The Thomas Vicary Lecture ON THE SURGICAL TRADITION.

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BY

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In the year 1646 Mr. Edward Arris, a member of the Company of Barbers and Surgeons, paid to the Company the sum of £300 for the use of the "New Publique Anatomy." This sum was subsequently repaid to Mr. Arris, and in lieu thereof he settled upon the Company an annuity of £30, which shortly before his death he redeemed by the payment of £510. Nine years later Mr. John Gale, a member of the Company, left to the Company an annuity of £16 for one anatomy lecture in every year, to be called "The Gale's Anatomy." By an Act of Parliament of the year 1745, for dissolving the union between the Barbers and Surgeons, the Arris gift and the Gale's annuity were given to and vested in the Company of Surgeons then incorporated, and upon the dissolution of that Company in the year 1800 they became vested in the Royal College of Surgeons on its incorporation by Royal Charter. Owing to building operations no lectures were delivered in the College until the year 1810, but since that time the Arris and Gale lectures have been delivered every year in this College with only one break. These lectures constitute a memorial of the long association of the Barbers and the Surgeons of London; and the transference of these trusts to the College marks the official dissolution of that association. Although there has been no official connexion between the two bodies since the separation in the year 1745, friendly relations have existed between them for the last hundred and twenty years. Several Members and some Fellows of the College have been freemen or liverymen, and even members of the Court of the Barbers' Company.

Early in the present year the Court of the Company, which for some years has maintained one or two exhibitors at Epsom College and one or two at one or more of the medical schools in London, expressed a desire to found a lectureship in this College on the History of Anatomy and Surgery, and it was suggested that an experiment might be made of giving one lecture a year for five years, the lecture to be called the Thomas Vicary Lecture. This offer was readily accepted by the Council of the College.

The idea of associating the name of Thomas Vicary with this historical lecture was happy. Vicary was Master of the Barbers' Company in the year 1540, when the Surgeons and the Barbers were formally united by Act of Parliament. He had been Master of the Company ten years before this, and he served the office on three other occasions after the union. The most eminent surgeon of the time, he was serjeant-surgeon to Henry VIII, Edward VI, Mary, and Elizabeth, and surgeon to Philip of Spain. In the year 1548 he was appointed Governor of St. Bartholomew's Hospital, and later became resident surgical governor there, and in 1552 was made one of the assistants for the term of his life. He is said to have published in the year 1548 his *Anatomie of the Bodie of Man*. This was long believed to be the first book on the subject in English; but the late Dr. J. F. Payne showed that the work had been wrongly attributed to Vicary, and that it was a transcript of an early English fourteenth century manuscript, which was itself based on Lanfranc and Henry of Mondeville, with a few brief additional passages. No copy of the first edition is now known to be extant, but the work was reissued by the surgeons of St. Bartholomew's in the year 1577, and a reprint of this was published for the Early English Text Society in the year 1888; it was edited by the late Dr. F. J. Furnivall, assisted by his son Percival, now a Fellow of this College.

As the Arris and Gale lectures mark the separation of the Surgeons of London from the Barbers, so the name of Thomas Vicary is very intimately associated with their

union. In Holbein's well known picture Vicary is represented as receiving the Act of Union of the two bodies from the hands of King Henry VIII. The Company of Barbers had, however, existed in London as a trade guild, and many of its members had been engaged in the practice of surgery for more than two and a half centuries before the date of the union. In the letters patent of Edward IV, granted to the Barbers of London in the year 1462, it is declared that "The freemen of the Mystery of Barbers of London, exercising the Mystery or Art of Surgery, as well respecting wounds, bruises, hurts, and other infirmities of our liegemen, . . . have for a long time undergone and supported, and do daily undergo and support, great and manifold applications and labours," etc. And in the year 1388, in the return of the company to the writ of Richard II, the Master recites that they "have found a document amongst the articles of their records made of a time to which the memory runneth not."

