JAMES JOSEPH WALSH

MAKERS OF MODERN MEDICINE

James Walsh

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Walsh J.

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Содержание

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PREFACE

The present volume is published at the solicitation of many friends who have read the articles contained in it as they appeared at various times in magazines and who deemed that they were worth preservation in a more permanent form. The only possible claim for its filling a want lies in the fact that it presents these workers in medicine not only as scientists but also and especially as men, in relation to their environment, social, religious and educational. I have to thank the editors of the ***Messenger, Donahoe's Magazine, The Catholic World*** and the ***Records of the American Catholic Historical Society***, for permission to reprint the articles which appeared in their periodicals.

The opening chapter, The Making of Medicine, is an abstract from the introductory lecture of the course in the history of medicine at the Fordham University Medical School, New York. Much of the material for the article on the Irish School of Medicine was gathered for a lecture before the Historical Club of Johns Hopkins University and the District Medical Society of the District of Columbia. The sketch of the life of Dr. Jenner has not hitherto been published. All of the other articles have been considerably lengthened and revised.

There are other makers of modern medicine who deserve a place beside those mentioned here, but as the material had reached the amount that would make a good-sized volume it {viii} was thought better to proceed with the publication of the first series of sketches, which will be followed by others if conditions conspire to encourage any further additions to our not very copious English medical biography. A subsequent volume will contain sketches of the lives of old-time makers of medicine in the fifteenth, sixteenth and seventeenth centuries, the men who laid the firm foundations of our medical science of the present day.

I have to thank my friend of many years and brother alumnus of Fordham University, Dr. Austin O'Malley, of Philadelphia, for reading the proofs and for suggestions while the book was going through the press.

THE MAKING OF MEDICINE

Without History a man's soul is purblind, seeing only the things which almost touch his eyes.
--Fuller, Holy and Profane State, 1641.

Our generation, in this no more self-concentrated than many another, has prided itself so much on the progress it has achieved in science that it has in its interest in the insistent present rather neglected the claims of the history of science. There has been the feeling that our contemporaries and immediate predecessors have accomplished so much as to put us far beyond the past and its workers, so that it would seem almost a waste of time to rehearse the crude notions with which they occupied themselves. In no one of the sciences is this truer than in medicine. Yet it seems likely that no more chastening influence on the zeal for the novel in science, which so often has led this generation astray, could possibly be exerted than that which will surely follow from adequate knowledge of scientific history. In medicine there is no doubt at all that an intimate acquaintance with the work of the great medical men of the past would save many a useless investigation into problems that have already been thoroughly investigated, or at least would help modern workers to begin at a place much farther on in their researches than is often the custom.

There are other reasons why the knowledge of the history of medicine cannot but prove of great service to the present generation. We are entering upon a time when original research as the main business of selected lives, in contra-distinction to the few hours a day or even a week that the medical practitioners of a few generations ago could steal from their busy lives, is becoming more and more the rule. A consideration then of the methods by which advances in medicine were made in the past, of the character of the men to whom we owe the ground-breaking discoveries, of the way in which such discoveries were accepted or rather rejected by contemporaries, for rejection was almost the rule, will serve as a mirror for reflections that will surely be helpful in this day of great institutions of research. It must not be forgotten, however, that only too often in the past it is in the large institutions that routine work has been done, while the occasional genius has sprung up in circumstances that seemed quite unlikely to be the fostering mother of originality, and there has taken for the world the precious step into the unknown which represents a new departure in medical science.

Prof. Osier's declaration that the world's best work was mainly done by young men was not well received, but no one knew better than he that this is the most salient fact in the history of medical progress. There is practically not a single great discovery in medicine that was not made by a young man under thirty-five. As a rule, indeed, the new departures in medicine came from men who were well under thirty, some of them in fact only at the beginning of their third decade of life. Morgagni's great germinal idea, which made him the father of modern pathology, came to him when he was a student scarcely more than twenty. He then began to take notes on all the morbid appearances that he found in bodies, recognizing very clearly that he must trace out not only the main cause of the disease, but also the subsidiary pathological factors that were at work in the production of the various symptoms of the special case as he had studied it clinically. This idea is so obvious now as to seem impossible to be missed; yet scarcely a century ago it constituted the foundation-stone of modern pathology.

Auenbrugger, who laid the foundation of modern physical diagnosis by his observations upon percussion, began the work when he was under twenty-five, at the Spanish Hospital in Vienna, and carried it out to a completely successful issue absolutely without any encouragement from the great masters of the Vienna school. As a matter of fact, they rather pooh-poohed the idea that this foolish drumming, as one of them is said to have termed it, could ever amount to anything in enabling physicians to recognize pathological conditions within the chest. For twenty-five years after the

publication of his little book, Auenbrugger's discovery attracted no attention. Laennec, who followed Auenbrugger in the development of physical diagnosis, set himself the much harder problem of constructing a system of auscultation when he was in his early twenties, studied the subject for twelve years and then published the book on it when he was as yet scarcely thirty-five. He accomplished the revolution in medicine that is due to him, though he was never strong and died at the early age of forty-six.

These are only striking examples which show what the young man has accomplished. The same thing was true in other countries. Corrigan wrote his famous essay on the "Permanent Patency of the Aortic Valve" when he was only twenty-nine years of age, and the work for it had been done during the preceding three years, at a hospital in which there were beds for only six medical patients. Trousseau declared this the greatest medical work, from a clinical standpoint, that had ever been accomplished, and hailed young Corrigan as one of the masters of clinical medicine. He maintained that disease of the aortic valve should receive the name Corrigan's disease. Stokes, Corrigan's contemporary and friend in Dublin, wrote his little book on the stethoscope when he was not yet twenty-one, and at a time when the distinguished clinicians of the day were all asking if these young men expected the old physicians to carry this toy about with them and use it for any serious purpose. Graves, also of the Irish school of medicine, made some of the clinical observations on which his reputation is founded, including a short description of characteristic cases of the affection that still bears his name, when he was well under thirty-five.

Further examples might well be cited, but they will be met with in the course of this book. The history of most of the sciences is like medicine in this respect, and it is to young men that the great ground-breaking ideas come. How true this is in biology can be noted even from the lives of the physician-biologists that are included in this volume. Theodore Schwann, the father of the cell doctrine, did all the work for which he deserves the name of founder of modern biology when he was scarcely more than thirty. Part of the best of it was accomplished before he was twenty-five. Claude Bernard had shown the precious metal of his originality before he was far on in his twenties. Pasteur, the most original genius of them all, began his work when he was scarcely more than a boy, and though every five years of a long life was filled with original observations of the most precious kind, his genius had received the bent which it was to follow from the successful accomplishment of observations during his third and fourth decades.

In these modern days, when the education of the young man for medicine is not supposed to be finished until he is nearly thirty, it is easy to understand that perhaps the precious years in which originality might manifest itself are already past before he gets out of the swaddling clothes of enforced instruction from others. As has been very well said, it is possible to smother whatever of the investigating spirit and original initiative there may be in a young man by attempting to teach him too much of what the present generation knows. Unfortunately, it happens only too often even in this wise generation of ours that it is not so much the ignorance of mankind that makes them ridiculous as the knowing so many things that are not so. The number of things that the young man has to learn and that are taught him, often with the assurance that they are almost gospel truth in medicine, and yet that he finds before he has been long out of school or indeed sometimes before he leaves school, to be at best opinions, is entirely too great. The saving grace for the correction of this constantly recurring fault in education is undoubtedly a knowledge of the development of medicine in the past and a recognition of the fact that the accepted truth of any one generation proves after all often enough to be only apparent.

After the false impression that it is to older men we owe progress in medicine, perhaps the most universally accepted apparent truth is that the investigating spirit is communicable, and that the pupils of a great master may be expected to carry on his work and add almost as much as he has done to the great body of medical knowledge during the generation immediately following his work. It would naturally be expected, for instance, that Morgagni having laid the foundations of modern

pathology and connected pathological observation with clinical observation the great development in modern diagnosis would have come down in Italy. This was not true, however. The next great step connecting bedside observations with postmortem appearances was made by Auenbrugger in Vienna in distant Austria. Auenbrugger's work having been successfully accomplished it might reasonably be supposed that he himself or some of those who had seen his successful diagnosis of thoracic conditions by percussion would take the next step and discover auscultation. This, however, did not happen in Germany, but in France. It is true that Laennec's work was done under the influence of Corvisart, who revived Auenbrugger's work and gave it to the world once more, and that in a way, therefore, Laennec may be considered an indirect pupil of Auenbrugger; but the fact stands that the two discoveries of percussion and auscultation were made at an interval of nearly fifty years and at a distance of more than a thousand miles from each other.

On the other hand, Laennec having solved the wonderful mystery of the significance of the sounds within the chest as far as they concern pulmonary diseases might have been expected to do as much also for heart disease. Even genius, however, is able it seems to take only one step into the unknown. Auenbrugger did not discover auscultation, though it apparently lay so near at hand. Laennec did not solve the riddle of heart murmurs, though for most of us they do not present any more difficulty than the wonderfully successful recognition of the significance of ***râles*** of various kinds in which Laennec never failed. The problem of heart diagnosis was to be solved by Corrigan and the Irish school of medicine hundreds of miles away, though they were doing their work about the same time that Laennec was making his observations in Paris. Curiously enough just during the same decade Richard Bright, in England, was studying out the problem of kidney disease, and, as a young man, teaching the world nearly as much about it as it has ever learned, though, in the seventy-five years that have passed since, so much of investigation has been devoted to the subject.

No one nation can claim the palm of superiority in the matter of original investigation. The spirit of genius breathes where it will, and unfortunately it is incommunicable. Students may think they absorb all that the master has to give them, and that they are ready to go on with his work where he left it. They do actually seem to their own generation to make distinct progress in medicine. When the situation is analyzed fifty or a hundred years afterward, however, it is found that only the master's work counts, and that much of what seems to be advance was only a skirmishing here and there along the lines laid down by him, but without any material progress for true science.

