AN ADDRESS ON THE HISTORY OF ANATOMY IN CAMBRIDGE.

Delivered at the Opening of the New Anatomy Buildings of the University.

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IN the lives both of individuals and of institutions there are certain events which mark out the subdivision of their history into epochs, and which are on that account naturally suggestive of retrospection.

The circumstances under which we meet here to-day are eminently of this character. The liberality of the Senate of the University has provided the Anatomical Department with this magnificent residence, and, as we formally take possession of our new home, it will be profitable to look backward and review the position which the science for whose cultivation these buildings are provided has hitherto taken among the studies of this University.

The attempt to trace the early history of any subject of study is beset with difficulties. The organisation of a mediæval *studium generale* on the one hand, and, on the other, that of a well-equipped modern university with its suite of laboratories each fitted for one particular branch of research, present differences comparable with those existing between a protozoön and a vertebrate; and as in the evolution of the organism it is seldom easy to identify the stage at which a given mass of protoplasm assumes a specific function and foreshadows the development of a separate organ, so there is the same kind of difficulty in determining the exact point of time at which the teaching of any one branch was differentiated from that of the generalised mass of knowledge comprehended of old under the title of philosophy.

The original university organisation of Cambridge was founded on the model of that of Paris, and from the time that a distinct Faculty of Medicine was set apart there must have been some kind of teaching—doubtless of an unsystematic character—by some of the resident readers in the Faculty which professed to deal with the physical nature of man.

We learn from a petition presented to Henry V. in 1491 that there was a "Scole of Pysyk" in each of the great universities, and these claimed a monopoly of the granting of licences to practise medicine. The prayer of this petition was granted by Parliament, one of the new enactments being that no woman should practise medicine under pain of a long imprisonment, and of a payment to the king of a fine of £40. The medical course laid down by the early statutes in this University consisted in the reading of the books of Johanniscus, Philaretus *On Pulses*; Theophilus *On Urine*; *quemlibet librum Isaac*, viz., *librum urinarum*, *de dietis particularibus*, *et librum februm*, *librum viatici*, *tres libros commentatos*, viz., *librum Tegni Galieni*, *librum prognosticorum*, *librum aphorismorum*, *librum de regimine oculorum et quod legerit cursorie ad minus unum librum de theoria et alium de practica*, etc.

Nearly two centuries after the dawn of the revival of anatomy in Italy, a young student from Norwich, John Key or Caius by name, having graduated from Gonville Hall, Cambridge, in 1539, proceeded to Italy. Having settled in Padua, he was there appointed professor of Greek language and literature, having become proficient in these studies in Cambridge, where the labour of the great Erasmus, of Queen's College, had given a new impetus to classical study.

While residing in Padua, Caius was for eight months a fellow lodger with the great Belgian anatomist, Vesalius, and it is reasonable to suppose that this companionship was the means of turning his attention to the new and attractive branch of study. Fired with enthusiasm, Caius devoted himself to his anatomical work under the guidance of Montanus, and when he had graduated as M.D. he returned to England in 1541.

In the Harveian Oration for 1761, Sir Thomas Baker claims

for Caius the credit of introducing into England the practical study of anatomy, and I see no cause to doubt it, as the only English works on anatomy before his time, those of Vicary and Halle, are at best poor compilations from the earlier Italian writers.

In 1559 Caius became Master of the College which bears his name, and he set himself to make specific provision for the introduction of practical anatomy among the studies of the institution. In the statutes of the College, which came into force in 1572, there is one paragraph which expressly provides for the maintenance of anatomical teaching.

The entries in the burial register of the parish church of St. Michael bear testimony that this statute was no dead letter, and this is confirmed by the statements of Dr. Mede, of Christ's College, and of other contemporaries. These facilities for the study of anatomy gave to Caius College its character as a favourite place for medical study, which it has ever since maintained.

The lectures on anatomy delivered by Caius in London, as well as in Cambridge, attracted the attention of the Corporation of Surgeons to this new branch of study. From this time forth they set apart annually two of their number to give instruction to the younger members of their body. It is worthy of note that of the lecturers who discharged this duty between 1563 and 1663, six were Cambridge men. The new interest in anatomy induced a London engraver, Thomas Gemini, to reproduce on copper the anatomical plates of Vesalius, and to bring them out in a form accessible to the English student.