It is not my intention to give a history either of the Barbers' Company or of its relations to the practice of surgery. This was superbly done by the late Mr. Sidney Young in his *Annals of the Barber-Surgeons of London*, published twenty-nine years ago. And the main facts relating to the jurisdiction of the Barbers' Company over the Surgeons of London, and of the constitutional relations of the Company of Barbers and Surgeons with this College, are set forth in the Historical Summary which is published in the *Calendar of the College*.

Before proceeding with the subject of this lecture, I desire to thank the Council of the College for the honour which they have done me in inviting me to deliver the first Thomas Vicary lecture. As a Past President of the College and as a Past Master of the Barbers' Company I greatly appreciate the compliment.

As this is the first of what I hope may be a long series of lectures, I propose to take a glance at a few salient points of surgical doctrine and practice rather than some particular subject, of which there is no lack of choice for many years to come. I have therefore taken as the title of my lecture, "The Surgical Tradition."

Egypt and Greece.

Even from prehistoric times we possess evidence of the practice of operative surgery. This evidence is, of course, osseous, and furnished by skulls and other bones. The soft parts have perished. In early historic times we may note that the code of Hammurabi, dating from about 2200 B.C., contains several records of surgical practice, and prescribes the payment to be made for surgical operations and the treatment of certain injuries and diseases, and the penalties in case of failure. Everyone is familiar with Homer's praise of the surgeons in the Trojan war, more particularly Podalirius and Machaon, whose effigies are represented as the supporters in the heraldic Arms of the College. In several places Homer describes injuries received in battle, and his descriptions of the effects of these injuries manifest a notable acquaintance with anatomy and physiology, and with the effects of loss of blood and of shock. Herodotus records many interesting events of medical and surgical interest, especially in Persia and in ancient Egypt. In ancient Egypt medicine and surgery early attained a high standard of proficiency, but were soon split up into a large number of specialities. Eventually extreme specialism put a stop to progress. Every practitioner was compelled to follow the rules for the treatment of diseases prescribed in the sacred books, and departure from these rules was a capital offence if the patient died. Originality and independence of thought and freedom of action were proscribed. Innovation and the trials of new methods were forbidden.

It is only when we come to the writings of Hippocrates that we have a positive and rational account of surgery and surgical operations. Although Hippocrates is usually thought of more in connexion with medicine than with surgery, there is ample evidence of his knowledge and skill as a practical surgeon. Indeed it may be argued that his surgery is of more permanent value than his medicine. With the exception of its method, its logic, and its ethics, Hippocratic medicine is antiquated, and its doctrines, being necessarily speculative and theoretical, are mostly obsolete; but Hippocratic surgery, having a more positive basis, retains its actuality. The directions which he gives concerning the arrangements of an operating room, the situation of the patient, the position of the assistants, the

disposition of the lighting, the care to be taken of the surgeon's hands, the need of ambidexterity, all indicate a careful and experienced practitioner. The Hippocratic treatises on wounds and ulcers, and on the injuries of the head, are replete with well-observed facts, and are full of excellent teaching concerning the treatment of wounds, and especially the extreme importance of cleanliness in dressings and instruments. The treatises on Fractures and Dislocations have been happily described by Littré as "the grandest surgical monument of antiquity."

Celsus and Galen.

For the four centuries after the days of Hippocrates there are few literary remains of surgery until the beginning of the Christian era, when Celsus compiled his famous *De Medicina*, the sixth and seventh books of which relate almost exclusively to surgery. Celsus's treatise is the most complete, the most methodical and didactic medical work that antiquity has transmitted to us. Very little is known of Celsus's personality. Broca remarks that Celsus should be regarded as a book or an epoch rather than as a man, and he is almost the only source of information in the important period between Hippocrates and the Christian era. But for him we should know little of the famous school of Alexandria, where, under the inspiration of Erasistratus and Herophilus and their disciples, anatomy and surgery were more cultivated than ever before, and where surgery made more progress in three hundred years than in the following thirteen centuries. Of the seventy-two authors mentioned by Celsus, the only writer who has come down to us is Hippocrates. Celsus is, moreover, the first and only authority for many operative procedures which were employed in the Middle Ages and even down to our days. He mentions the use of ligature for bleeding arteries, and advises the complete division of a wounded blood vessel after applying a ligature above and below the wound in the artery. His description of the operation for the removal of stone from the bladder is the first we possess, as is also his account of the amputation of a limb for gangrene. Hippocrates speaks of the mortification of a limb, and advises what should be done, but he does not recommend amputation in our sense of the word; indeed, he is opposed to it. In gangrene of a limb he advises that the dead part should be *ablated* at the joint beyond the line of demarcation as soon as death and insensibility of the soft parts are complete. The remainder of the dead portion should be allowed to separate by natural processes. He records that in a case of this kind he had seen the denuded femur fall off on the eightieth day, the leg having been taken off at the knee on the twentieth day.