This same peculiarity is manifest, also, not only in the history of sciences allied to medicine, but in that of all the physical sciences. A very striking example is to be found in the story of the rise of electrical science, which took place almost at the same period as that which saw the rise of clinical medicine. Origins in electricity date from Franklin's work here in America and Galvani and Volta's observations in Italy. It might quite naturally have been expected that the further progress of electrical science would come in either of these countries. The next great discoveries, however, were separated by long distances and a considerable interval of time. After Volta came the demonstration by Oersted, in Denmark, of the identity of magnetism with electricity. It was not in Denmark, however, that the problems connected with this principle were worked out, but by Ampere in France. In the mean time, Cavendish and Faraday, working quite independently of their Continental colleagues, were making significant strides in electricity in England.

When the problem of the resistance to the passage of electricity in a conductor was to be studied, another nation supplied the man for the opportunity. Ohm had never been in contact with any of these great contemporaries and did his work entirely by himself. It is a curious confirmation of what we have stated with regard to the young man in medicine and the making of great discoveries that practically all these founders in electricity were under thirty-five when their best original work was accomplished.

From a series of biographies of great medical discoverers, certain salient traits stand out so as to attract attention even from the cursory reader. The essence of significant work in medicine

consists of observation, not theory. It has always been the custom to theorize much and unfortunately to observe but little. Long ago John Ruskin said that the hardest thing in the world for a man to do is to see something and to tell it simply as he saw it. Certainly this has been true in medicine. The men who have had eyes, and have used them, have impressed their names upon the history of progressive scientific advance. The theorists have never contributed anything worth while to the body of medical truth.

While this is readily acknowledged by every generation, with regard to the past, it is curious to note how different is the appreciation of each generation for the theorist as opposed to the observer. Medical theorists have always been honored by their contemporaries unless their theories were utterly outlandish, and even then they have had many disciples, and have seldom been without honor and never, with sorrow for the foolishness of men be it said, without emolument. The observer, however, has but rarely been in favor with his contemporaries. Not infrequently the observation that he made appeared to be so obvious that his fellows could not think that it represented a great truth. As a consequence they have usually derided him for attempting to make them see a significance in his observation that they could not think was there. Huxley once stated the phases through which a new scientific truth ordinarily passes. At first it is said to be trivial and insignificant, then as it attracts more attention it is declared to be in contradiction with hitherto known truth. Finally it is declared to be after all only in other terms what the world has always believed in the matter. Certainly through these stages all the great discoveries in medicine have gone. So true is this, that if what seems to be a new truth in medicine is accepted at once, and willingly, there is more than a suspicion that it is not really a new discovery but only a modification of something hitherto well known.

All the great discoverers in medicine have practically without exception met, if not with opposition, surely with neglect of their work. We smile complacently now at the generation that considered the stethoscope a toy, and asked derisively if they should be expected to carry it about with them. The next generation, however, having grown accustomed to the stethoscope, refused quite as inconsequentially to have anything to do with the thermometer. They refused to carry these glass things around with them in order to test the fever that patients might have, since they claimed they were able to accomplish this purpose quite as well by means of their educated touch. The generation of medical men is not yet passed who refused to credit the thought that the diagnosis of diphtheria would ever be made only by the microscope and culture methods, and who considered that they could tell very well what was diphtheria, and what not, from the appearance of the throat.

Of course similar opposition was the fate meted out to every distinguished scientific discoverer, and so I suppose medical men cannot complain. His contemporaries said of Galvani that he had made of himself a dancing master for frogs, because he continued his observations on the legs of these animals in order to solve the problems of animal electricity. Pasteur's demonstration that there was no such thing as spontaneous generation, served at first only to bring down on his devoted head the aspersions of most of the distinguished scientific men in Europe. When that genius, the physician Robert Mayer, discovered the conservation of energy as the result of his acute observation, that blood drawn by venesection in the tropics was redder than that drawn in colder climates, he found that scientific circles were not only not ready to accept his demonstration, but that he was looked upon as a visionary, somewhat as one who thought that he had solved the problem of squaring the circle or the endless puzzle of perpetual motion.

Fortunately these men have as a rule had a physical and mental force that enabled them to go on in spite of the opposition or derision of their contemporaries. It is rather a curious fact that most of the great medical discoverers were born in the country and were as a rule the sons of rather poor parents. Many of them were so situated that they had to begin to make their own livelihood to some extent at least at the beginning of their third decade of life. Far from proving a hindrance to their original work, this necessity seems rather to have been one of the sources of inspiration that spurred them on to successful efforts in their investigations.

Most of them were what would be called handy men, in the sense that they could use their hands to work out their ideas mechanically. This was typically true of Galvani, who had to construct his own first electrical instruments, and of Laennec, who took pride in making his own stethoscopes. So many of them made by his own hands are still extant, that a number of museums have the opportunity to hold specimens of his handiwork. Auenbrugger and Johann Müller and Pasteur are further examples of this same handiness. Claude Bernard exhibited this quality very early in life and continued to exercise it all during his career.

Nor was their ingenuity limited to material things. Many of them were interested in literary and artistic work of various kinds. Morgagni was considered a literary light in his generation. Auenbrugger composed a musical comedy which had a distinct success, even in music loving Vienna. The Empress Maria Theresa said that she supposed he would now continue to write musical comedies; but Auenbrugger replied, with more candor than gallantry, that he had something better to do. Claude Bernard composed a play that shows distinct evidence of literary talent. It seems fortunate indeed that he was diverted from his original intention of following literature as a career, and took up medicine. Many of the others, as, for instance, Graves and Stokes, were excellent judges of art, critics of real knowledge and genuine appreciation; and indeed it may be said that none of them was ever so absorbed in his vocation of medicine as not to have much more than a passing interest in some of the great phases of intellectual activity quite apart from his professional work, or from scientific knowledge: an avocation to which he turned for the only true recreation of mind there is–a change of work.

This seems all the more worth while calling attention to in our strenuous age, because it is sometimes considered a mistake for a physician to show that he is interested in intellectual pursuits of any kind apart from his professional work. It is supposed that no one is capable of dividing his attention in this way and yet do justice to his profession and his patients. As a matter of fact it has well been said that no really great physician has ever been a narrow specialist in the sense that he knew only medicine well; there was always at least one other department of intellectual attainment with which he had made himself so familiar as to be an authority in it. It is not the lopsided who make great athletes, and it is not the one-sided man who succeeds in doing really great work. Practically all the great physicians have had favorite hobbies to which they have turned for relaxation, for surely no one understands better than physicians that recreation consists not in that impossibility, the doing of nothing, but in resting the mind by doing something quite different from what it has been engaged at before.

There is another phase of the lives of these great men of medicine that is so different from what is ordinarily thought to be the rule with physicians, that it seems worth while emphasizing at the end of this introduction. All these great discoverers have been men of constructive imagination, men who might have been distinguished litterateurs very probably, had they applied themselves in that field. All of them have had too much imagination to be materialists, that is, to consider that they could know nothing except what they learned from the matter with which their studies were taken up. All these great discoverers in medicine have been simple, sincere, faithful believers, ready to express their trust in an overruling Providence, and in a hereafter that they knew only by faith, it is true, but which was for that reason none the less distinctly recognized. While it is usually considered that medicine leads men's minds away from orthodox thinking in the great matter of the relationship of the creature to the Creator, all these men have been not only ready to acknowledge their personal obligations to Him, but have furnished exemplary models of what the recognition of such obligations can make of human lives.

There is an old proverb that runs ***Ubi tres medici ibi duo athei***, –where there are three physicians there are at least two atheists. This has made many a heartache for fond mothers when they found their sons had determined on becoming physicians. If the present series of sketches is to be taken as any argument, however, it is only the small minds among physicians who become atheists. They

are not able to see their way clearly from the material they work in to the higher things that prove a source of strength and consolation to the great minds while they are busy making medicine for their own and subsequent generations. Certainly no more thoroughly representative group of the makers of nineteenth century clinical medicine could have been selected than those whose sketches are here given. They are from all the nations who have contributed materially to modern medical advance, yet all of them were deeply religious men. There is another and equally important point with regard to them. It is their relations to their fellows. Without exception they were men beloved by those around them for their unselfish devotion not only to science, but also to their brother men. In the midst of their occupations the thought that has been the profoundest consolation for all of them without exception has been that they were accomplishing something by which their fellow-men would be saved suffering and by which human life would be made more happy. A study of their careers cannot fail to show the young physician the ideals he must cherish if he would have real and not apparent success and happiness in life.

MORGAGNI, THE FATHER OF PATHOLOGY

Let us then blush, in this so ample and so wonderful field of nature (where performance still exceeds what is promised), to credit other men's traditions only, and thence come uncertain problems to spin out thorny and captious questions. Nature herselfe must be our adviser; the path she chalks must be our walk; for so while we confer with our own eies, and take our rise from meaner things to higher, we shall at length be received into her closet-secrets.
--Preface to Anatomical Exercitations concerning the Generation of Living Creatures, 1653. William Harvey.

"VIR INGENII, MEMORIAE, STUDII, INCOMPARABILIS."
–-HALLER.

In 1894, when the International Medical Congress met at Rome, Prof. Virchow of Berlin, the greatest living pathologist at the time, was asked to deliver the principal address. He chose as his subject John Baptist Morgagni, the distinguished Italian physician and original investigator of the eighteenth century, whom he hailed as the Father of Pathology. No medical scientist of the nineteenth century was in a better position than Virchow to judge who had been the founder of the science for which he himself did so much. Virchow besides, through long and faithful study of the history of medicine, knew well whereof he spoke. In pathology especially modern medicine has made its sure advances, so that Morgagni's ground-breaking work may well be considered the beginning of the most recent epoch in medical science. As a matter of fact, medicine lost much of its obscurity by losing all its vagueness when Morgagni's methods came into general use.