Among the medical students attracted to Caius College, one of the earliest on record was William Harvey, who joined the College in 1594, being then in his 16th year. Having graduated as Bachelor, he proceeded to Padua; but it is extremely probable that he had commenced his anatomy in Cambridge, as he seems to have at once attracted the attention of Fabricius ab Acquapendente, the Professor, and a special note of his proficiency was marked upon his diploma.

This is not the place to recount the labours or to sound the praises of the earliest and greatest of British physiologists. Suffice it to say that his writings have given the texts to the successive Harveian orators of the College of Physicians, and are as yet unexhausted. It was in his course of lectures delivered in 1615 that he first announced his views as to the circulation of the blood; but his classical work, *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus*, was not published until 1628 (at Frankfort).

Harvey was not only a physiologist; he was an anatomist of no mean note. In the MS. fragment of his lectures preserved in the British Museum, and described by Sir George Paget, there is evidence of the care with which he describes the different parts referred to.

During Harvey's lifetime there were not a few Cambridge men engaged in the study of anatomy. Helkiah Crooke, of St. John's College, published in 1616 a folio work on descriptive anatomy, under the title, *Μικροκοσμογραφία*. Winston, of Clare, three years Harvey's senior, lectured on anatomy in London, and published his *Compleat Anatomist* in 1664. Drake, of Pembroke, who graduated in 1627, was one of Harvey's stoutest allies in the controversy which arose in reference to the circulation. In this connection I may also name Sir George Ent, of Sidney Sussex College, "to whose incomparable pen Dr. Harvey owes half his glory, and to whose divine art both natural philosophy and anatomy owe the hints at least of the best part of their new discoveries."

Of the other stars of the brilliant galaxy who, in the earlier part of the seventeenth century, raised the fame of the Cambridge school, there are some who deserve special mention. Francis Glisson, of Caius, two years younger than Harvey, follows him very closely in point of eminence. It was one of his books which Haller characterised as *egregius liber ut solent hujus viri esse*; and the great Dutch physician Boerhaave calls him "*omnium anatomicorum exactissimus*." He was a man of erudition, and of a philosophic mind. His admirer, Walter Charlton—no mean judge—puts him alongside of Bacon, and says of him that he had the felicity to improve whatever he borrowed, and to raise illustrious theories from obscure hints. He deserves the credit of having given the first accurate description of the lacteals of the stomach, as well as the structure which bears his name, and he noted the vas-

cular area of the chick. The fame of Glisson attracted to Cambridge a young Oxford student, who, having discovered that there were, throughout the body, vessels like those which Aselli, of Cremona, had found in the wall of the digestive canal, migrated hither to work with Glisson. Jolyffe joined Clare College, and he shares with Bartholin and Rudbeck the honour of being the discoverer of the lymphatic system.

Another classic anatomist of this period was Thomas Wharton, of Pembroke College, born in 1614. Having studied anatomy both in Cambridge and London, he published in 1656 a remarkable work—*Adenographia*—wherein he describes, among other structures, the ducts of the submaxillary glands to which his name has been attached. In later days a newer Cambridge investigator, Langley, has given us our best and most detailed observations on the structure of these glands.

Among others interested in pursuits allied to anatomy at this time, we find the name of Croone, of Sidney Sussex College, the founder of the periodic Croonian Lectures, and himself the author of a paper on embryology. He was a close friend of Martin Lister, of St. John's College, notable for his researches on the anatomy of the mollusca. Briggs, of Corpus Christi College, who resided in Cambridge, published here in 1676 his work on the eye—*Ophthalmographia*—and is chiefly known as having been a friend of Isaac Newton, and the man from whom Newton learned whatever of anatomy he knew.

Two other migrants from Oxford in the later years of the century were here engaged in anatomical research. Tyson, one of the earliest and most painstaking of comparative anatomists, joined Corpus Christi College, and in the same year published his work on the anatomy of the porpoise. Subsequently he published "*The Anatomy of a Pygmy*," being the first recorded dissection of the orang-outan.