Celsus's book is of value for another reason. Celsus was probably not a medical practitioner at all, but a learned, judicial, and impartial encyclopaedist. In this respect he contrasts with Galen. Galen mentions some of the surgeons and anatomists of the Alexandrian school, but he is not always impartial. He is generally controversial and polemical, and too much concerned to defend his own opinions or to attack those of other writers. It is, however, noteworthy that, although the writings of Celsus are so precious to us, they do not seem to have influenced the early surgical tradition. For some reason difficult to explain, his writings were rarely, if ever, quoted by later medical authors, and they seem to have been almost, if not entirely, forgotten until the fifteenth century, when a copy of the *De Medicina* was found in the year 1443 by Thomas of Sazanne, afterwards Pope Nicholas V, in the church of St. Ambrose at Milan. Celsus soon had his revenge, for, on the invention of printing, his was one of the first medical writings to issue from the press. The first edition was printed in the year 1478, five years before the *Ars Parva* of Galen and the *Aphorisms* of Hippocrates.

Galen, a native of Pergamus, who flourished in the second half of the second century, was perhaps the most learned and most intellectual man who ever engaged in the study and practice of Medicine. He was the greatest anatomist of antiquity, and made several interesting anatomical and physiological discoveries; but in his varied and voluminous writings there is comparatively little relating to Surgery. Perhaps he never wrote the work on surgery which he intended to write, or if he did write it the work has not come down to us. We know, however, that he practised as a surgeon in his younger days. But

after his second visit to Rome, about 170 A.D., he seems to have abstained from surgical operations and confined himself almost entirely to the practice of medicine. Moreover, his practical surgery was always reserved, if not timorous, and his influence upon Surgery was, on the whole, repressive. For example, his operation of amputation for gangrene was less radical and less bold than that of Celsus. Celsus advises that in amputation the incision should be made in the line of demarcation, but encroaching rather upon the living tissue, while Galen recommends that the incision should encroach on the dead tissues, trusting to the cautery to destroy the remnants of the gangrenous tissues left upon the face of the wound. It is clear that in Galen's time surgery was already beginning to decline. He himself remarks that in the days of Hippocrates all the rules of the surgical art were carefully studied, but that in his own day very little attention was paid to surgery, and it was often neglected altogether.

From the third, fourth, and fifth centuries few remains of surgical writings have been preserved, and those which have come down to us are embodied in the compilations of Oribasius and Aetius, of the fourth century and sixth century respectively. By this time, however, intellectual night was beginning to settle upon the Western Roman Empire. The penetration and invasion of the barbarians and the crushing taxation necessary to maintain a large army, an expensive Court, and a numerous body of officials, involved the Western Empire in economic ruin. Excessive taxation wiped out of existence the middle classes from which the professions were most likely to be recruited. Whole districts were depopulated and became solitudes. All the remains of Roman civilization gradually disappeared. There were no schools, no literature, and the inhabitants of the Empire became barbarized. Learning died out and ancient civilization came to an end. Medicine and surgery shared the same fate. The Germans who invaded the Empire did not bring with them a new civilization as the Romans did when they conquered Gaul, nor did they adopt the customs of antiquity as the Arabians did in the East three or four centuries later. They came with habits of life and government alien to those of the Romans; and yet in the fullness of time, under the organizing genius of Charles the Great, the union of the fresh energy of the North with the memories and civilization of the South constituted the beginning of modern history and of modern culture.