As a medical student scarcely twenty years of age, he revolutionized medical observation by studying his fatal cases with a comparative investigation of their clinical symptoms and the postmortem findings. This had been done before, but mainly with the idea of finding out the cause of death and the principal reasons for the illness which preceded. Morgagni's investigations in pathology consisted in tracing side by side all the clinical symptoms to their causes as far as that might be possible. This looks so simple now as to be quite obvious, as all great discoveries are both simple and obvious once they have been made; but it takes a genius to make them, since their very nearness causes them to be overlooked by the ordinary observer so prone to seek something strange and different from the common.

How much Morgagni's studies from this new viewpoint of the investigation of all the symptoms of disease has meant for modern medicine, may be best appreciated by a quotation from an address delivered before the Glasgow Pathological and Clinical Society in 1864, by Professor Gairdner, who thus tersely describes the character of the distinguished Italian pathologist's work:

> "In investigating the seats of disease, Morgagni is not content to record the coincidence of a lesion in an organ with the symptoms apparently due to disordered function in that organ.
>
> "For the first time almost in medical inquiry, he insists on examining every organ, as well as the one suspected to be chiefly implicated; not only so, he marshals with the utmost care, from his own experience and that of his predecessors, all the instances in which the symptoms have existed apart from the lesion, or the lesion apart from the symptoms. He discusses each of these incidents with severe exactness in the interest of truth, and only after an exhaustive investigation will he allow the inference either that the organ referred to is or is not the seat of the disease.
>
> "And in like manner in dealing with causes: a group of symptoms may be caused by certain organic changes–it may be even probable that it is so–but,

> according to Morgagni's method, we must first inquire into all the lesions of organs which occur in connection with such symptoms; in the second place, we must know if such lesions ever occur without the symptoms; and again if such symptoms can be attributed in any cases to other causes in the absence of such lesions."

During over sixty years of a long life Morgagni continued to follow out the idea that he had developed as a boy, and his works contain the first definite account of pathological lesions and clinical manifestations that attracted attention.

As a proof of the striking difference between the value of observation and theory in medicine, it may be said that many hundreds of volumes containing the most elaborate medical theories were published during the eighteenth century, and that practically none of these is ever read now, except for curiosity's sake by some seeker after the quaint and distant in medicine, while Morgagni's books still contain a precious fund of information, to which pathologists at least, and not a few clinicians, turn often with interest and come away always with profit. They are not infrequently quoted from, and, as we shall see, have been highly appreciated by some of the best medical authorities of the present and the immediately preceding generations.

To the modern thinker, accustomed to look rather to the northern nations or to France for great advances in science, it may prove somewhat of a surprise to have an Italian thus put forward as the founder of modern medicine, and especially of the most scientific department of it. Those who are familiar with the history of medicine since the revival of civilization after the Dark Ages will realize what a prominent place Italy has always held in the development of medical science. The first great Christian medical school was founded at Salerno, not far from Naples, in the tenth century. The first regular practical teaching of anatomy by means of dissections of human bodies and demonstrations on the cadaver was done at Bologna by Mondino at the beginning of the fourteenth century. The great Father of Modern Anatomy, Vesalius, was a Belgian, but he did all the work for his epoch-making book, the ***De Fabrica Humani Corporis***, at the Universities of North Italy, especially at Padua, Bologna and Pisa, during the first half of the sixteenth century. Every student of medicine in those times who was desirous to secure wider opportunities for medical education went down into Italy, and on the rosters of the Italian medical schools of the sixteenth century are to be found the names of most of the men who in all the countries of Europe became famous for their medical attainments.

Morgagni only forms a final link in the chain of great Italian medical scientists, connecting medieval with modern medicine. From the time of Vesalius to that of Morgagni there was never a period when Italy did not possess the leading medical investigator of Europe. We need only mention such names as those of Fallopius, who added so much to our knowledge of abdominal anatomy; Eustachius, to whom we owe many important details of the anatomy of the head; Spigelius, whose name is forever associated with the liver, and Malpighi, to whom the whole round of the biological sciences allied most closely to medicine owes more than perhaps to any other single investigator, to show the complete justification for this claim. As a matter of fact, every encouragement to the progress of medicine was extended both by the secular and the ecclesiastical authorities in Italy during these centuries, and the Italian peninsula was from the beginning of the sixteenth to the end of the eighteenth centuries the mecca for ardent medical students desirous of exhausting the medical knowledge of their time, quite as Germany has been in our day.

John Baptist Morgagni was born on February 25, 1682. His birthplace was Forli in Romagna. It was the capital of a little papal state, lying at the foot of the Apennines to the southeast of Bologna. The modern American traveler is likely to know something about it, because it is one of the principal stopping places on the road from Bologna to Rimini, for at least the feminine portion of any travelling party will want to make a pilgrimage to the home of Dante's poor Francesca and to the scene of the heroic exploits of Catarina Sforza, the great woman of the Renaissance, to whom in all honor, and without any tinge of the discredit it has since come to convey, was given the proud title of the Virago

of Forli. The little town is noted for the beauty of its situation, and well deserves a visit for itself, for it contains a famous palace built after designs made by Michael Angelo. The town had decreased in importance and population at the end of the seventeenth century, when Morgagni was born there, but it was favorably known for the high standard of cultivation among its inhabitants, possessed a good library, a number of schools and a well-known college.

Like many another great man, Morgagni seems to have been especially fortunate in his mother. He was left an orphan at a very early age. His mother, however, whose maiden name was Maria Tornieli, not only bore her loss bravely, but devoted her life and talents to the education of her gifted son. She seems to have been a woman of uncommon good sense and remarkable understanding. Morgagni often spoke of her during the course of his life, and attributed much of his success to the training he had received from her. It is the custom sometimes to think that women have come to exert great cultural influence only in these latter days. Nothing could be more untrue. All through history are abundant traces of women exerting the highest intellectual influences in their own sphere, and the North Italians in their era of highest cultural development seem to have been happier in nothing more than their recognition of the possibilities that lay in providing educational facilities for women.

These times and this part of Italy are famous in history for some of the opportunities afforded women in the matter of higher education. It has been suggested that it is perhaps to the liberal culture of the mothers we owe the fact that this part of Italy furnished for one hundred and fifty years about this time the greatest men in science of the time. It is well known that women occasionally held professorships at the University of Bologna, not far from Morgagni's birthplace. The general culture of the women of this section was very high. Modern masculine historians have even been ungenerous enough to point out that Bologna was famous for two things–the opportunities provided for the higher education of women and the extensive manufacture of various forms of prepared food, the best known of which, the classical Bologna sausage, has come down as a precious heritage to hurried housekeepers in our own time.

After an excellent preliminary education at Forli, always under the careful supervision and enlightened encouragement of his mother, Morgagni, as might have been expected from the place of his birth, went to the neighboring university town of Bologna for his higher studies. Bologna was at this time at the very acme of its reputation as the greatest of existent medical schools. The science of anatomy had been especially developed here as the result of important investigations and discoveries made by some of the greatest men in the history of medical science. Mondino had, very early in the fourteenth century, recreated the modern science of anatomy as we know it. He was the first to realize the importance and urge the necessity for the dissection of human bodies, if any real lasting progress in human anatomy was to be made. Medical teaching before this time had been largely by lectures and disputations upon the work of Aristotle, Hippocrates and Galen, but actual observation on human tissues and organs now replaced the older method. Bologna became a papal city in 1512, and it is especially after this date that, under the fostering care of the Popes, the University of Bologna became the centre of medical teaching for the whole world for several centuries.

As the result of actual observation and patient study instead of idle theorizing there came a large number of great discoveries in anatomy. From Mondino to Morgagni there is a continuous series of great men in connection with the University of Bologna such as no other institution can show. About midway between the first and last came the great Vesalius, who taught at Bologna as well as at Padua and Pisa, and whose work on anatomy was to be a treasure for anatomists of all countries for many generations. It was while teaching at Bologna that Vesalius made the famous series of dissections which formed the subjects of the illustrations for his great work on anatomy. Titian, the celebrated Venetian artist, who had come down from Venice in order to study anatomy for artistic purposes at the famous school of anatomy and under the supervision of its great teachers, is said to have executed the plates for the book. The work remains a worthy monument of the two great masters in their respective professions whose collaboration created it.

During the century before Morgagni's entrance into the University of Bologna, the distinguished English physician Harvey, who was to lay the foundation of modern physiology by the discovery of the circulation of the blood, was attracted to Bologna because of the opportunities it presented for advanced work in the studies in which he was so much interested. While repeating some of the dissecting work that Vesalius had done Harvey was led to suspect the existence of the circulation and had his thoughts directed in the channel which finally led to his masterly exposition of the subject. In a word, here at Bologna the study of the physical side of life, so important a characteristic of latter-day science, became a distinct and recognized branch of science. As Professor Benjamin Ward Richardson said, in his sketch of the life of Morgagni, "Since that time there has been no decline in interest in these studies and medicine has been developed in a manner as daring in project as it has been useful in application."

Bologna was, at the time, certainly an excellent place for Morgagni. He went there as an inquiring youth of fifteen and began his medical studies at once. He became a student of two of the most celebrated professors of the time–Albertini, a leader in his day, though since more or less forgotten, and Valsalva, whose investigations into the anatomy of the ear assure him a permanent place in the science of anatomy for all time. When Morgagni went to the university, Valsalva was at the zenith of his brilliant career as an anatomist. He was in the midst of his great work on the organ of hearing. This extremely intricate piece of human mechanism had never been understood before his time, and the working out of its details proved a time-taking but intensely interesting investigation.

It was not long before the genial insight of Valsalva picked out Morgagni as a person excellently fitted to assist him in his dissecting work. Morgagni had not only an enthusiasm for the work, but had, what is much more precious under the circumstances, untiring patience and industry and unswerving perseverance. These were the qualities that were afterward to prove the foundation of his reputation. His genius consisted certainly in the faculty for hard work, and his special talent was an infinite capacity for taking pains. Nearly all of the dissections which Valsalva required for his demonstrations during lecture hours, or for the illustrations of his books, are said to have been made by Morgagni under the master's personal supervision.