The other migrant, Humphrey Ridley, joined Pembroke College, and here matured and finished his monograph on the *Anatomy of the Brain*, one of the most accurate of the early descriptive treatises on that subject.

Of the other seventeenth century Cambridge anatomists there are two who cannot be passed by without notice: Clopton Havers, of St. Catharine Hall, in his *Osteologia Nova*, described, in 1670, those vascular canals in bone with which his name is associated, and the fatty masses in joints we have learned to call Haversian bodies. The other writer is James Drake, of Caius, the author of a very creditable work—*Anthropologia Nova*. On leaving Cambridge, Drake had given up anatomy and commenced authorship as a play-writer, but his first essay in that department—*The Sham Lawyer*—although performed at Drury Lane, proved unsuccessful. Turning then to history and politics he narrowly escaped prosecution and the pillory through a fortunate error in the drawing out of the indictment against him. Finally he returned to the less exciting task of writing a treatise on anatomy, which was published in 1707, and which, in the succeeding twenty years, went through three editions.

The Corporation of Surgeons kept up their connection with Cambridge in the seventeenth century by the maintenance here of scholars from time to time, to whom they allowed 40 shillings annually for maintenance and 20 shillings for the purchase of books. None of their scholars, however, attained to any note in anatomical science.

The amount of anatomical study required of candidates for graduation in medicine, during the seventeenth century, was small, attendance at the dissection of at least two bodies being specified in the statutes. In the statutes of Trinity College, Dublin, which were closely modelled upon those of Cambridge, it was ordained that every candidate must bring certificates of having been present at three anatomies.

The method of anatomical study was of the simplest, and not very systematic. The dissections only took place in winter. The bodies were opened, the viscera taken out and examined, the brain and spinal cord removed, then the muscles of the limbs were dissected and finally the skeletons were preserved, usually as natural skeletons. These dissections took place in private rooms in the colleges, there being no central place set apart for the special purpose.

Down to the end of the seventeenth century there was no official representative of the science of anatomy; but the Regius Professor of Physic was by ordinance of 1627 directed preside at the demonstrations. In the early years of the

eighteenth century, however, there was a general movement in all the great university centres in the direction of providing systematic teaching. In 1705 Dr. Elliott applied to the Town Council in Edinburgh to be allowed to give instruction in anatomy, and by a minute of August 29th, in that year, they granted his request; but he was not definitely appointed as a university professor, and the name professor is not used in connection with the subject until some years later.

As through the instrumentality of Caius Cambridge had taken a foremost place in introducing anatomy as an academic study, so now of their own motion the University took action in appointing a definite professor of the subject, and in 1707 a grace passed the senate founding a separate professorship of anatomy. Dublin followed suit in 1711, and Oxford in 1803. There had been in Oxford, in 1627, a titular professorship founded under the title of Tomlin's Professor of Anatomy, but by the founder's will this was not a separate post but only an appanage of the Regius Professorship of Physic, and a separate professorship was only founded under the will of Aldrich in 1803.

A portion of the disused printing office was set apart in 1707 as an anatomy house for the use of the new professor.

As has often happened, however, the foundation of the new chair in Cambridge was not productive of any increased interest in the subject. George Rolfe, the first professor, held office for twenty-one years, and was finally dismissed from his post for non-residence. The second professor, John Morgan, Fellow of Trinity, held office from 1728 until his death in 1737. No record remains of his work as far as I can discover, but we have indirect evidence that anatomy was diligently studied at that time, for in the later years of his professorship the resurrectionist was busy in the neighbourhood of Cambridge. In 1734 a body, exhumed from a neighbouring churchyard, was traced into Emmanuel College, and the pursuers obtained a warrant from a magistrate, Mr. Pern, to search for it. I need hardly remind you that this was quite illegal, as there is legally no recoverable property in a dead body. It was, however, meekly submitted to, but the body was so carefully concealed that it was not to be found.

An effort was made to introduce an Act for the better enabling the Faculty of Physic to take for dissection the bodies of persons who were executed for felony and other crimes, but owing to the opposition it encountered the Bill was dropped.

Very soon after a private arrangement was made whereby two bodies were sent up to Cambridge from London each year for the professor's public demonstrations; these were supplemented by others obtained privately from other sources. This, however, became a matter of such notoriety that a statute was passed in 1732 forbidding students from taking part in the procuring of bodies.