Paulus Aegineta.

In the East the Hellenic tradition of surgery was continued, though precariously, chiefly under the influence of the writings of Paulus Aegineta, who flourished in the first half of the seventh century and studied at Alexandria shortly before that city was taken, in the year 640, by the Arabians under Amrou. Historically Paulus Aegineta is in some respects more important than Celsus, chiefly because he carries on the story for six hundred years longer. Both were compilers; but while Celsus was, as I have already suggested, probably not a practising medical man at all, Paulus did engage in the practice both of medicine and of surgery, and was evidently an acute observer and skilled practitioner. In compiling his book on medicine, he states that his object was to give a brief summary of what had been written by the best authors before his time. His work was confessedly an abridged selection, and it was most intelligently done. He states that his compilation contains few of his own observations, except in a small number of things which he had seen and experienced in actual practice. The source from which he principally drew his material was the collection of Oribasius, most of which is now lost. Paulus Aegineta, like Celsus, is always impartial. He takes his descriptions from what he considers the best authorities, sometimes from one and sometimes from another, but always with regard to their practical superiority. He does not discuss theories or systems, and shows no preference for one school over another. The fifth book of his treatise on medicine deals with wounds, bites, and poisoned wounds; the sixth with surgery, which he regards as an integral part of medicine.

Paul closes the era of classical Greek medicine and its traditions, and these traditions would apparently have entirely disappeared but for the intervention of the Mohammedans, who in the seventh and eighth centuries overran and conquered Syria, Persia, and Egypt. Strictly speaking, there is no Arabian science or medicine; there

were Greek, Persian, Spanish, and Jewish. The Arabians themselves had no taste or training for scientific or philosophical pursuits, but in the countries which they conquered they came in contact with much Greek and Oriental learning, which they soon absorbed and assimilated.

Arabian Writers.

Perhaps there is no more striking illustration of the continuity of history than the conditions which favoured the adoption and continuation of the Greek learning by the Mohammedans. These conditions had their origin in the conquests of Alexander the Great over three hundred years before Christ. In Asia Minor and in Persia, and even in India, Alexander planted Greek settlements and founded Greek cities where Hellenic culture established itself. This culture was continued by Alexander's great successors, the Seleucidae and the Ptolemies, whose policy was to blend schemes of civilization and of literary and scientific research with their systems of civil administration. In the East, Greek became universally the state language and the exclusive language of all literature and science. The Hellenic character that was thus imparted remained in more or less vigour down to the time of the Mohammedan conquests. Although the Mohammedans at first manifested fanatical hostility against much of the Greek learning, they made an exception in favour of medicine. In Persia and in Asia Minor there were many Greek philosophers and physicians, not a few of whom were Christians, especially the Nestorians. Through the agency of these Christian Syrians many Greek authors were translated into Arabic. Many Nestorian Syrians lived among the Arabians as physicians. Hareth ibn Kalda, the friend and physician of Mohammed himself, was a Nestorian. Schools of translators were established. The most famous of these schools was at Baghdad, the head of the school being the Nestorian Honain ibn Ishak. Amongst the earliest translations were some of the writings of Hippocrates, Galen, Oribasius, and Paulus Aegineta. The last-named was not only one of the first of the Greek medical authors to be translated into Arabic, but remained for many centuries the chief authority of Arabian surgery, of which the most distinguished exponent was Albucasis of Cordova in Spain about the end of the eleventh century. It is a further illustration of the continuity of history that whilst in Asia the Arab conquerors yielded to the spell of an ancient culture superior to their own, they no sooner crossed the Straits of Gibraltar, at the beginning of the eighth century, than the parts were reversed. The inhabitants of Spain rapidly became imbued with Moslem civilization, and in the course of a few generations the Spanish converts to Islam were completely Arabicized. For several centuries some of the leading cities of Spain, especially Cordova and Toledo, became the principal seats of learning in Western Europe.