After four years of this precious training and study at the university, Morgagni took his degree as Doctor of Medicine and of Philosophy. The late Benjamin Ward Richardson, one of the great English medical men of the end of the nineteenth century, says that this is a happy combination of qualifications which might, with great advantage, be required of the graduate in the present day, when so much of medicine and so little of philosophy is demanded of the student, to the manifest detriment of both departments of knowledge.

Some idea of the estimation in which Morgagni was held at this time may be gathered from the fact that, though scarcely more than twenty-one years of age, he was sometimes allowed to assume Valsalva's lecture obligations during the master's absence. After graduation he spent some time at the university doing special work in connection with the science of anatomy, in which he was so much interested, and as an assistant professor and tutor. Bologna at this time enjoyed as wide a European reputation as at any period of its history. Students from all countries in Europe flocked here, especially to make their legal and medical studies. Among the medical students Morgagni was always a moving spirit, a leader in the phases of thought in many lines that were occupying students' minds at the time.

He was the founder and director of a society of young professors and maturer students, whose object was the discussion of scientific subjects of many kinds. The standard of the new society was personal investigation and observation as a means of arriving at scientific truth. The principal maxim that guided their discussions seems to have been that nothing was to be accepted on authority, merely because it was authority. In the physical sciences thought had been frequently cramped to fit the old theories inherited from Galen and Pliny and Aristotle and Hippocrates. A quotation from one of these classic authors on a point at issue was supposed to throw light on any difficulty that might be the subject of discussion.

Morgagni's society was called the Academia Inquietorum–"The Academy of the Restless"–the idea of the curious name being that the members were not satisfied to rest peacefully in the knowledge to be gleaned from the older authors, but preferred to get at science for themselves by direct observation and planned experiment. Morgagni's idea in founding the society seems to have been premature. The fate of the Academy of the Restless is involved in some obscurity, but biographers seem to hint that it failed of its purpose. Neither the university nor the times were yet ready for such freedom of thought as this. Even in our own day such a scheme would be considered radical and chimerical. The discouragement met with finally led to the abandonment of the meetings, and Morgagni gave up his attempt to inspire others with his own industry and enthusiasm for original investigation in the physical sciences.

For some years after this he seems to have been absent from Bologna. His time was spent especially at the medical schools of the great universities of Pisa and of Padua. Students who wished to make some special branch of medicine such as physiology, or anatomy, or the, then as yet scarcely known, science of pathology, their prime object in life, had to visit various universities in order to find opportunity and suggestion for study. Morgagni devoted himself so faithfully to his work that his eyesight failed him for a time and very probably his general health also. For some years he returned to his native town to recuperate. Here he took up the active practice of medicine. As so often happens, this period of rest after years of study proved especially broadening in its influence upon Morgagni. After his rest his contemporaries begin to realize his great possibilities as a scientist.

His first publication was a series of notes on anatomy. These were published in the form of collected essays, with the title ***Adversaria Anatomica***. The title has a pugnacious sound, but Morgagni did not indulge in controversy and ***adversaria*** is only the Latin name for note-books. The first articles thus collected were really communications made by Morgagni to the "Academy of the Restless" during his presidency of that body. This opened his career as a writer, and it is interesting to note that his last book was to be published some sixty-three years later–a period of fecund authorship almost unprecedented.

As the result of the reputation gained by this work he was offered a teaching position at the University of Padua and later was transferred to the chair of the second professorship of anatomy. After a few years he succeeded to the first professorship of anatomy at the university, at that time the most important post in the medical school. This gave him, at the age of about thirty-five, one of the greatest university professorships in the world. Opportunities for research were now amply provided. He was in a position where his communications would be received with due attention and his reputation was secure.

A university professorship in those days was a position of more importance than even in our own, and Morgagni was especially favored in the fact that it had come early in life, so as to enable him to round out his career. His work was eminently congenial to him, and the labor it involved was that which constituted for Morgagni the highest form of recreation. He made many friends among professors and students. The lectures which Morgagni delivered to the university became so popular that his lecture-room was overcrowded and new quarters had to be provided. Many foreign students were attracted to the university by his wide-spread reputation as a great and suggestive teacher. These students came in great numbers especially from the northern countries of Europe. At one time there were over a thousand German students at the University of Padua, and when they organized into a guild for mutual help and social purposes, Morgagni was chosen by them to act as their patron.

Here at the University of Padua Morgagni was to found the new science of pathological anatomy. Normal anatomy had received its development at the hands of the other great masters in the schools of North Italy. To Morgagni was to be given to describe the changes which take place in organs as the result of disease. Needless to say, this is the most important practical branch of modern medical science. The symptoms of disease mean very little unless we know just what organs are affected and what changes have taken place. Morgagni's work on ***The Seats and Causes of Disease***

contains the foundation of modern pathology. Modern advances might seem to put it out of date, but the acuity of its author's observations and the truth of his investigations make it an enduring classic.

Of this work of Morgagni's, Professor Benjamin Ward Richardson, said: "To this day no medical scholar can help being delighted and instructed by the study of this wonderful book. To move into it from the midst of a body of current medical literature, is like passing from the periodical flux of current general literature to the perusal of a Shakespearean drama, the ***Pilgrim's Progress***, or ***Paradise Lost***. It is a transition from the mediocrity of incessant repetition of well-known truths told in long and hackneyed terms, back to descriptions derived direct from nature and fresh from her treasury. It matters not where the book is opened, it is always good and instructive reading, full of suggestion and rich in original narrative."

Some of Morgagni's work in clinical medicine and in pathology, as detailed in these volumes, remains of perennial interest and is often referred to. Many an after-time discovery, proclaimed loudly by its author, will be found, at times only in embryo but often enough in entirety, in its pages. There are frequent surprises to the reader in the anticipation of what are supposedly much later thoughts in medicine. Some of these passages of more general interest I venture to present here.

It was Morgagni who first realized that minute connections between parts of the nervous system might very easily provide the basis for symptoms quite distant from the site of actual disease. He gives, for instance, a detailed account of a curiously interesting case in which the patient, a man somewhat beyond middle life, was annoyed on a number of occasions by violent sneezing. These attacks of sneezing became more and more frequent and finally were accompanied by difficulty of breathing and a sense of pressure over the chest. These symptoms became more and more marked, until finally, during an especially violent attack of sneezing, the man suddenly died.

Up to this time anatomists generally had declared that there was no direct nervous connection between the mucous membrane of the nose and the diaphragm. Sneezing is due to a violent contraction of the diaphragm and is almost invariably caused by the presence of an irritant in the nose. This is, in fact, nature's method of getting rid of irritant material on the sensitive nasal mucous membranes by an explosive expulsion of air through the nose. This expulsion of air is brought about by a convulsive contraction of the diaphragm. It had always been supposed that the sneezing was due to irritation transmitted through the brain to the diaphragm.

Morgagni, in discussing the reason why the diaphragm should be excited into sympathetic reaction by the presence of an irritant in the nose, pointed out a fact that had been forgotten or the significance of which had not been appreciated. The membrane of the nose concerned in smell is supplied by the first pair of cranial nerves, the so-called olfactory nerves. Between this olfactory nerve and the nerve which supplies the diaphragm, the phrenic nerve, which is a cervical and not a cranial nerve, that is to say, comes from the central nervous system through the spinal cord in the neck and not directly from the brain, the older anatomists declared there was no connection. Morgagni pointed out that the mucous membrane of the nose is partly supplied also from the fifth pair of cranial nerves. From the fifth nerve, small branches of connection with the cervical nerves, as low even as the intercostal nerves, had been traced by Meckel. This shows the possibility of a nervous reflex; that is, of a communication of nerve impulses without the necessity for the intervention of the central nervous system.

This was the first direct tracing of distant reflex nervous action in human physiology. The problem of nervous reflexes was to remain obscure for more than a century later, until light was thrown upon it by the investigation of the French physiologist, Claude Bernard. Here, however, was the pregnant suggestion of the explanation of the seeming mystery. In subsequent cases Morgagni looked for the confirmation of his theory in this matter and found it. He pointed out that there was a relationship between the abdominal viscera and the olfactory mucous membrane of the nose. In one of his cases an epileptic seizure was always accompanied by a sense of discomfort in the upper abdominal region and a fetid odor. This odor was entirely subjective; that is, though extremely

annoying to the patient it could not be noticed by any one else, even though the patient was close at hand and exhaled his breath at the moment of the observation.

This would seem to point to the fact that Morgagni suspected there were other connections between the special senses and important organs besides those which had been discovered by anatomists up to that time. As a matter of fact the so-called sympathetic nervous system does place all the organs of special sense in direct connection with the other important organs of the body. Morgagni's suspicions were to be confirmed by the discoveries made in this sympathetic system during the succeeding century.

Morgagni first of all seems to have realized what was the mechanism by which alcohol injures the human system. He pointed out that the excitation of the heart due to the action of alcohol was reflected in an overdistention of the arteries. This overdistention gradually led to degenerations in the arterial walls. The loss of elasticity thus induced brought on a disturbance of the circulation in the important organs of the body, and so gave rise to symptoms of wide-spread interference with organic functions.

Morgagni's studies in aneurism, that is, in the dilatation of bloodvessels, show how thoroughly he understood the mechanism of the formation of this serious pathological condition. He pointed out that the first noticeable disease change that occurs is a degeneration of the inner coat of the artery. This leads to the formation of furrows on the inner wall of the vessels and finally brings on weakness of the middle coat of the artery. He realized that the progress of these arterial changes is due to a large extent to blood pressure within the arteries. He felt, too, that blood pressure could be kept from being dangerously high by strict attention to diet limitation. If aneurisms are discovered in early stages the patient's life may well be prolonged by these simple measures. This idea contains the germ of the Tufnell treatment, which has been the most successful therapeutic measure for the treatment of aneurism in the nineteenth century.

