technique consultative» fut instituée, le 15 juin 1920, par Monsieur le Commissaire Général de la République, avec mandat de procéder à la discussion des comptes et à l'examen des contrats litigieux. Sur les représentations de son délégué, une réduction de 40% de la créance présentée par les Hospices était reconnue légitime en principe. Le 15 mars 1921, sur l'initiative de Monsieur Fonlupt, président de la commission au lieu et place au Préfet du Bas-Rhin, un arbitrage définitif fut accepté, qui englobait aussi le décompte de 1919 et ramenait à 600 000.- frs (sous déduction d'acomptes de 584.242frs.72 versés en août 1920, janvier et mars 1921) la créance produite pour 949.302frs.81.
Ce point réglé, la commission mit à l'étude les conditions convenables à un nouveau cahier des charges; après colloques et rapports écrits, elle en a discuté dans ses séances des 5,12 et 19 novembre: le remplacement du régime des Mehrkosten variables d'an à an par une somme préfixe approximativement triple de celle versée aux Hospices pour 1914, fut pris en considération; le 22 novembre, la commission administrative des Hospices Civils, dont il

[1] Casier 50/1. AHUS.

convenait de rechercher par avance l'adhésion au système, déclarait accepter l'application du principe aux exercices 1922, 1923, 1924, 1925 et 1926. La présente convention a ainsi pour but de fixer dans les détails le régime dorénavant unique des dépenses de personnel et des fournitures de chauffage, de lumière, de force et d'eau, dans les cliniques y est dénommées.

§2. Objet de la Convention

Art. 1 - Abandon complet et définitif est, de part et d'autre, consenti des contrats, accords et tractations, de toute date et de quelque nature, qui ont pu exister ou dont l'effet a pu être recherché jusqu'à ce jour, au sujet du fonctionnement et des frais des cliniques universitaires englobées dans la présente convention.

Art. 2 - Les clauses forfaitaires ci-après s'appliquent aux services dits communs, soumis ci-devant au régime des Mehrkosten, savoir:
Clinique médicale A, chirurgicale A, gynécologique et obstétricale, dermatologique (ancienne), ophtalmologique, neurologique, psychiatrique, oto-rhino-laryngologique – à l'exclusion:
1° des Cliniques dites concédées, qui demeurent toutes entières aux frais des Hospices Civils, mais où l'Université à droit d'enseigner, savoir: Clinique médicale B, chirurgicale B, dermatologique (nouvelle), infantile;
2° de la Maternité et du service des maladies chroniques, et de la clinique dentaire, qui sont services, les deux premiers hospitaliers, le troisième universitaire;
3° des policliniques, (sauf les prévisions pour le personnel faites ci-après à l'article 13);
4° des instituts proprement scientifiques; d'anatomie, d'embryologie, de physique biologique, d'hygiène et de bactériologie, de pathologie, de physiologie, de physiologie chimique, de pharmacologie.
Il est entendu pour l'application de cet article:
1) que le Pavillon, dit Salle 75, des maladies contagieuses restera à la disposition de la clinique médicale A, laquelle sera tenue, à titre propre, vis-à-vis de l'Administration des Hospices Civils, de payer loyer annuel de 5000 Frs., à moins que n'intervienne, avant le 1er mars 1922, entre le doyen de la Faculté de médecine et la Direction des Hospices Civils, échange à titre gratuit, des salles 75 et 101 ou, au même titre, toute autre combinaison satisfaisant les deux parties;
2) que l'Administration des Hospices renonce à la demande de 50.000.- Frs., qu'elle a ci-devant faite à la Faculté de médecine, comme prix annuel de location de la nouvelle clinique dermatologique en activité depuis le 1er janvier 1921, et que, ce faisant, elle se bornera à présenter des prétentions pour la fourniture d'eau, de chauffage et de lumière, si le régime forfaitaire était dans l'avenir étendu du groupe des cliniques et services exclus de la présente convention;
3) qu'à pareilles fins, au surplus, la Commission technique consultative s'appliquera avant le printemps à rechercher et établir les bases de pareils accords pour les cliniques, policliniques et instituts ci-dessus exceptés.

Art. 3 – L'entretien des voies et jardins appartenant à la Faculté de médecine dans l'enclos des Hospices Civils passe dans le contrat forfaitaire et au nombre des obligations promises par les Hospices.

§3. Du statut général des cliniques et du service des maladies

Art. 4 – Les titres de propriété et les droits de superficie relatifs aux diverses cliniques feront, dans un délais maximum de six semaines à compter du présent acte, entre le Directeur Général de l'instruction publique et des Beaux-Arts en Alsace et en Lorraine et la Commission Administrative des Hospices ou leurs délégués respectifs, l'objet de recherches et de déterminations: les contradictions existant dans les requêtes de l'ancien curateur et de la Commission des Hospices en date, l'une du 13 novembre 1913, l'autre du 19 juin 1914, et relevées le 4 juillet 1914 dans ses observations par le juge du «Livre Foncier», seront éclaircies, et les résultats de ces travaux inscrits au Livre Foncier, à la diligence du titulaire reconnu des dits droits, aux fins de la loi locale du 26 mars 1897 et de la section 2 du livre 3 du Code Civil allemand. Passé ce délai, et jusqu'à fixation de l'état de droit, pourraient être faites des inscriptions provisoires.

Art. 5 - L'Administration propriétaire des bâtiments, telle qu'elle sera déterminée selon la prévision de l'article précédent, sera tenue, sans pouvoir prétendre à une indemnité, de remédier à tout cause fût-elle un cas fortuit ou de force majeure, qui entraverait la jouissance de l'immeuble.
Les réparations de menu entretien, - récrépiment et peinture, remplacement de vitres et fermetures de portes, – autres que celle résultant de vétusté, force majeure ou accidents extraordinaires, vice de la chose ou défaut de construction, sont à la charge de l'Administration des Hospices, à l'exclusion de celles nécessaires dans les locaux servant exclusivement à des fins d'enseignement. Au cas où des réparations incombent à la Faculté de Médecine devraient être exécutées par les services d'architecture des Hospices Civils, elles ne seraient entreprises qu'après agrément par l'administration universitaire du principe et du devis des travaux.

Art. 6 –
Les modifications et agrandissements des installations existantes, non plus que l'aménagement des installations nouvelles, dont résulterait un supplément de charges pour les Hospices Civils, ne pourront avoir lieu que si, d'une part, l'Administration qui y songe n'en a hiérarchiquement et préalablement notifié à l'autre le projet accompagné de plan et devis, et si d'autre part, dans les deux mois de cette proposition, une décision concordante et expresse des deux administrations n'est intervenue quant à l'exécution des travaux.
Le raccordement des installations particulières des cliniques aux canalisations et génératrices de force, de lumière et de chaleur de l'Hôpital devra, en tous cas, faire l'objet d'études et de résolutions.

Art. 7 -
Les meubles, ustensiles, articles de literie, linge et tous objets mobiliers existant ou servant dans les huit services communs énumérés à l'article 2 sont la propriété reconnue de la Faculté de médecine. La jouissance en est permise, la garde confiée et la responsabilité laissée à l'administration des Hospices, moyennant l'engagement pris par celle-ci de les employer, gérer et surveiller comme s'ils étaient ses biens propres.
Toutefois la Faculté de médecine accepte de tenir comme non compris dans sa propriété les objets énoncés dans plusieurs décisions ou lettres administratives, savoir :
1) Clinique médicale A. – Dossier 30/3, No.14. Lettre du 12 septembre 1894: 110 lits complets, 110 tables de nuit.