Albucasis wrote a compendious treatise on medicine consisting of thirty books, entitled *Kitabu-t-Tasrif* (Book of Derivations). The most important portion, from our point of view, was that on Surgery. Albucasis's surgery is based upon Paulus Aegineta, but without acknowledgement, just as the Latin translations of Albucasis were taken without acknowledgement by the surgeons of Northern Italy in the later half of the thirteenth century. Practical surgery was then in a low state. In the introduction to his book on surgery Albucasis remarks: "Surgery is no longer held in honour in our country. It has disappeared almost without leaving any traces. There remain, indeed, a few vestiges in the writings of the ancients, but the transcription of them has been corrupted and error and confusion have been introduced, so that they are almost unintelligible and useless." He adds that the chief cause why there were no skilful operators in his day was that the study of anatomy as it is described by Galen had been given up, and he states that he had seen an ignorant practitioner, in making an incision upon a scrofulous tumour in the neck of a woman, open the cervical arteries, so that the woman died forthwith of hæmorrhage.

Rhazes, a century before Albucasis, refers to the low state of practical surgery. He called most of those who practised it "idiotæ, rustici et stolidi," who were unable to read books on the Art, and had not been taught by a master who could read them. Owing to their stupidity, he says, they often aggravated the maladies they undertook to treat.

Lanfranc: Guy de Chauliac.

It was from the translation of Albucasis into mediæval Latin by Gerard of Cremona that the revival of surgery in Northern Italy began. This revival had its chief seat at Bologna, whence surgeons migrated to the famous school of Montpellier, and later to Lyons and Paris, in the second half of the thirteenth century. Many Italian medical practitioners left their country in consequence of the troubles caused by the quarrels of the Guelphs and Ghibellines. They sought refuge on French soil, taking with them the doctrines and works of Albucasis. One of the first of these emigrants was Roger of Parma, from the school of Salerno. Following him were Bruno of Calabria, Lanfranc, and others. Lanfranc delivered a course of lectures on surgery in Paris about the year 1295. These were the first systematic lectures on surgery delivered in Paris, and were published under the title *Cirurgia Magna*. He insists that surgery should be regarded as an integral part of medicine. Although himself a cleric, he condemns the physicians for having abandoned surgical operations to laymen and barbitonsors. "Why," he asks, "is there now so great a difference between a physician and a surgeon except that the physicians have relinquished manual operations? The physicians say that it is because they deem work with their hands beneath their dignity; but I believe," he retorts, "it is because they do not know how to do operations."

The influence of Lanfranc in France was, however, transitory, notwithstanding the endeavours of Henry of Mondeville, who shortly after wrote the first book on surgery in French. Mondeville's work was, however, soon eclipsed by that of Guy of Chauliac, completed in the year 1363. Guy was not only the most learned surgeon of his time but perhaps the most learned surgeon of all time, and his book is one of the best ever written. Even to-day it may be perused with profit by any one interested in the history and practice of surgery, especially the surgery of the Middle Ages. The work is largely based upon the writings of Rhazes, Avicenna, and Albucasis. As evidence of Guy's extensive learning, and as an indication of the wide range of his studies, it may be mentioned that he cites Albucasis 175 times, Aristotle 62 times, Avicenna 661 times, Galen 890 times, Hippocrates 120 times, Lanfranc 102 times, Rhazes 161 times, Paulus Aegineta 10 times, and many other medical authors more or less frequently. He does not mention Celsus for the reason which I have already suggested, that Celsus's writings had been forgotten and lost and were not rediscovered until after Guy's time. In his remarkable introductory chapter, entitled "*Capitulum Singulare*," Guy defines the nature and object of Surgery, amplifying somewhat Galen's definition. It is, he states, "The science which teaches the manner and quality of operating, principally in consolidating, incising, and performing other manual operations, healing men so far as it is possible." In the same chapter he traces briefly the history of surgery from the time of Hippocrates downwards, and remarks that up to the time of Avicenna and Albucasis all medical writers had been both physicians and surgeons, but that after him surgery became separated from medicine and fell into the hands of mechanics.