Morgan was succeeded by George Cuthbert, Fellow of Trinity, who held office only for one year, and was followed by Robert Bankes, of King's College, a Fellow of the College of Physicians, who filled the chair until his death in 1746. There was in that year a contest for the office; Gibson, a Fellow of Jesus, succeeded in obtaining it by 55 votes, the unsuccessful candidates—Hutchinson, of St. John's, and Scotsman, of Caius, receiving 43 and 42 votes each. Gibson held the professorship until 1753.

This first half century of the professorship was a singularly barren period: I can find no traces of any research, or of any teaching worthy of the name. There seems to have been no museum, and if we may judge from the references in contemporary pamphlet literature, the endowment of the science seems to have extinguished all interest in it. In *A Letter from a Physician in Town to his Friend in the Country*, published by Miller in 1753, the author finds fault with the College of Physicians for giving special privileges to men from the universities: "Medicine is not regularly taught either in Oxford or Cambridge. The professors do not always reside, and seldom teach physic." And he satirically adds: "I would by no means be thought to intimate that a physician bred at Oxford or Cambridge must be inferior to one who has studied at other universities. There are geniuses who surmount every disadvantage."

The ease with which degrees were to be obtained by those who resided at the universities is referred to in another

pamphlet, *Pharmacopoea justificati*, published by Roberts in 1724, in which the author says that the student "need not fear being denyd a degree in physick from the University, for I think I may affirm that there are very few or no instances of persons stopp'd for insufficiency in that study."

Gibson's successor, Charles Collignon, Fellow of Trinity, was in some respects a remarkable man. He has left behind a sample of his teaching, having published in 1756 a syllabus of his course, *Compendium Anatomico-Medicum eorum quae in Scholis apud Cantabrigienses mense Martio quotannis explicat demonstratque Charles Collignon, M.D.* His course consisted of twenty-eight lectures, but he says that they were not always delivered in the same order. He did not teach or lecture except in the Lent term. The professor also published in 1763 his introductory lecture, under the title *Tyrocinium Anatomicum*. His style is of the stilted rhetorical character so common at this period. Thus he speaks of the nervous system as "a kind of boundless ocean—a deep unfathomable abyss. The nerves are those (almost tyrannical) instruments of sensation, without which we can have no bodily perceptions, and by means of which we can suffer such variety of pain." He tells us that in his lectures he combined with the anatomy "a mixture of physiology which properly interspersed greatly relieves the nauseous satiety of bare descriptions." In spite of this, if the *Tyrocinium* is a fair sample, his lectures must have been uncommonly dull for his class, if he had any.

Leaving the beaten track of anatomy, Collignon published a heavy tractate, entitled, *Medicina Politica*, in 1765. The year before he brought out a popular treatise, entitled, *An Inquiry into the Structure of the Human Body, relative to its Supposed Influence on the Morals of Mankind*. He also published an equally dull work, *Moral and Medical Dialogues*, in which his characters, Hortensius, Sophronius, Cleanthes, Philaethes, and Ariston discourse of Nature, habit, etc.

During Collignon's professorship, a strange and gruesome incident occurred in the history of our school. Near the end of the Lent term of lectures in 1768, the professor invited two friends to see an interesting dissection which he had prepared to illustrate his lecture for March 26th. The body was one which had been procured from a resurrectionist who had brought it from town. The friends accompanied him to the room, and during the dissection one of them uncovered the face of the body, and recognised it as that of Laurence Sterne, whom he had known in his lifetime. Poor Tristram Shandy had died in an obscure lodging, and had been followed to his grave by two friends. His place of interment was St. George's Burial Place at Tyburn, a favourite spot for the operation of the resurrectionists, and it was disinterred probably that night, and brought to Cambridge and sold to Collignon. Malone records that he had the story directly from the lips of the gentleman who had recognised him, and at a later date it is recorded that the Rev. Thos. Greene stated that he had seen the skeleton of Sterne in Cambridge. What the ultimate fate of the poor satirist's bones has been I cannot discover. I am informed by Mr. J. W. Clark that the story was current when his father was appointed professor in 1817. I cannot identify any skull in the collection as that of the author of *Tristram Shandy*, who, having so tragically ended his sentimental journey of life, returned after death to his old university. It is a strange coincidence that of the two great Irish satirists of that period, the skull of Swift should have temporarily sojourned on the shelves of the museum in Dublin, and that of Sterne in the collection at Cambridge.