The Italian anatomist's acumen led him to appreciate better than ever before in medical history the influence of the mind on the circulation. He pointed out that emotions have a powerful influence on the circulatory system in all its parts. How much the peripheral bloodvessels are affected can be seen in the tendency to blushing during certain forms of excitement, involving shame or embarrassment; on the contrary, pallor in anger, or indignation, or fright. He pointed out, too, that the heart is affected by such emotions and is sometimes strenuously excited and sometimes very much retarded. Morgagni understood that the influence of such emotions in especially excitable individuals leads to wear and tear on the bloodvessels and so to a shortening of lives. He thought of some aneurisms, even those affecting the large bloodvessels, might be caused by sudden intense emotions, and especially by violent efforts to suppress or conceal emotions. We know now, however, that these pathological conditions are due to human passions, but quite other than those which Morgagni had in mind.

It is interesting to note that comparative pathology–that is, the study of the diseases of animals as illustrating corresponding conditions in human beings–had already attracted the attention of the Bolognese school of medicine. Albertini, who had been a professor of Morgagni's, pointed out that aneurisms are rarely found in animals, because brutes were not subject to emotions as are human beings. Morgagni made still further observations in this line to confirm his own conclusions in the matter. For a time in his earlier life he devoted himself to the study of fishes, because they seemed to promise to throw light on certain problems in human anatomy and pathology.

How closely he studied pathological changes in tissues can be gathered from the fact that his observations led him to point out that aneurism of the aorta occurs most frequently at that part of the curvature of the aorta against which blood is constantly projected by the heart. The realization of the importance of this mechanical factor in the production of aneurism is one of the first successful results of carefully applied observation and knowledge of physical laws in the causation of changes in the tissues as opposed to elaborate theories with very little foundation in fact.

Variations in the pulse attracted his attention, and he was among the first to point out that the occurrence of flatulency is liable to cause disturbance of the heart's action and to bring on noticeable cardiac palpitation in the absence of any organic affection of the heart itself. Morgagni also pointed out that intermittence of the pulse may be due to nervous conditions. He showed that severe mental shock or trying emotions may cause irregularity of the heart's action and pulse intermittency. Some of his observations in this matter show an intuition with regard to the nerve supply of the heart that is quite beyond the anatomy of his time, and seems to indicate that he suspected the existence and function of the sympathetic system and also the existence of a special nerve supply to the small arteries.

Perhaps Morgagni's most penetrating evidence of insight in pathology and its relations to clinical medicine is with regard to tuberculosis. Over a century and a half ago he insisted on its contagiousness. He refused to make autopsies on patients who had died of tuberculosis, and his position in the matter was undoubtedly of the greatest service in directing the attention of his contemporaries, and especially those closely in contact with him, to the important question of intimate association with tuberculous patients as a potent factor in the acquirement of the disease, more potent even than heredity which then occupied all men's minds on this subject.

It might be deemed that this advanced position of Morgagni was due rather to intuitive abhorrence of the disease than to the conviction of actual observation, and that his conclusions were the result more of prejudice than of real knowledge. Any such opinion, however, is absolutely contradicted by the fact that he knew and understood better than any one of his generation the pathology of consumption. He pointed out at a time when any chronic affection of the lungs was liable to be considered consumption that there are a number of forms of chronic bronchitis that are not due to pthisis pulmonalis, but to other slow-running conditions within the lungs.

He anticipated very completely the present position of surgery with regard to the treatment of cancer. He advised the operative removal of these malignant tumors whenever possible. As Benjamin Ward Richardson points out, this advice was given evidently not with the idea that the disease could be always thus completely cured, but because early operation gave speediest relief of annoying symptoms and assured the greatest prolongation of life. Many other methods of removal of cancerous growths were suggested in Morgagni's time, as in our own, and many false promises made and false hopes raised by their advocates. He pointed out that the quickest, the safest, the surest and in the end, for the patient, the easiest method of removal is by the knife in the hands of the bold and skilful surgeon. After a century and a half of vauntedly great advance, especially in surgery, we are practically in the same position as when Morgagni's advice was penned, and his opinion remains practically as valuable to-day as then.

In another important point of medicine Morgagni seems to have anticipated the opinion of our own time. It was the custom to practise venesection very freely. On one or two occasions in his own lifetime Morgagni fell ill and venesection was recommended. His biographer says that he constantly refused this method of treatment, adding very naively, "and he who had often cured others by venesection would never allow this remedy to be used upon himself because, as I believe, he had a natural abhorrence to it."

It was an index of thoroughgoing independence of thought in those days to stand out, even for personal reasons, against the overwhelming tradition in favor of blood-letting. But Morgagni had well-grounded doubts as to the remedial efficacy of abstraction of blood, and at least avoided it in his own case.

Besides his skill in practical and theoretic medicine, Morgagni was a man of cultivated taste in art, and he was conversant not only with the literature of his own language, but also of French, Latin and Greek. He was always welcomed in the literary circles of the cities of Northern Italy, and counted among his friends many of the great writers of the time. His success in winning the friendship of rulers was especially noteworthy, and had not a little influence for the advantage of education and

science. The patricians of Venice were proud to consider him as a personal friend, and to the Venetian Senate he owed his professorship at Padua. The King of Sardinia, Emanuel III, looked upon him as an intimate acquaintance. All the Popes, five in number, of the second half of his life were on terms of personal intimacy with him, and his advice was asked on many important questions with regard to educational matters in his own day.

Some of these Popes are among the most influential pontiffs that ever occupied the Roman See. The great Benedict XIV, himself a native of Bologna and an intimate friend of the scientist, in his classic work "De Beatificatione Servorum Dei" mentions Morgagni in terms of special commendation. His scarcely less famous successor, Clement XIII, had often consulted Morgagni professionally at Padua before his elevation to the See of Rome. After his election as Pope he assures Morgagni of his continued esteem and friendship, and asks him to consider the Vatican always open to him on his visits to Rome. In an extant letter Clement praises his wisdom, his culture, his courtesy, his charity to God and men, and holds him up as an example to others, since with all his good qualities he had not aroused the enmity or envy of those around him.

Morgagni's life must have been in many ways ideally happy. Rewards for his scientific success began early in life, even before his professorship, and continued all during his long career. The Royal Society of England elected him a fellow in 1724; the Academy of Sciences of Paris made him a member in 1731. In 1735 the Imperial Academy of St. Petersburg conferred a like honor upon him. In 1754 the Academy of Berlin elected him to honorary membership.

His English biographer, Dr. William Cook, says quaintly that all the learned and great who came into his neighborhood did not depart without a visit to Morgagni. He was in correspondence with most of the great men of his time, and the terms of intimate relationship that this correspondence reveals are the best evidence of the estimation in which Morgagni was held, especially by the prominent scientists of his time. Among them were such men as Ruysch, Boerhaave, Sir Richard Mead, Haller and Meckel. This wide acquaintanceship of itself was a great distinction at a time when the means of communication were so much more limited than at present.

It is gratifying to think that Morgagni must have been enviably content in his private life, though, as usually happens when this is the case, very little is said explicitly on this subject. His untiring labor deserved the compensation of a loving domestic circle. During his retirement at Forli, after his graduation from the university and when, from overwork, his health failed him for a time, he married the descendant of a noble family of the town, Paola Vergieri by name, a companion for him who, biographers declare, could not have been surpassed in judgment or in affection. They had a family of fifteen children, eight of whom survived their father though he lived to the ripe age of eighty-seven years. There were three sons, one of whom died in childhood; another became a Jesuit and taught in the famous Jesuit school at Bologna whose magnificent building has now become the municipal museum, the Accademia delle Belle Arte. The third followed his father's profession, married and settled in Bologna, but died before his father, who assumed the care of his grandchildren. All Morgagni's daughters who grew up to womanhood, eight in number, became nuns in various religious orders.

The spirit of science had not disturbed the development of a homely simple faith in the family. The great Father of Pathology, far from being disturbed by the unselfish self-sacrifice of so many of his children, bore it not only with equanimity but even rejoiced at it. His relations to his children were ever most tender. After the suppression of the Jesuits, his son, who had been a member of the order, worked at science with his father at the University of Bologna and not without distinction.

The estimation in which Morgagni was held by his contemporaries can be judged from the fact that twice when invading armies had entered the Emilia and laid siege to Bologna, their commanders, as in old Greek history did the Grecian generals with regard to Pindar and Archimedes, gave strict orders that special care was to be taken that no harm come to Morgagni, and that his work was not

to be hampered. Having lived his long life amidst the reverent respect of all who knew him, he died full of day and honors.

Succeeding generations have not been backward in acknowledging Morgagni's merits. I have already spoken of Virchow's tribute to his greatness. The Italians have long considered him as one of their most brilliant names in medicine. One of the best known of the representative Italian medical journals is ***Il Morgagni***, published at Milan. To its pages the foreigner seeking to know the progress of Italian medicine turns almost as the first resort. ***Il Morgagni*** was founded some fifty years ago, and continues to uphold its reputation as one of the world-known medical periodicals.

The great medical scientist whose work was to prove the foundation of modern pathology, and thus be the source of more blessings to mankind than ever even he dreamed of, remained in the midst of the reverence and gratitude of his generation, one of those beautifully simple characters whom all the world delights to honor. As a teacher he was the idol of his students. No great scientist who came to Italy felt that his journey had been quite complete unless he had had the privilege of an interview with Morgagni. This friend of Popes and of many of the European rulers was the happy father of a houseful of members of religious orders, and considered himself blest that so many of them had chosen the better part. He was himself all during his long life the ardent seeker after truth, who did well the work that came to his hand and followed his conscience in sincere simplicity of heart and reaped his personal reward in the peace that is beyond understanding to those who have not the gift of faith to appreciate the things that are beyond the domain of sense.