Guy observes that not only had surgery become separated from medicine, but that surgeons had themselves been split up into sects, of which he enumerates five. Only three of these need be mentioned now. First, that of Roger, Roland, and the Four Masters who sought to produce suppuration in all wounds and abscesses by means of poultices; the second, that of Bruno and Theodoric, who dried all wounds by the application of wine only; the third, that of William of Salicet and Lanfranc, who followed a middle course and dressed wounds with ointment and soothing plasters.

Guy's ideal of a surgeon was noble. The surgeon should be well read, expert, ingenious, and well mannered; he should be bold when sure but cautious amid dangers. Personally, Guy had great moral courage, as shown by his determination to remain at Avignon and attend to his professional duties during the severe visitation of the plague in the year 1348, while many other practitioners fled from the town. He was himself attacked, but recovered, and was again at the post of professional duties at the time of the next visitation of the plague in the year 1360. As a practical surgeon, however, Guy sometimes erred on the side of over-caution. In his account of the treatment of a

gangrenous limb he describes the operation of amputation as it is given in Paulus Aegineta, whose description differs only in some details from that of Celsus and Galen. He concludes by remarking:

As for myself in these cases, I envelope the whole of the mortified limb with many layers of adhesive plaster and then tie it up, maintaining the constriction until the line of demarcation liquefies and the limb drops off of itself. It brings more credit to the surgeon, he remarks, to let the limb drop off than to cut it off, because when it is cut off there is always a feeling of rancour or regret in the patient's mind that his limb might have remained.

Ambroise Paré.

Guy was almost the only authority in surgery for at least two centuries—that is, until the time of Ambroise Paré, who was born in the year 1517. When about 25 years of age Paré went to Paris and became an apprentice to a barber-surgeon, probably his brother. He attended the instruction given to the apprentices of Barbers and Surgeons at St. Côme. This instruction consisted largely of explanations of parts of Guy of Chauliac. Malgaigne, in his learned introduction to Paré's works, says it is almost certain that the principal, if not the only, books read by Paré in his earlier years were those of Guy and a French translation of John of Vigo. And as showing the esteem in which these works were held it may be noted here that Vicary bequeathed his copy of Guy's surgery to the Barbers' Company and his copy of John of Vigo to one of his assistants.

Malgaigne suggests that Vigo was probably too recent an authority to be admitted to the public course of instruction; but Paré himself tells us that he had read John of Vigo on gunshot wounds, and that when he first went to the wars he knew only what he had read in Vigo about these wounds. Vigo had recommended the use of boiling oil for gunshot wounds, believing them to be venomous. Guy was undoubtedly the more learned, but Paré was the better and bolder practical surgeon. It was perhaps to Paré's advantage that he was not learned. He was not hampered by the trammels of authority. His experience was eminently practical, and in his earlier life was acquired in the wars. He knew little Latin and no Greek, but he possessed what was better, a passion for knowledge, and he could use his eyes and ears and understanding. He is best known for the innovations he made in the treatment of gunshot wounds, and for the suggestion of the use of ligatures to the divided arteries in primary amputations. By a mere accident Paré was led to abandon the use of boiling oil in gunshot wounds, but the employment of the ligature for the divided arteries in primary amputation was the outcome of reasoned observation. Although firearms had been used in battle for a couple of centuries or more before Paré's time, it was only at the end of the fifteenth century that they became efficient weapons. The injuries they inflicted were of an extent and kind previously unknown to surgical experience. The severity of the wounds, the smashing of bones, the laceration of flesh, and even the complete avulsion of limbs, the severe haemorrhage and shock, were altogether different from anything that had been previously known to surgeons. These new experiences called for new procedures, and ultimately revolutionized the art of operative surgery. Down to Paré's time amputation of a limb was rarely performed except for gangrene, but Paré had to face the necessity of performing primary amputation. In amputation for gangrene, when the incision was made in or near the line of demarcation, the haemorrhage, as a rule, would be slight and easily controlled by the actual or potential cautery, but in primary amputation Paré soon found the cautery was not sufficient. The copious flow of blood quickly quenched the cauteries, and, even if the bleeding was temporarily arrested, secondary haemorrhage frequently followed. To avoid this danger Paré proposed to tie the divided blood vessels. There is some evidence that he did this for the first time in the year 1552, and yet two and a half centuries more were to elapse before the true principles of arterial ligation were discovered.