On the death of Collignon, Busick Harwood of Christ's, and afterwards of Emmanuel College was elected to the chair, which he held until 1814. Shortly after his election he commenced the publication of a large work on comparative anatomy, but, not receiving sufficient encouragement, one part only was published, that on the organ of smell. It is a matter of regret that the project fell through, for the part of the work issued shows originality and erudition, and is beautifully illustrated. It was translated into German, and published under the editorship of Wiedemann. To Harwood we owe the formation of our anatomical museum, as he prepared a series of specimens to illustrate his lectures, and the University purchased these at his death.

The gossip chronicler, Gunning, tells many amusing incidents of Harwood's domestic life. He tells us that in his day

Cambridge was but a poor school for medicine. Harwood had been in practice in India for some years before coming to Cambridge. He lectured on comparative anatomy, "and it was no unusual thing to see the turbot on which Mr. Orange, his demonstrator, had exercised his skill one day, carved by the professor on the following."

Haviland, of St. John's, succeeded Harwood, and held the chair for three years; and, being elected into the Regius Professorship of Physic, he was succeeded by Dr. Clark.

Dr. Clark entered upon his office in 1817, and held the professorship for forty-nine years. He is best known to science as the translator of Van der Hoeven's *Zoology*, and he has earned the gratitude of the University by his untiring labours in the formation of a creditable museum. Conscious that the teaching of anatomy, more especially of comparative anatomy, in which, rather than in human, he was particularly interested, could not be carried on without a collection, Professor Clark added largely to the nucleus of Harwood's Museum. He procured from Italy a number of anatomical models in wax, purchased a number of specimens from Brookes's Museum, and the whole of the collection made by Professor Macartney, of Dublin.

The Macartney collection deserves a special word in passing, but I refrain from more full reference at present, as I hope shortly to publish a biographical notice of that distinguished man. He had, while lecturing on comparative anatomy at St. Bartholomew's in the early days of the century, commenced to prepare a series of illustrative specimens, which Sir Charles Bell, Brodie, and Home pronounced to be the most beautiful dissections they had ever seen. During his twenty-one years' service as professor in Dublin, he had added to this museum until his specimens numbered over 2,000. When elected to the professorship in Dublin he found a museum of fewer than 100 specimens, a lecture class of 15, and a dissecting roll of 3 students. He raised the class to be the largest in the kingdom, and attracted to it men from all parts; but he met the fate of a reformer, and was in the end forced to resign. The authorities in Dublin having refused to buy his museum, he offered it to Dr. Clark, who most willingly secured it, Cambridge giving him for it an annuity of £100 a year for ten years. Clark's museum consisted of 1,307 specimens, and with this accession of 2,000 it became one of the best selected and richest collections in Europe. In 1837 Clark writes to Macartney to tell him how much he admired the collection. He says that Owen and Buckland having come to Cambridge to examine the fossils in the Woodwardian Museum, were so much taken with Macartney's specimens that they spent most of their time in the Museum of Anatomy. "In short, your museum is the chief lion of Cambridge."

Hitherto there had been only one professorship in subjects relating to animal life and organisation; but in the beginning of the second half of this century rapid changes were in progress in biological science in general and in the Cambridge School in particular. On the one hand, the growth of knowledge and of interest in biology was rapid and unprecedented, and on the other, the more purely medical side of the Cambridge School of Natural Science, so long dormant, began to show signs of reviving life, owing chiefly to the labours and influence of two men—Sir George Paget and Sir George Humphry.

In consequence of this growth the duties of the chair were divided, even during Clark's professorship (about 1852), Dr. Humphry taking the lectures in human anatomy and the Professor retaining those in comparative anatomy. On the occurrence of a vacancy in the professorship in 1866 the subject of anatomy was divided, Professor Humphry being elected into the Chair of Human Anatomy and Professor Newton into the newly-founded Chair of Zoology and Comparative Anatomy.