Dossiers 39/31 et 31/32: Lettres des 8 avril et 30 septembre 1895, 28 février 1896, 17 décembre 1904; délibération du 7 juin 1901 No. 11: Le mobilier de 3 chambres privées de 1ère et 2^{e} classe.
2) Clinique chirurgicale A. – Dossier 38/2: Délibération du 30 juin 1880 No.5, rapport du Directeur de l'Hôpital du 18 septembre 1901: 138 lits complets, 124 tables de nuit. Délibération du 20 septembre 1901 No.6: Le mobilier de 2 chambres du personnel au pavillon d'isolement; Délibération du 20 décembre 1907 No.7: Le mobilier de 2 chambres privées de 3^{e} classe (3 lits, tables, armoires, fauteuils).
3) Clinique Gynécologique - Dossier 38/1: Délibérations des 20 septembre 1901 No.7,
25 avril 1902 No.12, 14 septembre 1906 No.7: Le mobilier de 5 chambres privées, dont 1 à 3 lits (7 lits en literie, 6 tables, fauteuils, armoires, 5 toilettes, glaces, 1 table pour toilette et 1 baignoire d'enfant). Lettre du 16 juillet 1887: Le mobilier de la baraque destiné à remplacer, pour le service des malades, la salle 38.
4) Clinique de Dermatologie ancienne - Dossier 39/3 No.15: Lettre de l'ancien curateur du 8 avril 1895, sur la vente faite à l'hôpital par l'école normale installée dans la clinique d'un certain nombre d'armoires (30).
5) Clinique ophtalmologique - Dossier 39/2: Rapport du directeur de l'Hôpital du 2 et délibération du 6 juin 1888 : 28 lits. Délibération du 24 octobre 1907 No.12: Le mobilier de 4 chambres privées de 1re classe, dont 1 à 2 lits (lits, armoires, glaces, toilettes).
6) Clinique psychiatrique - Dossier 38/4 : Lettre du 16 mars 1886 : 80 lits.
7) Clinique oto-rhino-laryngologique - Dossier 39/1: Lettre du 7 octobre 1897: 15 lits, dont 3 d'enfants et le mobilier accessoire; 12 armoires. Délibérations des 19 mai, 1er juin et 8 décembre 1921: Le mobilier de 3 chambres d'assistants et 2 chambres privées.

Art. 8 – La Faculté de Médecine a la propriété et la charge des instruments dans tous les services hospitaliers communs et concédés. Un inventaire sera établi incessamment et avant le 10 février dans chacune des cliniques, sur l'ordre du doyen de la Faculté de Médecine par les soins et sous la responsabilité du chef de service, le directeur des Hôpitaux Civils convoqué et contresignant.
Pour tarir d'inadmissibilité abus, la Faculté de médecine, en cas de détérioration ou de bris provenant du fait du personnel appointé par les Hospices Civils, subordonne expressément son obligation de réparer et remplacer à la double condition :
1° d'une demande écrite visée par le chef responsable du service
2° d'un dépôt préalable de l'appareil ou instrument détérioré ou devenu inutilisable.

Art. 9 – L'Administration des Hospices Civils fournira, sans en pouvoir rien répété, aux cliniques dénommées dans l'alinéa 1er de l'article 2 ci-dessus les médicaments, appareils et objets de pansement.
Ne rentrent dans cette clause et obligation que les examens de radiologie appliqués aux malades qui n'ont pas à supporter, de façon distincte, les frais de leur traitement; justification des plaques et des films dépensés à cet effet sera fournie par la Faculté de médecine à l'Administration des Hospices Civils dans la première quinzaine de chaque mois pour le mois précédent.

Art. 10 – La Faculté de Médecine accepte, à la demande de l'Administration des Hospices Civils, de réserver dans chacune des cliniques concédées médicale B et chirurgicale B, des salles ou emplacements pour au moins cent malades de 3^{e} classe strasbourgeois; nul tuberculeux n'y sera admis, nul travail scientifique donné ou poursuivi; nul étudiant en médecine n'y aura l'accès, non plus que nul malade étranger à Strasbourg, hors le cas de défaut de place ou d'encombrement dans les locaux ouverts à l'enseignement.

Art. 11 – La présente convention laisse et garantit leur effet aux prescriptions concernant le service médical, aux réglementations sur le régime intérieur et économique des cliniques, au pouvoir d'instructions du directeur de l'Hôpital à l'égard du personnel payé et aux mesures utiles au contrôle des prestations fournies par l'Administration des Hospices Civils. Elle reconnaît en particulier:

1° le droit pour la Commission administrative des Hospices Civils d'approuver, préalablement à l'entrée du service, la nomination des médecins en chef, assistants et internes des services concédés, et

2° la faculté pour la direction de l'Hôpital de ne plus faire servir qu'au mess central les repas de tous les médecins assistants autres que ceux attachés à la clinique d'accouchements.

§4. Des bases du Contrat Forfaitaire

Art. 12 – L'Administration des Hospices et la Faculté de médecine, en vue du présent et forfaitaire contrat, s'engagent, l'une envers l'autre, à tenir pour justifiées, mais extrêmes en tout cas, l'effectif du personnel au 15 novembre 1921 et la somme des fournitures durant l'exercice 1920.

Art. 13 – Le personnel employé du 15 novembre 1921 dans les cliniques ressortit aux chiffres ci-après:

	Sœurs	Infirmiers	Infirmières diplômées	Gardes malades	Servantes de salle	Servantes de casi??	Sges-femmes	Couturières	Lingères	Cuisinières	Portières, Concierges	Garçon de laboratoire, stérilasteur, infirmier major	Radiologiste (fém.), laborantines, manipultatrices	Surveillant Général	Portier	TOTAL
A) CLINIQUES																
Clinique Médicale A	11	8			13	1		1		1	1		1	1		38
Chirurgicale A	12	7			17	1		2			1					40
Gynécologique	6		2	12	11	1	4	1					1			38
Dermatologique ancienne			2		3								1			6
Dermatologique nouvelle	1	3			4	1		1			1	1				11
Ophtalmologique	3				6											10
Neurologique	3	2	1		9											15
Psychiatrique	5	9			11	1			1			1			1	29
Oto-Rhino-Laryngologique	3	2			4											9
B) POLICLINIQUES																
Dermatologique nouvelle					1							1				2

Ophtalmologique					3											3
Neurologique		1														1
Oto-Rhino-Laryngologique			1													1
Psychiatrique		1														1
	44	33	6	12	82	5	4	5	1	1	3	3	3	1	1	204

Cet effectif ne sera dorénavant point dépassé.

<u>Art. 14</u> – En égard à l'abaissement constant ou accidentel du nombre de lits occupés dans les cliniques, pourra être décidée, par la Commission Administrative des Hospices Civils, sur proposition de l'Administration de l'Hôpital, et après avis conforme du doyen de la Faculté de Médecine, une compression temporaire, dans la mesure des convenances et selon les lois de la prophylaxie, des malades et du personnel en exercice dans les salles; à toute réquisition sur preuve des admissions plus régulières et plus nombreuses, et sans délai l'effectif tout entier du personnel devrait être remis en service.

<u>Art. 15</u> – Les fournitures et dépenses de chauffage et de vapeur, de lumière, de forces et d'eau durant l'exercice 1920, prises pour mesure de l'obligation des Hospices, sont avérées comme suit :

	Chauffage	Electricité courant			Gaz	Eau	
		Triphasé lumière	Triphasé force	Continu		Chaude	Froide
	Chauffage à	HKW	HKW	HKW	m3	m3	m3
Clinique Médicale A	vapeur	14647	1192	1231	12751	2103	27134
Clinique Chirurgicale A	Raccordé	_	_	58	42460	2900	16359
Clinique Gynécologique	_	_	_	_	29120	_	15167
Cl. Dermatologique ancienne	à vapeur	2965	_	_	5611	2840	8875
Clinique Ophtalmologique	id.	4472	4472	332	5345	1046	4124
Cl. Neurologique Annexes	_	6120	_	_	400	12550	7522
salles 33 et 35	_	735					
Clinique Psychiatrique	_	_	_	_	12067	_	35380
Cl. Oto-Rhino-Laryngologique	Raccordé	_	_	110	7513	_	_
TOTAL		28939	5664	1731	115267	21439	116311

Il est toutefois stipulé en tant que réserves et engagements:
1° que le <u>chauffage</u> des cliniques gynécologiques et psychiatriques reste à la charge de la Faculté de Médecine, sauf le paiement du traitement du chauffeur et de l'aide chauffeur de la seconde de ces cliniques, auquel s'engagent les Hospices Civils;
2° que <u>l'électricité</u> en courant alternatif ou triphasé est fournie aux Cliniques chirurgicale A et gynécologique, psychiatrique et oto-rhino-laryngologique par l'usine électrique de la Ville jusqu'à raccordement des dites cliniques à la centrale des Hospices et continuera à être directement acquittée sous les justifications de droit, par la Caisse de l'Université;
3° que le <u>gaz</u> sera remplacé par l'électricité, comme procédé d'éclairage et de stérilisation, dans toutes les cliniques où il existe, dès avant le 31 décembre 1923, à frais communs, sur devis fourni et agrée, à la diligence et par les soins des Hospices civils;
4° que <u>l'eau froide</u> continuera à être demandée dans la clinique oto-rhino-laryngologique aux distributions de la Ville, et sera payée pour elle au service municipal par la Caisse de

l'Université jusqu'à ce que les Hospices aient, dans un délai de 12 mois au maximum, effectué le raccord promis de la clinique aux proses et pompes d'eau de l'Hôpital.