AUENBRUGGER, THE INVENTOR OF PHYSICAL DIAGNOSIS

While medicine is your vocation, or calling, see to it that you have also an avocation–some intellectual pastime which may serve to keep you in touch with the world of art, of science, or of letters. Begin at once the cultivation of some interest other than the purely professional. The difficulty is in a selection and the choice will be different according to your tastes and training.
--Osler, Aequanimitas and other Addresses.

At the present time the most interesting development in medicine is the gradual reduction of the death rate from tuberculosis. This is entirely due to the fact that the disease can now be recognized very early in its course, and that, as a consequence, the treatment may be begun before serious damage has been inflicted on the lungs. Under the circumstances, the disease formerly supposed incurable has become according to all the best modern authorities one of the most tractable of infectious diseases. In their recent lectures in Philadelphia, before the Phipps Institute for the Prevention and Cure of Consumption, such distinguished medical authorities as Dr. Trudeau, of Saranac; Professor Osler, of Johns Hopkins, and Professor G. Simms Woodhead, of Cambridge, England, insist on the absolute curability of tuberculosis when it is taken in time. Professor Woodhead particularly asserts that there has been entirely too much pessimism in this matter, even among physicians.

This present confidence with regard to the successful treatment of pulmonary consumption is due to the fact that the diagnosis can be made early. The glory of this early recognition depends entirely on two men–Auenbrugger, of Vienna, and Laennec, of Paris. To Auenbrugger, whose work was done nearly half a century before that of Laennec, must be given the credit of having first approached the problem of differentiating diseases of the lungs from one another by methods which were so objectively practical that every practitioner of medicine could, after having become expert in their employment, use them with absolute confidence in his diagnosis.

Modern medical science and practice acknowledges very gratefully its deep obligations to what is known as the Vienna school of medicine. It is not a little surprising to find that it was the practical side of medicine particularly which was developed at Vienna, since the inhabitants of the Austrian capital, while supposed to have artistic tastes far above the average, are usually considered to be among the most impractical people in Europe. For over one hundred and fifty years, however, the medical department of the University of Vienna has always ranked among the first in the world. Many of the Viennese professors of medicine have been acknowledged as the greatest teachers of their time. Beginning with Van Swieten and De Haen during the second half of the eighteenth century, the medical department of the University of Vienna has scarcely ever been without at least one of the leading lights of medicine in Europe. Wunderlich, Rokitansky and Skoda were, in the middle of the nineteenth century, the greatest medical men of their time. Hebra, Billroth and Nothnagel worthily continued the tradition of medical greatness in the Austrian capital. Even at the present time, notwithstanding the great advance in medicine and medical teaching that has come over all Europe, it is generally conceded that the best place in the world to study clinical medicine–that is, to study illness at the bedside of the patient–is the famous Allgemeines Krankenhaus, the General Hospital of Vienna.

The clinical teaching of medicine developed much later in the history of medical education than might naturally have been expected. There is a tradition of bedside instruction in medicine in old Grecian times at the various shrines of AEsculapius, but this is not well authenticated. Early in the sixteenth century came the modern birth of clinical medical instruction at St. Francis's Hospital, in Padua, in connection with the University there, which in every line did so much for

modern medicine. The first clinic that attracted widespread attention, however, did not come until Boerhaave's time, at the end of the seventeenth and the beginning of the eighteenth century. The bedside instruction in medicine by this distinguished master drew hosts of students to the hitherto comparatively unimportant University of Leyden, in Holland. Two rulers–just the two who, to modern minds, would perhaps appear least likely to do so–at once recognized the immense practical value of this innovation in medical teaching and immediately set about securing its benefits for their people. Pope Benedict XIII and the Empress of Austria put themselves in communication with Boerhaave, and the Pope was the first to avail himself of the advice in the matter which the great Dutch master gave. The Roman clinic became, in the first half of the eighteenth century, under the direction of the distinguished Lancisi, one of the best known in Europe.

The Austrian Empress, Maria Theresa, interested in everything that could prove to be for the benefit of her people, invited the distinguished pupil of Boerhaave, Van Swieten, to become her family physician, and encouraged him in the foundation of a clinical medical school at Vienna. Van Swieten soon came to occupy a very prominent place at Court. When he was invited from Holland, on the recommendation of the sister of the Empress, there was no heir to the Austrian crown, though one had been anxiously looked for for several years. Heirs to the number of sixteen in all blessed the imperial family in the next twenty-five years, and Van Swieten became the confidential adviser of the reigning monarchs in polity as well as in medicine. Accordingly, when he suggested the invitation of De Haen, who had also been a pupil of Boerhaave, the suggestion was promptly accepted, and the Leyden colleagues became the founders of the Old Vienna School of Medicine, as it is called. They established the tradition of bedside teaching, of actual practical experience in the treatment of patients, and of the collection of detailed information of every feature of cases that could possibly be helpful for diagnosis. They also established the custom of demonstrations on pathological material with confrontation of the diagnostic conclusions during life and the findings of the postmortem examination in fatal cases, which, down to our own day, makes Vienna an ideal place for serious post-graduate work in clinical medicine.

It was not long after the establishment of the clinic on these broad lines at Vienna before the first important fruit of the new teaching method was to be gathered. Curiously enough, however, this initial advance in practical medicine did not come from one of the distinguished heads of the clinic, but from a comparatively young man of no previous reputation. The greatest discovery ever made at Vienna is due to Auenbrugger, an unassuming practitioner of medicine, who came from the Austrian province of Styria, or, as it is called in German, the Steiermark, about the middle of the eighteenth century. He was the son of a small hotel keeper of Gratz, and, after making his medical studies in Vienna, he remained at the capital for some years, doing hospital work.

While thus engaged, the young Styrian, who attracted very little attention except for his affability, and who made no pretension to special knowledge or genius in observation, laid the first stone in the structure of modern exact diagnosis of pulmonary disease, and cleared up many of the obscurities in which all affections of the chest had been shrouded before his time. Having accomplished this noteworthy achievement before he was forty years of age, Auenbrugger then quietly settled down to be an ordinary medical practitioner in the Austrian capital, with a special reputation for his knowledge of chest diseases, and for kindly ways that gave him as much interest in his poor patients as in those that could afford to pay handsomely for his services.

Leopold Auenbrugger, afterward Edler von Auenbrug–a term about equivalent to the English "Knight of Auenbrug"–who thus stands at the head of modern medical diagnosis, was born on the 19th of November, 1722, at Gratz, in Lower Austria. His early education was received at Gratz, and it seems to have been of rather a comprehensive character, for Auenbrugger, later in life, was a member of the elegant literary circles in Vienna and a welcome friend at the tables of cultured and distinguished fellow-townsmen. It will be recalled, by those who remember German literature, that at

this time Vienna was the centre of culture in Germany, attracting many literary men–as, for instance, the two Schlegels–from other parts of Germany.

Auenbrugger's father was of the lower middle class, the proprietor of the Gasthaus Zum Schwarzen Mohren, in one of the suburbs of the city of Gratz, but also the owner of another hotel in the city itself, so that he was able, by making some sacrifices, to afford his son a university and medical education in Vienna. The family were not in very affluent circumstances, however, and in this Auenbrugger was in the same condition as many other of the distinguished medical men who have made important original discoveries. Volta, Laennec, Johann Mueller, Helmholtz, Pasteur and Virchow were all the sons of comparatively poor parents, and had to eke out their university education by doing teaching work as soon as they were considered capable.

Auenbrugger's studies in medicine were pursued under the well-known Baron Van Swieten. Van Swieten was, as has been said, one of the most distinguished of Boerhaave's pupils, and devoted most of his life to writing a set of commentaries on Boerhaave's aphorisms and editing his master's work. Van Swieten's greatest ambition was to make the Austrian capital the home of the great clinical school of medicine and a pilgrimage at least as attractive for physicians seeking to study practical medicine at the bedside as had been his own alma mater at Leyden. He was of so great administrative ability that Maria Theresa made him one of her state counsellors.

With all the influence of the government behind him, then, it is not surprising that Van Swieten succeeded in his very laudable project of establishing a great medical school at Vienna.

It was fortunate that Auenbrugger made his medical studies under such good auspices. We have no details of his student life nor of his success in his examinations. Even as a student his engagement of marriage to Marianna von Priesterberg was announced. The formal marriage ceremony took place in 1754, when Auenbrugger was about thirty-two years of age. His wife seems to have had a dowry, and this enabled Auenbrugger to begin his medical career in Vienna. Some years before this, as a young graduate physician, he had accepted the position of resident medical attendant at the Spanish military hospital of the Holy Trinity in Vienna. This hospital was large and important and provided manifold opportunities for clinical study. Its wards were frequently drawn on by the clinical department of the University of Vienna for cases to be demonstrated before the students.

This fact was sufficient to make Auenbrugger's position of great educative value for him. Mistakes in diagnosis would be apt to be discovered, since the interesting cases were reviewed by some of the best physicians of the time in Europe. His position carried with it no salary beyond his maintenance, but proved well worth the time he gave it, since it developed in him habits of careful investigation. Just ten years after he began his work at this hospital he published the little book called "Inventum Novum," or new discovery, on which his reputation depends. It was written in Latin, and its full title ran: "A New Discovery that Enables the Physician, from the Percussion of the Human Thorax, to Detect the Diseases Hidden within the Chest."

Altogether his little manual probably does not contain much more than ten thousand words. It is perhaps two or three times as long as thousands of medical articles published every year in our modern medical journals. It contains, however, one of the most important discoveries in the whole history of medicine. One of the best diagnosticians of the nineteenth century, Skoda, the distinguished head of the Vienna school of sixty years ago, calls the discovery that Auenbrugger outlined so unpretentiously "the beginning of modern diagnosis," and hailed Auenbrugger himself as the founder of the new science of diagnosis that was to prove so fruitful of good in the prevention of human suffering.