Of the progress of the department since that time there is no need for me to speak. The labours of him whom our gracious Sovereign has recently delighted to honour are fresh in our memories, and we all most heartily unite in wishing that he may be spared for many years to participate in the prosperity of our University Medical School, whose present vigour and activity are so largely due to him. In many branches of anatomy the researches of Humphry have become classical. His work *On the Human Skeleton* was an

epoch-making monograph in British anatomy, and his various works on myology are all of the highest importance to comparative anatomists. It was, therefore, a well-merited tribute to his position as the foremost of British anatomists that he was chosen as the first President of the Anatomical Society of Great Britain and Ireland.

ON THE ACTION OF APOMORPHINE AND APOCODEINE, WITH REFERENCE TO THEIR VALUE AS EXPECTORANTS IN THE TREATMENT OF CHRONIC BRONCHITIS.

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A.—APOMORPHINE.

THE discovery of apomorphine is usually ascribed to Matthiessen and Wright, although there is reason to suppose that they were to some extent forestalled by Arppe. At a meeting of the Royal Society held on June 10th, 1869, Mr. Augustus Matthiessen and Mr. C. R. A. Wright read a paper received on May 6th of the same year, "On the Action of Hydrochloric Acid on Morphine,"¹ and in this communication they gave particulars of the mode of preparing a substance, for which they proposed the name of "apomorphia." It is not necessary to give all the details of their method, but it practically amounted to this, that they took some morphine, sealed it up in a tube with a large excess of hydrochloric acid, and kept it at a temperature of from 140° to 150° for two or three hours. On breaking open the tube it was found to contain the hydrochlorate of the new base apomorphine. It was purified by dissolving in water, adding an excess of bicarbonate of sodium, and extracting the precipitate with ether or chloroform. On shaking up the solution with hydrochloric acid the sides of the vessel became coated with crystals of the hydrochlorate. These were drained from the mother liquor, washed with cold water, recrystallised from hot water, and dried on bibulous paper, or over sulphuric acid. This was the way in which they originally obtained their apomorphine, but they found on further investigation that the new base might also be prepared by digesting morphine with excess of hydrochloric acid for some days on a water bath under paraffin. In this process the morphine loses a molecule of water, and becomes converted into apomorphine (morphine, $C_{17}H_{19}NO_3 = H_2O + C_{17}H_{17}NO_2$, apomorphine). They found that apomorphine might also be obtained by heating codeine with hydrochloric acid according to the formula (codeine, $C_{17}H_{17}(CH_3)INO_3 + HCl = CH_3Cl + H_2O + C_{17}H_{17}NO_2$, apomorphine). It is probable that in this reaction there is an intermediate product, but with this we are not for the moment concerned.

These same observers showed that apomorphine was formed when morphine was heated with dilute sulphuric acid in sealed tubes for some hours at a temperature of from 140° to 150°. This is pretty much what was done nearly a quarter of a century previously by Arppe,² his product, which was probably an impure sulphate of apomorphine, being subsequently named by Laurent and Gerhardt "sulphomorphide." This sulphomorphide turned green on exposure to light and air, and gave the reactions now ascribed to apomorphine.

In a paper by Matthiessen and Burnside,³ the authors called attention to the fact that apomorphine might be prepared by heating morphine with chloride of zinc. This method of manufacture seems to have been suggested by E. L. Mayer,⁴ who worked at the subject in conjunction with Matthiessen.

¹ *Proceedings of the Royal Society*, vol. xvii, p. 455.

² "Über eine merkwürdige Veränderung des Morphins durch Schwefelsäure, *Annalen der Chemie und Pharmacie*, vol. xl, 1845, p. 96.

³ *Proceedings of the Royal Society*, vol. xix, 1871, p. 71.

⁴ *Berichte deutschen. chem. Gesell.* Berlin, 1871, vol. iv, p. 121.

The hydrochlorate of apomorphine prepared by these different methods was distinctly crystalline, and its crystalline form was determined by Professor W. H. Miller.⁵ When exposed for some time to the action of air and light it turned green, probably from oxidation. The reason for supposing that the change in colour was due to oxidation was that, under these conditions, the salt increased in weight. The green mass was soluble in water, communicating to the solution a bright emerald green colour. It dissolved in alcohol, forming a green solution in ether and benzol, giving a magnificent rose purple, and in chloroform a violet pink. It was found, too, that it gave certain characteristic colour reactions with nitric acid, perchloride of iron, and other reagents.