Art. 16 – Le raccordement prévu ci-dessus des cliniques particulières aux installations, canalisations et distributions de chauffages, d'eau, de force et d'électricité de l'Hôpital, devra être opéré au cours des cinq premières années de l'application du présent contrat ; les Hospices Civils en assureront dans les conditions de l'article 15 l'exécution depuis leurs chaudières, leurs turbines ou leurs puits jusqu'à l'entrée des cliniques; les installations intérieures, conformes à des devis préalablement soumis à son approbation, seront à la charge de la Faculté de médecine.
Il sera effectué, tour à tour :
1° pour le chauffage dans les cliniques chirurgicale A, oto-rhino-laryngologique, psychiatrique, gynécologique;
2° pour l'électricité, dans les cliniques chirurgicale A, gynécologique, psychiatrique, oto-rhino-laryngologique. La présente obligation, en ce qui concerne le chauffage, lie les Hospices Civils dans la mesure où les installations existantes seront contradictoirement reconnues aptes à la fourniture.

Art. 17 – A concurrence des quantités d'eau et sous le bénéfice des précisions indiquées aux deux articles précédents, l'administration des Hospices Civils assume pour l'avenir la charge des fournitures de chauffage, de lumière et de force électrique de gaz et d'eau. Le dépassement de la consommation de vapeur pour le chauffage et la stérilisation ne lui confèrera droit à aucune indemnité; l'excès éventuel de dépenses en électricité, gaz et eau froide sera partagé par moitié entre elle et la Faculté de médecine. Par ses soins et à ses frais, des compteurs seront incessamment placés ou vérifiés dans toutes les cliniques; leurs indications seront relevées et notées, chaque mois, contradictoirement, par un employé des Hospices et un agent de l'administration universitaire dûment habilités, sur un livre spécial, que devra viser, sans délai, le médecin-chef responsable de la clinique.

Art. 18 – La Faculté de médecine qui garde provisoirement à sa charge les frais des appareils téléphoniques reliant ses cliniques à l'Hôtel des P.T.T. s'engage à raccorder ces appareils avant la fin de l'année 1922, au poste central de l'Hôpital. Ce raccordement apéré d'accord et à moitié frais avec les Hospices Civils, la Faculté de médecine paiera à l'Administration des Hospices, pour l'entretien et l'usage des appareils, le taux fixé par le servie technique des Hospices, étant entendu que ce taux ne pourra, en aucun cas ni en aucun temps, dépasser celui des administrations publiques.

§5. De la somme forfaitaire

Art. 19 – Elle est une partie, fixée par prévision et par approximation de celle dont les Hospices Civils, sur les bases rapportées aux articles 13 et 15 ci-dessus, se sont prétendus créanciers pour l'exercice 1920, ensemble avec celle représentée par l'entretien des voies et jardins de la Faculté de Médecine dont il a été question à l'article 3, à savoir:

1) Personnel des services communs et de la nouvelle cl. dermatologique	Frs. 619 549.75
2) Distributions de chauffage, lumière, force et eau	Frs. 353 440.45
3) Entretien des voies et jardins de la Faculté de médecine	Frs. 13 392.80
Soit un total de:	Frs. 986 383.00

Art. 20 – A titre de forfait et pour remplacement définitif des Mehrkosten aux chefs discutables et malaisément contrôlables, le budget de l'Instruction Publique s'engage à payer, et l'Administration des Hospices Civils accepte de recevoir, chaque an, et par douzièmes, pour l'ensemble des services et prestations faisant l'objet du présent contrat, une somme unique de cinq cent mille francs (500 000.- Frs).

§6. De l'exécution et de la durée du Contrat

Art. 21 – Tout arrêt ou fléchissement, du fait de l'une ou de l'autre partie, dans l'exécution de l'accord, après avoir été avéré par une mise en demeure de la partie défaillante, donnerait lieu dans les vingt jours de cette mesure, si elle restait sans effet à la réunion de trois arbitres, lesquels, désignés l'un par le Directeur général de l'Instruction publique et des Beaux-Arts en Alsace et Lorraine, le deuxième par le Commission administrative des Hospices Civils, le dernier par les deux autres en dehors de l'administration hospitalière et du personnel universitaire, devrait, dans le délai de deux mois, apprécier les faits et leur donner juste sanction; à peine de quoi serait employée par l'administration publique intéressée, contre l'autre, la voie de droit, afin d'obtenir le bénéfice des obligations contractuelles ou la réalisation du contrat aux torts et risques de la partie en défaut.

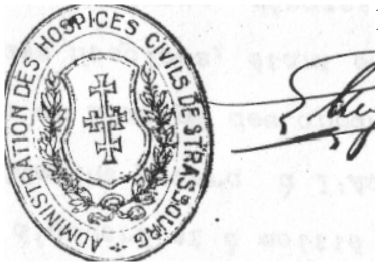
Art. 22 – Le contrat ci-dessus est fait pour valoir cinq ans à compter du 1er janvier 1922.

Art. 23 – Il est entendu, en outre, que ses bases serviront, à titre de transaction nouvelle, à la liquidation des exercices 1920 et 1921, sous déduction des sommes versées en acompte pour l'un et pour l'autre.

Art. 24 – Le rapport de droit, tel qu'il est ci-dessus établi sera à l'expiration de la première période quinquennale, prolongé pour pareille durée, si l'une des partis n'a fait officiellement connaître l'autre, avant le 1er juillet 1926, sa volonté de réviser, d'après les chiffres des douze derniers mois réglés, les bases du forfait. La partie qui userait de cette faculté devra, en outre, à peine de forclusion, formuler, avant le 1er octobre, ses propositions pour le nouveau contrat. Le travail de révision serait fait, le cas échéant, en une commission composée, sous la présidence du préfet du Bas-Rhin ou de son représentant, du directeur général de l'Instruction publique et des Beaux-Arts en Alsace-Lorraine ou de son délégué, du doyen de la Faculté de médecine, de deux membres nommés par la Commission Administrative des Hospices Civils et en outre, à titre consultatif, de Secrétariat Général des Hospices Civils et du Directeur de l'Hôpital.

Fait et signé à Strasbourg, en double exemplaires

10 janvier 1922.



S. Charléty

Vu et approuvé
le Commissaire général

4 février 1922

2.2 Convention du 26 juillet 1922

Entre Monsieur Laurent Meyer, agissant au nom de la Commission Administrative des Hospices Civils de Strasbourg et pour exécution des décisions prises par la dite Commission en sa séance du 25 juillet 1922,
D'une part,

Et monsieur Georges Weiss, Doyen de la Faculté de Médecine de l'Université de Strasbourg, en cette qualité administrateur et dépenses et habile à passer les marchés de la Faculté, conformément aux crédits ouverts au budget de la dite Faculté, selon les articles 27 du décret su 23 décembre 1886, 7 et 8 de celui du 22 juillet 1897.
D'autre part,

Vu 1° la clause du ci-devant contrat forfaitaire du 10 janvier 1922 qui prévoyait un nouvel accord relativement aux frais des policliniques; 2° le rapport fait à la date du 5 juillet 1922, par le Professeur Delpech sur le différent suscité par les décomptes de 1920 et 1921 est soumis à la demande de la Commission administrative des Hospices (lettre des 23 avril et 5 mai 1922) à la commission technique consultative instituée par arrêté de Monsieur le Commissaire Général en date du 15 juin 1920; enfin 3° les délibérations et décisions dites commission administrative et technique, en date des 22 et 25 juillet, touchant le rapport et l'accord susvisés.
Considérant que les policliniques sont, autant qu'une forme d'enseignement pour la Faculté, un moyen d'amener les malades aux salles et à la caisse des Hospices Civils – que, de ce chef, il est temps de substituer à la manière unilatérale, fâcheuse et surannée des décomptes des combinaisons équitables et équilibrées; et qu'à ces fins il est, en particulier, légitime et nécessaire d'opérer la ventilation des dépenses imputées à certaines policliniques (infantile) et se référant, dans la réalité des choses, à l'ensemble de la clinique correspondante.
A été arrêté ce qui suit, pour valoir un % à l'égard de toute les policliniques présentement existantes, la policlinique dentaire exceptée par ce qu'elle est service tout universitaire et sera, au surplus, comprise dans les stipulations en vue d'élaboration qui, à l'automne, parachèveront le système des forfaits et marchés des fournitures pour tous les services et locaux de la faculté de médecine.