It is interesting to compare Auenbrugger's little book with Van Swieten's commentaries on Boerhaave's works, which were published in some eight huge volumes. Van Swieten's successor, De Haen, an equally illustrious contemporary of Auenbrugger, published about the same time some eighteen volumes on the science of medicine. Neither of these works is ever consulted now, except by some enthusiastic student of the history of medicine, who wishes to clear up a point in medical historical development; but Auenbrugger's unpretending monograph is, and will ever remain, a

classic. Practically nothing has been needed to complete the clinical usefulness of his discovery. Like Laennec, whose work was done just half a century later, he had the genius to realize what the possibilities and the limitations of his discovery are, and he completed it in all its details before giving it to the public.

Auenbrugger's discovery consisted in recognizing that diseases of the chest can be distinguished from one another and their varying character differentiated by the sounds elicited when the chest is tapped with the finger. To this tapping he gave the technical name, since become classic in medicine, of percussion. Wherever there is air in the chest, that is all over the healthy lungs, the sound elicited by percussion resembles that given out by a drum over which a thick woolen cloth has been placed. Over the heart, where there is no air, the sound given out, when the chest is percussed, corresponds very nearly to the sound produced when the thigh is tapped. The sound elicited by percussion of the thigh Auenbrugger took as the standard of dulness and applied to it the term Schenkel-ton, or thigh sound.

When the lungs become consolidated because of an inflammatory process such as pneumonia or tuberculosis, then the percussion note over the consolidated area resembles the sound over the leg or that found over the heart. As a rule the heart is somewhat covered by the lungs, and the sound produced by percussion over it is not quite as dull as that over the solid muscular structures of the legs. Whenever fluid finds its way into the thorax, as in pleurisy, then the sound produced on percussion is very dull.

Auenbrugger further showed that by means of the sound thus obtained he could demonstrate the size of the heart under varying conditions, and so determine whether it is larger than normal or not. This gave the first inkling as to the discernment of hypertrophy and dilatation of the heart, and was the first step in the modern differential diagnosis of heart diseases. He showed, moreover, that he could, by percussion, outline very exactly the extent to which a consolidation of the lung has taken place, or the height to which an effusion into the pleural cavity reaches. These conclusions and demonstrations require not only the greatest care but the most deliberate confirmation of every detail by comparison of the diagnosis during life with the condition found after death in fatal cases.

Auenbrugger seems to have spared neither time nor labor in this work of confirmation. He made a number of experiments upon dead bodies, injecting fluid into the pleural cavity and then demonstrating by percussion the line of demarcation that indicated the level of the fluid within the chest, as well as the pulmonary conditions that developed because of its presence. In the study of pneumonia and tuberculosis particularly, Auenbrugger spent many hours of patient investigation during his ten years of hospital service. He succeeded not only in demonstrating the presence of consolidation, but also the existence of cavities in the lungs and their size and general character.

Vienna was an ideal place for the development of Auenbrugger's ideas of confirmation. At this time, it must have been one of the most unhealthy places in Europe as regards pulmonary diseases. The city was surrounded by walls that occupied the ground now taken up by the magnificent Ring Strasse and the inhabitants were packed into extremely narrow quarters, The modern municipal sanitary conscience is lax enough in our own day, but at that time it had not been awakened to the slightest sense of duty toward the citizens. Narrow, wandering streets lined by high buildings that made an attaché of the British Legation of Vienna speak of the houses of the city, scarcely more than fifty years ago, as "well-like," were the universal rule.

It must be remembered that the present magnificent Austrian capital, containing, perhaps, the handsomest single street and some of the finest buildings in the world, is entirely a creation of the last half-century. The old city had every cause to be unsanitary. Situated in the valley of the Danube, liable in the spring-time to serious floodings from the capricious, mighty river, which has been brought under control only in recent years at great expense; in an exposed situation, which makes it a veritable temple of the winds during the autumn and winter; it is not surprising that tuberculosis should have been very frequent. Even with all its improvements in recent years, sanitary, hygienic, municipal and domiciliary, Vienna has at the present time one of the highest death rates from tuberculosis in

Europe. In Auenbrugger's time there must have been practically unlimited opportunity for the study of pulmonary diseases of all kinds.

How well the brilliant young medical observer took advantage of the opportunities thus afforded him can be judged very well from the passages of his book that refer to chronic pulmonary diseases. He divides the chronic diseases of the thorax in which abnormal percussion sounds are heard into two classes. In the first place, he places those in which the thoracic organs are rendered less capable of resisting disease and become actually affected, because of insidious influences, such as hereditary conditions, depressing circumstances, poverty and poor nutrition. Without really calling it tuberculosis, it is evident that in this group pulmonary consumption is included. The second class consists of affections in which the thoracic organs become diseased from definite, easily recognizable causes. Such are disturbances of the general health in pulmonary affections that follow thoracic disease not completely recovered from. By these diseases Auenbrugger evidently intends cases of pneumonia or other affections of the lungs, or trauma and the like, which are followed by tuberculous processes.

With regard to cavities in the lungs, Auenbrugger was able not only to demonstrate their presence and to show by autopsy records that his localization and determination of their approximate form and size were correct, but he also understood the method of their formation and explains the reasons for certain varieties of cavities that occur. He speaks of two classes of cavity formations. From one kind there is an ichorous discharge; from the other variety the evacuations are purulent. Cavities with non-purulent secretions are situated only in the lung. Abscesses of various kinds–that is, cavities with purulent secretions–may occur in any part, or in any of the organs of the thorax. The lung cavities are usually due to the breaking down of what he calls crude tubercles. Both kinds of cavities may either be closed or have an opening into the bronchi.

Auenbrugger showed very well how to distinguish, by percussion, cavities of various kinds, and set it down as a principle, that before the evacuation of the contents of the cavity percussion over it gave a distinctly dull note, resembling that obtained when the thigh is percussed, while after evacuation, as by copious expectoration, a distinctly resonant note occurred. It is clear from his discussion of the symptoms noted in cavities (at least in the opinion of Dr. Merbach, who wrote a sketch of Auenbrugger's life for the Jahresbericht der Gesellschaft für Natur und Heilkunde in Dresden, in 1861), that Auenbrugger was very near the discovery of auscultation in his study of pulmonary cavities. Auenbrugger says that when a cavity has been located by means of percussion, if the hand be laid over the place beneath which it lies and the patient is asked to cough, the fremitus produced by the pus in the cavity can be felt as it moves under the coughing impulse. This is what we now know as palpation. If instead of using his hand Auenbrugger had applied his ear to the chest, auscultation would have been discovered nearly half a century before Laennec began his work upon the subject. Perhaps Merbach, who was himself a native of Styria and a professor at the University of Gratz, was for patriotic motives more ready than others might be to give Auenbrugger credit for practically discovering auscultation.

Auenbrugger's and Laennec's observations were made on exactly the same sort of clinical material. They were both studying advanced cases of tuberculosis in the hospitals of a great city. Laennec's work was actually not anticipated in the slightest degree however. How Auenbrugger could have made the careful examinations of the chest that he did in thoracic diseases without acquiring some knowledge of the value of the further application of the sense of hearing, which Laennec was to employ so fruitfully in the diagnosis of affections of the lungs and heart, seems to us almost impossible to understand. Discoveries once made, however, always seem so obvious that the wonder is they were not made long before. It takes genius to cross the line into the realm of the hitherto unknown, and the contemporary generation usually occupies itself mainly with making little of the new discovery. Even genius very rarely makes more than one original observation in a lifetime, and it would be too much to expect more from Auenbrugger.

The preface to Auenbrugger's little book is a model of concise directness typical of the man and his ways. As the modest introduction to a work that will ever be a classic in medicine it seems to deserve a place here:

> "I present to you, kind reader, a new sign for the detection of diseases of the chest, which I have discovered. It consists in the percussion of the human thorax and the determination of the internal condition of this cavity by the varying resonance of the sounds thus produced. My discoveries in this subject are not committed to paper because of an itch for writing, nor an inordinate desire for theorizing. Seven years of observation have put the subject in order and have clarified it for myself and now I feel that it should be published.
>
> "I foresee very well that I shall encounter no little opposition to my views and I put my invention before the public with that anticipation. I realize, however, that envy and blame and even hatred and calumny have never failed to come to men who have illuminated art or science by discoveries or have added to their perfection. I expect to have to submit to this danger myself, but I think that no one will be able to call any of my observations to account. I have written only what I have myself learned by personal observation over and over again, and what my senses have taught me during long hours of toil. I have never permitted myself to add or subtract anything from my observations because of the seductions of preconceived theory.
>
> "I would not wish, however, that any one should think that this method of diagnosis, which I suggest, has been developed to its utmost perfection. I confess with all candor that there are defects in the system which conscientious observation will, I hope, amend with time. It is possible that there are even other important truths for the recognition of disease still hidden from this method of diagnosis. Some of these may prove of great usefulness for the differentiation, prognosis and cure of diseases of the chest.
>
> "This was the reason why in my personal experience, after I had succeeded in finding the signs in the chest and proceeded further to the investigation of their causes so far as my own observation could help me, I have always afterward had recourse to the commentaries of the illustrious Baron Van Swieten, since I have considered that whatever can be desired by an observant man is sure to be found in his work. I have thus been able to spare you a long disquisition. I have found in his work a sure basis of knowledge on which my slight superstructure may be raised up to view.
>
> "I do not doubt, however, that I have accomplished a work which will earn the gratitude of all true devotees of the art of medicine, since I have succeeded in making clear certain things which shed not a little light on our knowledge of the obscure diseases of the chest, a subject hitherto very imperfectly understood.
>
> "I have omitted many things that seem doubtful because they are as yet not sufficiently elaborated. I shall endeavor, however, faithfully to devote myself to [literally to sweat over] the further development of these points. Finally, it has not been my effort to write in any elegant diction. I have chosen a style in which I may be thoroughly understood.
>
> ***Vale;***
>
> "December 31, 1760."