Some of the specimens of apomorphine obtained by Matthiessen and Wright were submitted for investigation to Dr. Gee, who published two papers on the subject. The first of these was read before the Clinical Society,⁶ and the second was published in the *St. Bartholomew's Hospital Reports*.⁷ Dr. Gee established the fact that when the hydrochlorate of apomorphine was injected subcutaneously in doses of a tenth of a grain, it acted as a speedy emetic. He also mentioned the circumstance that "a gentleman who was working with the new base, and who had his hands sometimes wetted with the solutions, frequently vomited three or four times in the course of the evening," presumably from its absorption by the skin. Dr. Gee seems also to have supposed that it acted equally well as an emetic when taken by the mouth, for he quoted the case of a man who, after taking $\frac{1}{2}$ of a grain, "felt dizzy and depressed, with an uncomfortable sensation in the head, and vomited freely in twenty-five minutes." That this was not regarded as exceptional seems to be established by the fact that in a summary of the advantages of the drug, Dr. Gee says: "As much can be raised by the tip of the little finger as will cause vomiting when taken by the mouth," and in his second paper he adds: "To the best of my knowledge apomorphine has never been administered in an emetic dose (namely, $\frac{1}{16}$ grain subcutaneously, or $\frac{1}{4}$ grain by the mouth) without producing speedy vomiting."

During the next four or five years a good many papers appeared on the action and properties of apomorphine, the most noteworthy contributions being by Dujardin-Beaumetz, of Paris;⁸ Siebert, of Dorpat;⁹ Max Quehl;¹⁰ under the direction of Professor Köhler—Bourgeois;¹¹ Routy;¹² Carville; Charcot; Choupe;¹³ Trousseau and Pidoux; Théodore Verger;¹⁴ Vulpian and Juratz.¹⁵ Reichert, in an inaugural thesis published in 1880, gave an elaborate account of its physiological action, but no serious attempt seems to have been made to controvert the statement that it uniformly acted as an emetic when administered in small doses by the stomach. It was pretty generally accepted that it produced emesis by whatever channel it was introduced into the system, and that solutions could not be employed with safety when once they had commenced to change colour.

In 1881, being anxious to obtain a good emetic for use in cases of poisoning, I made some observations on apomorphine, and found: (1) That it acted promptly as an emetic when injected hypodermically. (2) That no emetic effect was produced when given by the stomach in small doses. (3) That its properties were not impaired by keeping; and (4) That it differed so completely in action from morphine that there was no reason why it should not be given as an emetic in cases of poisoning by opium. As a proof that the drug does not deteriorate by keeping, I may mention that I gave a patient a hypodermic injection of $\frac{4}{5}$ minims of a 1 in 50 solution of the hydrochlorate, which had been exposed to the light for three months, and had assumed a dark green colour, and in less than two minutes it acted powerfully, and completely evacuated the stomach. Six months later I used the

⁵ *Proceedings of the Royal Society*, vol. xviii, p. 88.

⁶ On the Action of a New Organic Base, Apomorphia, *Transactions of the Clinical Society*, vol. ii, 1869, p. 168.

⁷ Note upon Apomorphia and Chlorocodide, vol. v, 1869, p. 215.

⁸ *Bulletin Général de Thérapeutique*, October 30th, 1874.

⁹ *Untersuchungen ueber die physiologischen Wirkungen des Apomorphins*, Dorpat, 1871.

¹⁰ *Ueber die physiologischen Wirkungen des Apomorphins*, Halle, 1872.

¹¹ *De l'Apomorphine, Recherches cliniques sur un nouvel Emetique*, Paris, 1874.

¹² *De l'Emplot de l'Apomorphine comme Vomitif administrée par Injection hypodermique*, Paris, 1874.

¹³ *Gaz. hebdomadaire*, December, 1874.

¹⁴ *Bull. de Thérap.*, No. 32, p. 499, 1877.

¹⁵ *Centralblatt f. d. med. Wiss.*, p. 499, 1874.