Article 1er. – La répartition entre les Hospices Civils et la Faculté de médecine, durant les cinq exercices 1922 à 1926 des dépenses du personnel et fournitures propres aux policliniques a été arbitrée sur le pied des salaires actuels et le taux moyen des fournitures au cours des trois dernières années, dans les limites du tableau ci-après, dont les données, littérales ou ramenées aux réalités ont été fournies par les décomptes et documents des Hospices, et auxquelles les parties entendent donner le caractère de maxima.

									Distributions							
									Eau		Courant Electrique				Chauffage	
											Triphasé		Continu			
	Infirmières	Servantes	Infirmiers	Concierges	Sœurs	Garçons de laboratoire	Dactylo- radiologistes	Gérant	Froide	Chaude	Eclairage	Force	Eclairage	Force	Eau chaude	Eau froide
Policliniques									m3	m3	KWH	KWH	KWH	KWH	Cal.	Cal.
Médicale A	1	1							1074	267	897					222,500,000
Médicale B	1	1							716	196	711				17,000,000	
Chirurgicale A		1		1	1F											
Chirurgicale B			1												27,000,000	
Infantile	1	3		1		1	1	1	402		874			37	35,000,000	
Ophtalmologique		3F														
Gynécologique		1F														
Neurologique			1F													
Psychiatrique						1F										
Oto-rhino-laryngologique			1F													

La lettre F signifie que l'employé en service dans la policliniqu depend de la clinique correspondante et figure déjà au tableau joint à l'article 13 du contrat forfaitaire du 10 janvier 1922.

Article 2. - Les Hospices Civils s'engagent à maintenir le personnel à l'effectif, tel qu'il est spécifié
ci-dessus, d'après les nécessités existantes et reconnues du service des policliniques. Nul emploi ne sera crée ou supprimé, en excès ou en diminution du tableau, hors le consentement écrit du doyen de la Faculté de Médecine. A titre immédiat et tout à fait exceptionnel, une réserve est faite pour celui de concierge de la policlinique chirurgicale A.

Article 3.- Pour simplification de comptabilité, en suite d'accommodements réciproques et à titre de forfait, la contribution de la Faculté de médecine aux dépenses (salaires et assurances sociales, nourriture et logement) du personnel est fixée, pour chacune des cinq années envisagées par l'accord, à une somme fixe de vingt-cinq mille francs.

Article 4.- La consommation d'eau froide sera dorénavant, comptée, non plus séparément par policlinique, mais en une seule masse des distributions et quantités, de manière à assurer plein effet au tarif dégressif qu'à fixé la délibération du conseil municipal en date du 27 novembre 1920, et sur lequel les Hospices Civils maintiennent le rabais de 20% convenu par lettre (1354 19 octobre 1911; 1645 20 avril 1912) du Conseil d'Administration des Hospices Civils et du curateur de l'Université. La Faculté de médecine sera quitte de celle indiquée dans le tableau joint à l'article 1er ci-dessus par le paiement annuel d'une somme de six cent francs.

Article 5. – Les Hospices Civils renoncent, à raison de l'incertitude ou de l'imparfaite justification de la dépense, et en égard à sa minimité certaine, à toute prétention de créance pour livraison d'eau chaude ou vapeur pour stérilisation.

Article 6. – La fourniture du courant électrique triphasé et continu (éclairage et force) a été calculée et acceptée, de part et d'autre, motif pris tout ensemble de l'élévation dans les dernières années des frais de production et de l'atténuation de plus en plus caractérisée par la clause de charbon, aux taux de 0,95 KHW pour le continu et l'alternatif lumière et 0,50 KWH pour le triphasé force. Il a été convenu, en outre et spécialement, de fixer les dépenses de la policlinique infantile pour ses propres besoins, par rapport à celle de la clinique infantile, 2/10 du triphasé et 1/20 du continu force utilisé dans l'ensemble des examens électriques.
La dette de la Faculté de Médecine est, dans ces conditions, arbitrée et arrêtée à une somme de Deux mille quatre cents francs pour chaque année.

Article 7. – L'aménagement, l'entretien et les modifications des installations restent soumis aux usages et particulièrement aux stipulations des art. 5 et 6 du contrat forfaitaire du 10 janvier 1922. – Les compteurs achetés et installés en 1921 dans les policliniques par les Hospices y demeureront pour la justification de la dépense dans la limite des moyens convenus. Leur usage donnera lieu au paiement, par la Faculté de médecine, non d'un prix de location, mais d'une somme de deux cents francs par an et pour l'ensemble des policliniques, au titre d'amortissement.

Article 8. – La distribution des calories nécessaires au chauffage à 18° par vapeur et par eau chaude des locaux des policliniques a été ramenée et restera fixée, quelle que puissent être, durant la période quinquennale du marché, les variations de prix de la tonne de charbon ou de la main d'œuvre et celles de l'aménagement ou de l'amortissement des installations à 3,20 Frs. et 3,70 Frs. les 100 000 calories selon si le procédé de chauffage est à vapeur ou à eau chaude.

Article 9. – Pour les quantités énoncées au tableau de l'article 1er et au tarif fixé par l'article précédent à une dépense forfaitaire de Dix-mille francs par an est mise à la charge de la Faculté de médecine.

Article 10. – Nul chef de dépenses et fournitures autres que ceux dénombrés et réglés aux articles précédents d'eau froide, de courant électrique et de calories ne fera sous aucun prétexte, durant le présent accord, et en l'état des policliniques actuellement ouvertes, l'objet d'une réclamation pécuniaire utile des Hospices à la faculté. Par contre, tout excès éventuel et d'importance des dépenses d'eau et d'électricité par rapport aux quantités inscrites dans le tableau ci-dessus sera partagé, par moitié, aux frais des Hospices Civils et de la Faculté de médecine.

Article 11. – A titre de forfait, pour remplacement définitif des décomptes aux énonciations discutables, souvent contraires et malaisément contrôlables, le doyen de la Faculté de médecine s'engage à payer sur son budget, et l'Administration des Hospices accepte de recevoir, chaque an, et par douzièmes, pour l'ensemble des services et fournitures faisant l'objet du présent marché, une somme unique de Trente-huit mille deux cent francs.

Article 12. – Renvoi exprès et intégral est fait aux stipulations consignées dans les articles 21 à 24 au contrat forfaitaire du 10 janvier 1922, en vue d'étendre leur force obligatoire à ce qui, touchant les policliniques, concernera les garanties d'exécution du présent marché de fournitures, su durée pour cinq années à compter du 1er janvier dernier, et l'application de ses bases à l'apurement des décomptes et à la liquidation des exercices de 1920 et 1921.

Fait et signé à Strasbourg, en double exemplaire, le 25 juillet mille-neuf-cent-vingt-deux.

Signé L MEYER Signé WEISS

Vu et approuvé
Strasbourg, le 26 juillet 1922.
Le Commissaire Général de la République
Cachet du Commissariat Général. Signature.

2.3 Convention du 28 octobre 1935

Portant règlement des rapports passés et futurs des Hospices Civils de Strasbourg et de la Faculté de Médecine de l'Université de cette Ville et transfert de propriété de l'une à l'autre de ces deux administrations.