Much controversy has taken place with respect to the originality and value of Paré's innovation, but it must be remembered that Paré did not claim, as is sometimes thought, the credit of being the first to use ligatures to bleeding arteries. He knew that this was one of the modes of arresting haemorrhage which had been known to and employed by surgeons for many centuries, but he was

the first, or at all events one of the first, to employ the ligature in primary amputation. He did not, however, know the essential conditions of a successful application of ligature. He was not careful to isolate the artery, and indeed recommends that it should not be isolated, arguing that the surrounding tissues should be included in the ligature, because the union of the vessels would take place better and more surely when the tissues were included. We know now that such a mode of tying an artery must often have failed, and that secondary haemorrhage must have been a not uncommon sequel. The practice of tying an artery in amputation did not, therefore, at once commend itself to practical surgeons, and for many years it was opposed and condemned by most surgeons. In this country Alexander Read, lecturing on Surgery in the Barber-Surgeons' Hall in the year 1634, speaks of Paré's ligature as a "troublesome and dangerous toy." And yet the idea was a compelling one. Those who did employ the ligature were usually afraid to damage the coats of the vessels by too tight a constriction, and various contrivances were made to bind the vessel without injuring the coats. Multiple ligatures, reserve ligatures, broad ligatures, tapes, and ribbons were used, or the artery was flattened against a roll of wood or other material, lest a fine ligature drawn sufficiently tight to stop the bleeding should damage the arterial tunics. Ligatures made of animal tissues, such as strips of untanned deer skin, were also tried. Even so sagacious a surgeon as John Hunter failed to discover the true path. In his first operation of the tying of the femoral artery for popliteal aneurysm he employed no less than four ligatures, thinking thereby to ensure greater safety. Fortunately the operation was successful, in spite of the risk incurred by using multiple ligatures.

Notwithstanding the failure and disappointment which attended the use of the ligature for more than two centuries and a half after Paré, observant practitioners were gradually making progress along two lines of advance. One set called attention to the increased safety of isolating the artery before tying it, and the other demonstrated the greater safety of using fine ligatures tightly applied. But the full credit of discovering the true principles of arterial ligation belongs to Dr. J. F. D. Jones, a Member of this College, who published his treatise on the use of the ligature in the year 1805. By means of a few well designed and skilful experiments on animals, chiefly horses and dogs, Jones discovered that the only safe and sure method of tying an artery was to apply a small ligature with sufficient force to divide the inner and middle coats. Hundreds of surgeons must, of course, have done this without knowing it; but Jones demonstrated why and how it must be done in every case.

When we reflect what a terror the risk of haemorrhage had been to surgeons for more than two thousand years, and how faulty and misleading clinical and practical observation had been, and when we consider how many thousands of lives must have been lost from haemorrhage before Jones's investigations, and how many hundreds of thousands of lives have since been saved by the knowledge of the truths which he discovered, it is hardly necessary to make any attempt to justify the use of the experimental method on lower animals. Jones does, however, defend it in noble but simple language, and on this note I will end.

"When we remember," he says, "the incessant carnage of war which has followed man through all the ages of his history, not to mention the consequences of accident and disease, it is not too much to assert that thousands might have been and may still be saved by a perfect knowledge of these subjects, which can only be directly obtained by experiments on brutes, and indirectly and very slowly by observations on the injured arteries of man, and even these cannot be made until he has fallen a sacrifice to the want of assistance or to the imperfect knowledge of the surgeon."

THE Royal Institute of Public Health has received an invitation from the Burgomaster of Brussels, M. Adolphe Max, and the rectors of the universities of Belgium to hold its next congress in Brussels. This will begin on Thursday, May 20th, and end on Monday, May 24th. Further information can be obtained from the Honorary Secretaries of the Institute, 37, Russell Square, W.C.1. The Harben Lectures for 1920 will be delivered in June by Professor Maurice Nicolle, M.D., of the Pasteur Institute, Paris.