ENTRE: Monsieur ROBLOT, Préfet du Bas-Rhin, Chevalier de la Région d'Honneur, agissant au nom de l'Etat, Monsieur DRESH Recteur de l'Académie de Strasbourg, Officier de la Légion d'Honneur, agissant au nom de l'Université de Strasbourg , Monsieur FORSTER, Doyen de la Faculté de Médecine de Strasbourg, Chevalier de la légion d'honneur agissant en tant que de besoin au nom de la Faculté de Médecine de ladite Ville, Monsieur WEISS, Directeur des Domaines du Bas-Rhin et du Haut-Rhin à Strasbourg, Chevalier de la Légion d'Honneur, agissant au nom de l'Etat, en tant que la présente convention porte transfert de propriétés de biens meubles et immeubles, appartenant à l'Etat, d'une part,

ET: Monsieur Charles FREY Député, Maire de la ville de Strasbourg, Président de la Commission administrative des Hospices Civils de Strasbourg, dûment autorisé par délibération de la Commission administrative desdits Hospices du 28 octobre 1935 N°I approuvé par Monsieur le Préfet du Bas-Rhin, après avis conforme du Conseil Municipal de Strasbourg, agissant aussi bien au nom de la Ville de Strasbourg qu'en celui des Hospices Civils de Strasbourg, d'autre part,

Il a été convenu et constaté ce qui suit, aux fins de mettre un terme à la complexité des rapports existants à Strasbourg entre la Faculté de Médecine et les Hospices Civils :

Titre 1er.- Règlement des rapports à venir entre la Faculté de Médecine et les Hospices Civils de la Ville de Strasbourg

Article 1er – A l'intérieur du périmètre des Hospices Civils tracé en bleu sur le plan I annexé à la présente convention, l'Université de Strasbourg est à ce jour propriétaire:
1° Du sol et des bâtiments compris à l'intérieur du périmètre tracé en rouge
2° Des bâtiments 38 (clinique médicale) avec son pavillon des animaux. La bâtiment 46 (clinique ophtalmologique); E. (Institut scientifique d'histologie) marqués en rouge.
3° En outre, par l'effet du droit de superficie résultant de la convention du 15 avril 1913, mais sous les conditions du droit local, du bâtiment n°23 (clinique neurologique) marqué en violet sur le plan.

Article 2 – Par le fait des présentes conventions, à l'intérieur du même périmètre tracé en bleu sur le plan N°2 annexé à la présente convention, la propriété, sol et bâtiment compris est dévolue ainsi qu'il suit:
Propriété définitive de l'Université: à l'intérieur des périmètres tracés en rouge sur ledit plan 2.
Propriété définitive des Hospices Civils: de tout le restant à l'intérieur du périmètre tracé en bleu audit plan.

Article 3 – Par application de l'article précédent, l'Université conservera ses Instituts scientifiques:
A) Anatomie, et anatomie pathologique et médecine légale
B) Chimie biologique et Embryologique
C) Physiologie et physique biologique

D) Pharmacologie et médecine expérimentale
E) Institut d'Histologie
47. Ancienne Clinique de Dermatologie et salle du gymnase
48. Clinique dentaire et ancienne clinique oto-rhino-laryngologie
Pavillon des animaux et autres petites constructions non numérotées à l'intérieur des périmètres rouges.

Elle acquiert le sol de l'Institut d'Histologie et la partie du sol de la salle du gymnase qui jusqu'à présent n'est pas encore sa propriété.
Elle abandonne aux Hospices Civils:
1) le sol, les bâtiments et les jardins avoisinants des cliniques et policliniques suivantes:
40, 41, 42 - clinique chirurgicale A avec son pavillon d'isolement et sa policlinique;
43 - Clinique psychiatrique
44 et 45 – Clinique gynécologique et obstétricale avec son pavillon d'isolement.
49 – Locaux du contrôle sanitaire et de l'ancien secrétariat de la Faculté de Médecine.
36 – Dépôt mortuaire

2) le sol (pour autant qu'il ne soit pas déjà propriété des Hospices Civils) et les bâtiments des cliniques suivants :
38 – Clinique médicale A
46 – Clinique ophtalmologique

3) Le droit de superficie visé ci-dessus avec la clinique neurologique

4) Toutes les routes et voies d'accès.

Article 4 – La plan N°2 annexé à la présente convention fait foi des délimitations. Les administrations, futures propriétaires des bâtiments, prennent respectivement à leur charge et à leur risques les immeubles et le sol de leur état actuel.

Article 5 – Toutes grosses et petites réparations, toutes dépenses d'entretien et d'exploitation afférents au personnel et au matériel sont à la charge exclusive des propriétaires. Exceptionnellement, dans les bâtiments qui sont propriété des Hospices Civiles encadrés en vert, sur le plan 2, amphithéâtres et laboratoires de clinique utilisés pour l'enseignement ou l'Administration, à savoir:
Partie du bâtiment 34 (actuellement secrétariat de la Faculté de Médecine) ;
18 – Pavillon d'enseignement de la clinique médicale B
28 – Clinique infantile (partie du bâtiment central)
Aile du bâtiment 40 de la clinique chirurgicale A
Partie centrale et laboratoire de l'Aile Nord de la clinique gynécologique
Amphithéâtre et laboratoire de clinique médicale A
la Faculté de Médecine aura à sa charge les dépenses de chauffage, de gaz, d'électricité, d'alimentation d'eau chaude et froide, l'exclusion de toutes autres.

Cette obligation n'aura effet, qu'à dater du jour où les compteurs auront été placés par les soins et aux frais des Hospices Civils dans les parties des bâtiments énumérés ci-dessus.

Les prix de ces différentes fournitures seront fixés par contrats régulièrement approuvés.

Article 6 – a) Toutes les policliniques – à l'exception de la clinique dentaire – quel qu'ait été leur régime antérieur, seront, par l'application des articles précédents exploités à son compte et profit par l'Administration des Hospices Civils, laquelle s'engage à faire délivrer régulièrement des quittances par l'un de ses agents pour toute recette effectuée.

b) les meubles, ustensiles, articles de literie, linge, les instruments médicaux et chirurgicaux, les appareils radioscopiques et radiologiques et tous objets, mobiliers existant dans les servies sont ou deviennent propriété de l'Administration des Hospices Civils.

c) les appareils de laboratoire, les livres de bibliothèques restent propriété de la Faculté.
Un inventaire de tous ces objets sera dressé contradictoirement entre l'Administration des Hospices et la Faculté de Médecine.
Les membres du personnel de l'Etat qui auront à revendiquer les objets personnels déposés dans les cliniques seront, à cette occasion, inviter à justifier leur propriété pour les réserver à leur profit.

L'entretien et le renouvellement de tout le mobilier et de toutes les catégories d'objets énumérés aux alinéas précédents à l'exclusion de celles visées sous l'alinéa C seront à la charge de l'Administration de Hospices.

Article 7 – Une convention spéciale à conclure entre l'Administration des Hospices Civils et la Faculté de Médecine et régulièrement approuvée fixera les limites et les conditions dans lesquelles seront remboursés les frais d'hospitalisation, d'examen, de soin des clients personnels que les membre de la Faculté de Médecine sont autorisés à recevoir et à traiter dans les locaux des Hospices Civils de Strasbourg.

Article 8 – Les Hospices Civils s'engagent à laisser à perpétuité, comme par le présent, les cliniques à l'entière disposition de la Faculté de Médecine pour l'enseignement. La Direction des cliniques est assurée par la Faculté en ce qui concerne le personnel médical, et par les Hospices Civils en ce qui concerne le personnel administratif et le personnel de service. Les traitements à payer par l'Etat, l'Université ou la Faculté de Médecine comprennent, à l'exclusion de tous autres, ceux des professeurs, agrégés, chargés de cours, chefs de clinique ainsi que ceux des assistantes, laborantines et garçons de laboratoire intégralement employé employés aux travaux de recherche et d'enseignement. Les médecins et chirurgiens de policlinique sont nommés par la commission administrative des Hospices Civils sur présentation du chef de service. Le Préfet statuera en cas de désaccord. Les internes et les externes sont nommés pas la Commission administrative après concours organisé par la Faculté de Médecine entre les candidats figurant sur une liste arrêtée par le Doyen de la dite Faculté. Les médecins et chirurgiens des policliniques, les internes et les externes sont indemnisés par les Hospices Civils. Les sages-femmes sont nommées par l'Administration des Hospices Civils et payées par eux.

Article 9 – Le prix global de toutes les cessions faites par l'Etat, l'Université et la Faculté de Médecine en exécution des présentes conventions, est fixé à 100. F. L'est également à la même somme le prix de cession faite par les Hospices.
Toutefois, il est entendu qu'au cas où les Hospices Civils rétrocèderaient ou délaisseraient le bâtiment ou le sol de l'un des établissements cédés par la présente convention, sans faire dans un délai de deux ans, remploi en nature du prix par la rétrocession ou le délaissement en sol des bâtiments d'affectations hospitalières, 75% du prix obtenu reviendront au cédant actuel et 25% aux Hospices, cessionnaire actuel. La même clause vaudra à l'égard des terrains acquis

par l'Etat du fait de la présente convention, si le remploi du prix représentatif de l'abandon ou du délaissement n'est pas fait pour des besoins d'enseignement supérieur de l'ordre des sciences médicales.

Article 10 – A titre de compensation des charges nouvelles que les Hospices civils, par la présente convention, assumant à dater du 1er Janvier 1935, il sera versé par l'Etat à l'Administration des Hospices Civils :

1°) Dans le délai de trois mois à partir de la signature de la présente convention, une somme de 2.500.500.-Fr. (Deux millions cinq cent milles francs) que les Hospices Civils s'engagent à employer à la remise en état des immeubles acquis par eux du fait des textes ci-dessus.

2°) Au 31 décembre de chaque année de 1935 à 1944 inclus, des annuités dégressives ainsi fixées :

1935……………………………………………….. 900 000.-
1936……………………………………………….. 850 000.-
1937……………………………………………….. 800 000.-
1938……………………………………………….. 750 000.-
1939……………………………………………….. 650 000.-
1940……………………………………………….. 550 000.-
1941……………………………………………….. 400 000.-
1942……………………………………………….. 350 000.-
1943……………………………………………….. 200 000.-
1944……………………………………………….. 100 000.-

Passé ce délai de dix ans pleins, l'Administration des Hospices Civils n'aura plus à prétendre à une subvention quelconque de l'Etat, de l'Université ou de la Faculté de Médecine de Strasbourg, si ce n'est à titre de fournisseur ordinaire des locaux et instituts administratifs restant à la propriété de la Faculté de Médecine ou de l'Université de Strasbourg.

Article 11 – Dispositions transitoires
Les Dispositions de la présente convention ne sont applicables aux recettes et aux dépenses d'exploitation des policliniques qu'à dater du 1er janvier 1936.

Titre II. – Règlement du passé
Article 12 – Les dettes contractées à l'occasion de fournitures faites par l'Administrations des Hospices Civiles à la Faculté de Médecine pour les instituts scientifiques et pour le fonctionnement des policliniques seront payées par l'Etat ou par la Faculté de Médecine, lorsque leur montant exact aura été contradictoirement arrêté avec la commission administrative sur la base de la lettre de Monsieur Le Conseiller de l'Etat, directeur général des services d'Alsace et de Lorraine et la réponse de la commission administrative des Hospices Civils en dates des 12 juin et 31 juillet 1935.

Article 13 – Toutes les autres dépenses auxquelles les Hospices Civils de Strasbourg réclament que l'Etat, l'Université ou la Faculté de Médecine participent, et afférentes à la période antérieure au 1er janvier 1935 – et, pour les policliniques, au 1er janvier 1936, sont d'un commun accord entre les parties contractantes, réputées définitivement réglées par le paiement forfaitaire d'une somme de 3 000 000.- Fr. (Trois millions de francs) qui sera mandatée au profit des Hospices civils de Strasbourg dans les trois mois de la signature de la présente convention.

Article 14 – Sont annexés à la présente convention les plans N°1 et N°2 ci-dessus visés, et l'acte de vente dressé en exécution de la présente convention pour les besoins de l'Office de Livre Foncier.

Fait à Strasbourg,
le 28 octobre 1935.

Le Préfet du Bas-Rhin
Signé : ROBLOT

Le Recteur de l'Académie de Strasbourg
Signé: J. DRESCH

Le Président Délégué de la Commission
Administrative des Hospices Civils
Signé : SCHIESS
Signé : FREY

Le Doyen de la Faculté
de Médecine de Strasbourg
Signé: FORSTER

Le Directeur de l'Enregistrement
des Domaines et du Timbre des Départements
du Bas-Rhin et du Haut-Rhin
Signé : WEISS

2.4 Contrat entre l'Université de Montreal et Pierre Masson du 1 décembre 1926[2]

Entre l'Université de Montréal représentée pour sa Faculté de Médecine, autorisée à cette fin, et Monsieur Pierre Masson, professeur à l'Université de Strasbourg, en congé autorisé, il est convenu ce qui suit :

I°. La Faculté de Médecine nomme Monsieur Pierre Masson professeur d'Anatomie pathologique, et comme tel le charge de cet enseignement en conformité avec les programmes et les horaires de la Faculté.

2°. Le professeur Pierre Masson devant par ailleurs s'occuper des laboratoires de l'Hôpital Notre-Dame, la division de son temps dans la mesure du possible se fera comme suit : les matins appartiendront à l'Hôpital Notre-Dame, les après-midi. à la Faculté de Médecine.

3°. En considération du travail du laboratoire, de la direction et de la surveillance du musée, de l'enseignement (cours réguliers ou cours de perfectionnement) que le professeur Pierre Masson est appelé à faire dans sa Faculté de Médecine, l'Université de Montréal lui versera annuellement et ce à partir du premier décembre 1926 la somme de cinq mille dollars.

La présente convention est proposée et acceptée de part et d'autre pour une durée de cinq années. Mais résiliation pourra toujours en être faite sur avis préalable de six mois par l'une ou l'autre des parties.

Il est de plus convenu que si la demande de résiliation survenait du fait de l'Université de Montréal, le professeur Pierre Masson aurait droit à une indemnité pour frais de retour en France, le montant de cette indemnité ne devant pas dépasser un douzième de ses honoraires annuels comme professeur à la Faculté de Médecine de l'Université de Montréal.

[2] File: Pierre Masson, 80. Cote E38, 90/70/2/1. AUM.

2.5 Convention entre l'Hôpital Notre-Dame et le Professeur Pierre Masson du 1 décembre 1926[3]

Entre l'Hôpital Notre-Dame de Montréal représenté par le Docteur Louis de L.Harwood, son président, autorisé à signer la présente convention et le professeur Pierre Masson de l'Université de Strasbourg, il est convenu ce qui suit :

1°. L'Hôpital Notre-Dame nomme le professeur Pierre Masson directeur de ses laboratoires spécialement chargé de l'Anatomie pathologique.

2°. Le professeur Masson consacrera les matinées au travail de l'Hôpital, le reste de son temps devant appartenir à l'Université de Montréal à titre d'enseignement.

3°. En considération du travail personnel du professeur Pierre Masson, de la direction et de la surveillance générale des laboratoires de l'Hôpital Notre-Dame, l'administration de cet hôpital versera par mensualités et annuellement au Professeur Pierre Masson, la somme de cinq mille dollars, et ce à partir du Ier décembre 1926.

4°. Il est entendu que les honoraires professionnels pour histo-diagnostics versés au professeur Pierre Masson pour des malades étrangers à l'Hôpital resteront sa propriété moins une légère rémunération à fixer pour les frais de laboratoire.
Les histo-diagnostics pour malades hospitalisés à Notre-Dame seront faits au bénéfice exclusif de l'Institution.

5°. Le professeur Pierre Masson aura la responsabilité et par conséquent le contrôle absolu, non seulement des pièces d'autopsie, mais également de la totalité des pièces chirurgicales recueillies aux opérations.

Il en disposera pour le mieux des intérêts de l'Hôpital et de l'enseignement.

6°. La présente convention est proposée et acceptée de part et d'autre pour une durée de cinq années. Mais résiliation pourra toujours être faite sur avis préalable de six mois par l'une ou l'autre des parties.

Si la résiliation est demandée par le Professeur Pierre Masson, en aucun cas celui-ci ne pourra contracter engagement avec aucun autre hôpital canadien.

Il est de plus convenu que si la demande de résiliation venait du fait de l'Hôpital Notre-Dame, le professeur Pierre Masson aurait droit à une indemnité pour frais de retour en France, le montant de cette indemnité ne devant pas dépenser un douzième de ses honoraires annuels tels que fixés au présent contrat.

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[3] File: Pierre Masson, 80. Cote E38, 90/70/2/1. AUM.

2.6 Contrat Entre l'Université de Montréal et le professeur Pierre Masson du 2 juin 1931[4]

Le professeur Pierre MASSON, titulaire de la chaire d'Anatomie pathologique de l'Université de Montréal depuis le 1er janvier 1927, restera en fonction aux conditions suivantes, qui entreront en vigueur, le 1er septembre 1931.
Le professeur Pierre MASSON aura les mêmes garanties d'inamovibilité que les professeurs titulaires de nationalité canadienne. Il aura droit à la totalité des vacances universitaires.
Il recevra un traitement annuel de $12 000.00 garanti par l'Université de Montréal. Lorsqu'il atteindra la limite d'âge, il aura droit à une retraite au même titre que les autres professeurs.

Ses fonctions seront les suivantes :

Direction du département d'Anatomie pathologique de l'Université et de l'enseignement de l'Anatomie pathologique.

Direction et contrôle de laboratoires d'Anatomie pathologique de l'Hôpital Notre-Dame, de l'Hôtel-Dieu et de l'Hôpital Ste-Justine par délégation de l'Université et sans contrat personnel avec aucun des hôpitaux sus-nommés. Il va sans dire que la responsabilité du professeur Pierre MASSON envers les hôpitaux ne sera engagée qu'en autant que ces derniers lui fourniront des moyens matériels suffisants et le personnel compétent et stable chargé d'expédier la besogne courante.

Contrôle scientifique de toutes les pièces anatomiques et biopsies provenant des malades de salles et de dispensaires, ainsi que des pièces opératoires provenant des malades payants traités dans l'un des sus dits hôpitaux.

Réserve

Tout examen de biopsie, provenant d'un malade privé, avant opération ou traitement, de même que toute consultation donnée à un malade privé, sur la demande d'un médecin ou d'un chirurgien traitant, seront considérés comme consultation de spécialiste. Dans les cas ainsi déterminés, le professeur MASSON aura le droit d'envoyer son compte au malade. En cas de biopsie, une somme de $5 sera versée à l'Hôpital, aussitôt après perception, par le professeur MASSON, de ses honoraires.

Le montant minimum de ses honoraires sera de $20.

Si le malade se refuse à payer cette somme, l'examen sera fait et le rapport signé par un assistant du laboratoire.

Le professeur Pierre MASSON aura le droit de donner des consultations anatomopathologiques à des malades non hospitalisés dans l'une des institutions desservies par lui. Ces malades seront considérés comme clients privés du professeur MASSON qui, s'il y a lieu examinera leurs pièces à l'Université.

Le professeur Pierre MASSON

Pour l'Université de Montréal :
Le recteur,
Mgr J.-V. PIETTE, P.A.
Pour la Faculté de médecine :
L. de L. HARWOOD

Montréal, le 2 juin 1931.

[4] File: Pierre Masson, 80. Cote E38, 90/70/2/1. AUM.

Appendix 3

Laws organizing the medical analysis activities in France, 1946

3.1 Loi N° 46-447 du 18 mars 1946

Loi N° 46-447 du 18 mars 1946 portant statut des laboratoires d'analyses médicales.

L'Assemblée nationale constituante a adopté,

Le Président du Gouvernement provisoire de la République promulgue la loi dont la teneur suit :

Article premier. – Nul ne peut ouvrir, exploiter ou diriger un laboratoire d'analyses médicales s'il n'est pourvu d'un des diplômes dont la liste sera fixée par décret portant règlement d'administration publique pris sur proposition du Ministre de la Santé Publique et de la Population.

Sont considérées comme analyses médicales les examens de laboratoires destinés à faciliter le diagnostic médical, le traitement ou la prophylaxie des maladies humaines.

Article 2 – Toute publicité est interdite aux laboratoires d'analyses médicales, à l'exception de la publicité scientifique auprés du Corps médical et pharmaceutique.

Article 3 – Les inspecteurs du Ministère de la Santé Publique et de la Population sont habilités à inspecter les laboratoires d'analyses médicales.

Article 4 – Les dispositions de la présente loi ne s'appliquent pas aux laboratoires dépendant de l'armée, de la marine ou de l'air.

Article 5 – Le Ministre de la Santé Publique et de la Population peut accorder l'autorisation de diriger un laboratoire, à titre exceptionnel et sur avis de l'Académie de Médecine et de la Société de Pharmacie de Paris, à des personnalités scientifiques qualifiées ne possédant pas les diplômes prévus à l'article 1er.

Article 6 – Un décret portant règlement d'administration, pris sur proposition du Ministère de la Santé Publique et de la Population fixera les conditions d'application de la présente loi.

Article 7 – Toute infraction à la présente loi sera considérée comme une infraction aux lois concernant l'exercice de la médecine.

La présente loi, délibérée et adoptée par l'Assemblée nationale constituante, sera exécutée comme loi de l'Etat.

Fait à Paris, le 18 mars 1946.

Félix Gouin.

Par le Président du Gouvernement provisoire de la République :

Le Ministre de la Santé Publique et de la Populations,

R. Prigent.

Le garde des sceaux, Ministre de la Justice,

Pierre-Henri Teitgen.

3.2 Décret N° 46-1111 du 18 mai 1946

Décret N° 46-1111 du 18 mai 1946 portant règlement d'administration publique pour l'application de la loi N° 46-447 du 18 mars 1946, portant statut des laboratoires d'analyses médicales.

Le Président du Gouvernement provisoire de la République,
Sur le rapport du Ministre de la Santé Publique et de la Population,
Vu la loi du 18 mars 1946 portant statut des laboratoires d'analyses médicales et notamment les articles 1er et 6, ainsi conçus :

« *Article premier.* – Nul ne peut ouvrir, exploiter ou diriger un laboratoire d'analyses médicales s'il n'est pourvu d'un des diplômes dont la liste sera fixée par décret portant règlement d'administration publique pris sur la proposition du Ministre de la Santé Publique et de la Population. »

« *Article 6.* – Un décret portant règlement d'administration publique, pris sur proposition du Ministre de la Santé Publique et de la Population, fixera les conditions d'application de la présente loi » ;

Le Conseil d'Etat entendu,
Décrète :

Article premier. – Nul ne peut ouvrir, exploiter ou diriger un laboratoire effectuant les analyses médicales telles qu'elles sont définies par la loi du 18 mars 1946, s'il ne possède l'un des diplômes d'Etat de docteur en médecine, de pharmacien ou de vétérinaire et s'il ne remplit les conditions exigées pour exercer la profession de médecin, pharmacien ou vétérinaire. *Les laboratoires désirant pratiquer les analyses anatomo-pathologiques devront disposer des services permanents d'un docteur en médecine*. Lorsque le laboratoire sera exploité par une société, la majorité du capital devra appartenir à des personnes possédant les diplômes visés ci-dessus.
Si le laboratoire comprend plus de dix employés, le directeur doit être assisté d'un adjoint possédant un des diplômes prévus à l'alinéa précédent. Il doit être assisté d'un deuxième adjoint si le laboratoire comprend plus de trente employés.
Quel que soit le nombre des employés, un directeur suppléant possédant un des diplômes prévus au premier alinéa doit être désigné à l'avance pour remplacer, en cas d'empêchement de plus de quarante-huit heures, les directeurs et directeurs adjoints.
Nul ne peut être employé comme directeur ou directeur adjoint dans *plus d'un laboratoire*. Cette interdiction n'est pas applicable aux directeurs suppléants visés à l'alinéa précédent du présent article.
Les laboratoires spécialisés désirant effectuer les examens sérologiques pour le diagnostic de la syphilis ou les examens biologiques pour le diagnostic de la grossesse ainsi que ceux fabriquant les auto-vaccins, restent soumis aux lois et règlements particuliers qui les régissent.

Article 2. – Toute personne, physique ou morale, qui se propose d'entreprendre ou de poursuivre l'exploitation d'un laboratoire d'analyses médicales formule une déclaration écrite.

La déclaration, rédigée sur papier timbré, mentionne les noms, prénoms, professions, titres universitaires et hospitaliers, diplômes et certificats, nationalité et domiciles et l'auteur de la déclaration, ainsi que du directeur suppléant et du ou des directeurs adjoints s'il y a lieu.
Si elle est formée par une personne morale, elle mentionne les mêmes renseignements pour tous les membres composant la personne morale impétrante, ainsi que le montant des capitaux engagés par chacun d'eux.
Dans tous les cas, les copies certifiées conformes des diplômes et certificats des intéressés seront jointes à la déclaration.
Toutefois, les dispositions des paragraphes précédents ne sont pas applicables s'il s'agit d'un laboratoire relevant de l'Etat, d'un département, d'une commune ou d'un établissement public, ou reconnu d'utilité publique à caractère sanitaire, d'une société mutualiste ou d'une caisse de Sécurité Sociale. En ce cas, la *déclaration formulée* sur papier libre est signée par l'autorité responsable.
La déclaration est adressée au *Préfet du département* dans lequel fonctionne ou doit fonctionner le laboratoire.
Elle indique la dénomination choisie par le laboratoire et son adresse.
Le Préfet en délivre récépissé et la transmet au Ministre de la Santé Publique et de la Population. *Le diplôme du et des praticiens devra être enregistré au greffe du tribunal* du ressort de la localité où fonctionne le laboratoire. Toutefois, cet enregistrement ne sera pas nécessaire lorsque le laboratoire est adjoint à un cabinet médical ou à une officine de pharmacie dont le praticien titulaire a déjà fait enregistrer son diplôme.
Dans tous les cas, la déclaration doit être accompagnée d'un plan coté des locaux servant aux analyses, ainsi que de la liste des principaux appareils.

Article 3. – Le Ministre de la Santé Publique et de la Population arrête et tient à jour la liste des laboratoires en exercice.
Toute déclaration d'*enregistrement* provoque l'*inscription* du laboratoire qu'elle concerne sur cette liste. Le numéro d'inscription sur ladite devra figurer de façon très apparente sur tous les comptes rendus d'analyses émanant du laboratoire et sous la forme obligatoire suivante : « Le laboratoire enregistré sous le n° …. ». Aucun laboratoire *ne pourra fonctionner s'il n'est muni de ce numéro d'inscription.*
Une déclaration identique doit être faite à toute changement de titulaire ; elle est adressée au Préfet et transmise par celui-ci au Ministre de la Santé Publique et de la Population pour nouvelle inscription.

Article 4. – Il est créé, au Ministère de la Santé Publique et de la Population, un Conseil supérieur des laboratoires d'analyses médicales chargé d'étudier toutes les questions relatives aux laboratoires d'analyses médicales. Sa composition et son fonctionnement sont fixés par arrêté du Ministre de la Santé Publique et de la Population.

Article 5. – En application de l'article 5 de la loi du 18 mars 1946, l'autorisation de diriger un laboratoire pourra être accordée aux personnes non munies des diplômes exigés à l'article 2 du présent règlement, notamment aux docteurs ès sciences et aux ingénieurs chimistes, les uns et les autres possédant au minimum les certificats d'études supérieurs de chimie générale, de physiologie et de chimie biologique.
La demande visée à l'article 5 de la loi du 18 mars 1946 sera faite sur papier timbré et devra mentionner les noms, prénoms, titres universitaires, diplômes et certificats, nationalité et domicile de l'auteur de la demande. Les copies des diplômes et certificats, certifiées conformes, devront être jointes.

La demande est adressée au Préfet du département dans lequel fonctionne ou doit fonctionner le laboratoire, elle indique la dénomination choisie pour le laboratoire et son adresse. Le Préfet en délivre récépissé et le transmet avec l'avis du directeur départemental de la Santé et ses propositions au Ministre de la Santé Publique et de la Population.
Elle est soumise pour avis à l'Académie de Médecine et à la Société de Pharmacie de Paris. Elle est instruite par le Conseil Supérieur des Laboratoires, lequel en fait rapport au Ministre de la Santé Publique et de la Population qui accorde ou refuse l'autorisation.
L'autorisation spécifie que la méconnaissance de ces obligations pourra entraîner son retrait selon la même procédure.

Article 6. – Tout laboratoire se proposant d'effectuer des analyses ressortissant à plusieurs disciplines devra avoir un minimum les locaux séparés suivants :
1° Une pièce pour effectuer les examens de chimie biologique, de sérologie, cytologie, hématologie, parasitologie, anatomo-pathologie, bactériologie, etc. ;
2° Si le laboratoire effectue des prélèvements sur les malades, ces prélèvements devront être effectués dans un local spécial ;
3° L'élevage des animaux de laboratoire, s'il existe, devra être fait dans un local nettement séparé des salles où seront surveillés les animaux inoculés.
Un arrêté du Ministre de la Santé Publique et de la Population, pris après avis du Conseil Supérieur des Laboratoires d'Analyses Médicales, fixera le minimum de matériel que devront posséder les laboratoires d'analyses médicales, pour s'acquitter des tâches qu'ils assument.

Article 7. – Le contrôle général des laboratoires est assuré par les médecins inspecteurs de la santé et par les pharmaciens inspecteurs de la pharmacie.
Le contrôle technique est assuré dans les conditions fixées par arrêté du Ministre de la Santé Publique et de la Population. En aucun cas, les prélèvements effectués en vue du contrôle ne donneront lieu à remboursement.
Un arrêté conjoint du Ministre de la Santé Publique et de la Population et du Ministre des Finances fixera les conditions financières de ce contrôle.

Article 8. – Il est interdit aux laboratoires visés dans le présent décret de consentir sous quelque forme que ce soit, des intérêts ou des ristournes pour les analyses ou examens dont ils sont chargés.
Toutefois, les pharmaciens d'officine ne possédant pas un laboratoire d'analyses sont autorisé à percevoir des honoraires qui seront fixés par le Conseil National de l'Ordre des Pharmaciens sur les analyses effectuées par un laboratoire sur leur demande.
Toute compte rendu d'analyses émanant d'un laboratoire doit porter la signature du directeur de ce laboratoire.
Il est interdit à quiconque de signer un compte rendu d'analyse qu'il n'aurait pas pratiquée lui-même ou contrôlée lui-même. Il est également interdit à tout laboratoire de délivrer un compte rendu d'analyse non signé. L'emploi de tampon ou de griffe est interdit.

Article 9. – Toutes les analyses effectuées par un laboratoire seront affectées d'un numéro d'ordre et inscrites chronologiquement sur un registre spécial, coté et paraphé par le maire ou le commissaire de police, et comporteront, outre le numéro d'ordre et la date, la nature de l'analyse, les résultats analytiques, le nom et l'adresse du client.

Article 10. – Les docteurs en médecine, pharmaciens ou vétérinaires, directeurs de laboratoires d'analyses médicales, sont justiciables, pour leur activité professionnelle, de leurs ordres respectifs.

Les autres praticiens sont justiciables du Conseil Supérieur des Laboratoires, qui pourra proposer au Ministre de la Santé Publique et de la Population le retrait temporaire ou définitif de l'autorisation accordée.
L'arrêté prévu à l'article 4 précisera les conditions dans lesquelles le Conseil Supérieur des Laboratoires sera saisi des infractions commises par les praticiens.

Article 11. – Les personnes physiques ou morales exploitant actuellement un laboratoire où sont effectuées les analyses médicales telles qu'elles sont définies à l'article 1er de la loi du 18 mars 1946 devront, dans un délai de six mois à compter de la population du présent décret, se conformer à ces dispositions et notamment :
a) Pour les personnes munies d'un des diplômes exigés par l'article 1er du présent décret, faire la déclaration prévue par l'article 2 ci-dessus, même si le laboratoire a été précédemment autorisé, soit pour le diagnostic de la syphilis, soit pour celui de la grossesse ;
b) Pour les personnes non munies d'un des diplômes de docteur en médecine, pharmacien ou vétérinaire, solliciter l'autorisation prévue à l'article 5 ci-dessus.

Article 12. – Il est interdit de faire usage de la mention « Laboratoire agréé par le Ministre de la Santé Publique et de la Population » ou de toute autre mention analogue, s'il ne s'agit pas d'un laboratoire agréé au titre du décret du 19 mars 1940 sur le diagnostic de la syphilis ou du décret du 18 mars 1940 sur le diagnostic de la grossesse.

Article 13. – Le Ministre de la Santé Publique et de la Population est chargé de l'exécution du présent décret, qui sera publié au *Journal Officiel* de la République française.

Fait à Paris, le 18 mai 1946.

Félix Gouin.

Par le Président du Gouvernement provisoire de la République :

Le Ministre de la Santé Publique et de la Population,

R. Prigent.

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[3] These documents were communicated to me by Pierre Bastien in June 2011.
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