Auenbrugger's own realization of the importance of his work and of its significant value for medicine kept him faithfully investigating his chosen subject, though he seems to have met with very little encouragement from members of the medical profession near him. It is extremely difficult to

understand how his practical observations and thoroughly conservative claim failed to attract more attention than they did from really great physicians who were deeply interested in the progress of medicine. At least two distinguished writers on medicine, Van Swieten and De Haen, compiled treatises on medical subjects that included the consideration of diseases of the chest within a few years after Auenbrugger's ***Inventum Novum*** appeared, and yet neither of them devotes any space to the question of percussion nor hints at its possible value.

Van Swieten's work consisted of commentaries upon the aphorisms of Boerhaave. The Vienna professor did not, however, limit himself to the consideration of the aphorisms alone, but made his work also a compendium of his own clinical experiences with acute and chronic diseases. As a matter of fact his commentaries on the aphorisms are each a monograph on some special disease. The two last volumes of this commentary appear after the publication of Auenbrugger's book on percussion, one volume being published in 1772, the other in 1774.

The first of these articles contains a long article on pulmonary consumption, and the other an almost equally long chapter on pleurisy with effusion. In neither of the volumes, however, is there any mention of percussion, or of Auenbrugger's work, though if Van Swieten had given any serious attention to the subject, he must have become convinced how valuable Auenbrugger's invention was in the diagnosis of these conditions.

This omission is all the more surprising as Auenbrugger was a pupil of Van Swieten's and practically dedicated his ***Inventum Novum*** to his master. He mentions Van Swieten's work several times in his little book. Auenbrugger's investigations were not unknown to Van Swieten then, and the only conclusion to be drawn from his neglect to mention Auenbrugger's methods is that he deliberately omitted reference to them because of his failure to recognize the value of the discovery. This constitutes one of the most serious blots on Van Swieten's medical career. He was succeeded as the head of the clinic in Vienna by De Haen, who also came from Leyden and brought with him the methods of Boerhaave's clinical school. As the time during which Auenbrugger was making his valuable observations at the Spanish military hospital coincides with the years when De Haen was professor of clinical medicine, and when he was frequently indebted to his colleague of the Spanish hospital for his cases for demonstration, it is impossible to conceive that Auenbrugger or his work should have remained unknown to the distinguished head of the clinic.

There is not a single mention, however, to be found anywhere in De Haen's voluminous writings of Auenbrugger or his work. De Haen's principal work is his ***Ratio Medendi*** (***System of Medicine***), published at Vienna during the years from 1757 to 1779. It consists of eighteen volumes, in which all the important forms of disease as well as the rarer types of affections that came to the clinic are thoroughly discussed. De Haen treated of pneumonia, of consumption, of pleurisy with effusion, which he calls dropsy of the chest, but never suggests the use of percussion. On the contrary, he complains in a number of places how very obscure and difficult of diagnosis are thoracic diseases and especially dropsy of the chest, pleuritic and pericardial exudates, and insists on the ease with which errors of diagnosis may be made in these subjects. He failed completely to recognize how much light had just been thrown on this subject by Auenbrugger's work, and how much easier the differential diagnoses of these conditions were to be as the result of systematic percussion.

Some of the commentaries on Auenbrugger's work are not entirely depreciative, however. In Ludwig's ***Commentaria de Rebus in Scientia Naturali et Medicina Gestis*** for the year 1762, published at Leipzig, there is an excellent notice of Auenbrugger's work within a year after its appearance. It is not known who the reviewer was, but he calls Auenbrugger's discovery "a torch that was designed to illumine the darkness in which diseases of the thorax had up to this time lain concealed." A brilliant future was prophesied for the new method of examination. It is evident that the writer not only thoroughly comprehended Auenbrugger's work, but had himself applied the percussion method for purposes of diagnosis.

This is almost the only favorable and reasonably intelligent review of Auenbrugger's work to be found in the medical journals of the time. In the new Medical Library, issued by Rudolph Vogel, Professor of Medicine in Göttingen, published in six volumes in 1766, there is a short mention of Auenbrugger's book and his new discovery. This reference is, however, an extremely curious affair. The good professor completely failed to understand in what the new discovery really consists. It is clear that he had never read Auenbrugger's book. He seems to have heard of the subject from some medical friend, and to have obtained an entirely wrong notion. He talks of Auenbrugger's new diagnostic method as if it were an imitation of Hippocrates's succussion method of recognizing the presence of fluid in the chest by shaking the patient till the liquid gave the characteristic splash.

Other medical writers of the time perhaps, as the result of reading Professor Vogel's book, made the same mistake in their appreciation of Auenbrugger's work. Vogel himself insisted that Auenbrugger did wrong to claim any originality for his invention, since it had been used so long before by Hippocrates. He adds that what is original with Auenbrugger is of very little value, the older ideas being the only ones worth while considering with regard to the application of this so-called new method of diagnosis. Vogel was an authority in medicine at the time and other commentators took the key note from him in this matter, and in many parts of Germany it was generally accepted that Auenbrugger's method of percussion was only an elaborated method of the so-called succussion of Hippocrates.

Under these circumstances it is perhaps not surprising that Auenbrugger's work attracted very little attention in the German-speaking countries. In Vienna itself, as we have already said, Van Swieten and De Haen failed utterly to recognize its value. Outside of Vienna their example was naturally followed, for the Vienna school was considered authoritative, and surely, if any one, the professors of the University of Vienna might be expected to know whether Auenbrugger's new discovery was really of any value or not.

It is interesting to compare Auenbrugger's state of mind, with regard to the neglect of his discovery, with Laennec's remark in the preface of his book. Laennec said: "For our generation is not inquisitive as to what is being accomplished by its own sons. Claims of new discoveries made by contemporaries are apt for the most part to be met by smiles and mocking remarks. It is always easier to condemn than to test by actual experience." Auenbrugger seems to have suffered from more than the neglect of which Laennec complains. When he speaks of envy and calumny in no uncertain terms, the only conclusion possible is that his representations as to his discoveries must have been set down as pretensions that his contemporaries considered unjustified by what they knew of his work.

It is interesting also to note that both men found their prospects of reward, not in the good will of their contemporaries, nor even the prospect of fame, but in the hope that their work would be useful in lessening the sum of human suffering. Laennec said: "It suffices for me if I can only feel sure that this method will commend itself to a few worthy and learned men who will make it of use to many patients. I shall consider it ample, yea more than sufficient reward for my labor, if it should prove the means by which a single human being is snatched from untimely death."

Laennec's words are almost an echo fifty years afterward of Auenbrugger's expressions, just quoted: "I console myself," he said, "with the thought that I have accomplished a work which will earn the gratitude of all true devotees of the art of medicine, since I have succeeded in making clear many things which shed not a little light on the chapter of the obscure diseases of the chest, in which our knowledge has hitherto been so very incomplete."

As a rule it may be said that medical observers whose genius leads them to step across the narrow line that separates the known from the unknown are likely to lack the appreciation of their own generation. Long before Auenbrugger or Laennec, Harvey, the discoverer of the circulation of the blood, said to friends that he did not expect any one of his generation to accept the new doctrine, and it is well known that the great medical men of the time did not accept it. Harvey is not an isolated example, and even in our own time real medical progress sometimes waits for years

for recognition, while well-advertised pretended advances are occupying the centre of the stage. Auenbrugger's discovery made its impress, however, and was never entirely lost to sight. Even before his death there was the consoling prospect of its meeting with adequate attention.

De Haen's successor in Vienna, Maximilian Stoll, treated Auenbrugger's work very differently from his predecessors, and was the first to introduce it practically into clinical medical training. Stoll did not hesitate in his clinic, on the strength of what was discovered by means of percussion, to attempt the evacuation of fluid from the pleural cavity on a number of occasions. It can be easily understood that with their lack of knowledge of the necessity for thorough cleanliness in the surgical sense, such an operation might readily be followed by discouragingly fatal results. This actually happened in Stoll's own experience. He does not, however, seem to have abandoned his practice of tapping the chest because of this. He insisted to his students that Auenbrugger more than anyone else had experience in removing fluid, and especially purulent collections, from the chest, and he recommended the practice to them. He added that medicine owed as much to Auenbrugger for his rational method of treating effusions into the pleural cavity, whether of pus or serum, as for his diagnostic sign by which the presence of the fluid could surely be recognized.

Some of Stoll's pupils took up the work of commending Auenbrugger's method, and a little book written by one of them, Eyerel, came into the hands of the distinguished French physician, Corvisart. Eyerel did not hesitate to say, in his treatise on empyema, that the practice of percussion of the thorax, a diagnostic method introduced by the very distinguished Vienna physician, Auenbrugger, had been of great help to them in the study of this disease.

Once the great French professor of medicine, Corvisart, took it up, the new method of diagnosis was destined to have an immediate and world-wide vogue. Corvisart was not only a power in medicine because of his faculty of observation and his thorough appreciation of the work of others, but he was the court physician of the first Napoleon, and this gave any ideas that he favored many adventitious chances for publicity. Napoleon's well-known faculty for selecting men for special positions whose genius was calculated to be of service to him was never less at fault than when he violated most of the court medical traditions in Paris and chose Corvisart for the imperial physician. Corvisart's selection was the result of Napoleon's appreciation of his new method of diagnosis, namely, that of percussion, in chest diseases.

The Emperor himself was suffering from a persistent cold and was told that Corvisart, instead of following the traditional method of feeling the pulse, looking very wisely at the tongue and then gazing learnedly into space, conducted an actual examination of the chest and sounded it carefully all over, in order to determine where abnormal conditions might exist. This struck Napoleon as a very practical and possibly valuable feature of diagnosis. Accordingly Corvisart was summoned to give his professional opinion. After the consultation he was made the Emperor's private physician. When Corvisart took up the subject of percussion of the chest, it was practically unknown in Europe outside of Vienna. Even in the city of its origin, as we have seen, it was not well appreciated. Auenbrugger's little book had fallen into oblivion. Corvisart obtained his hint as to the possible value of percussion from Stoll's and Eyerel's appreciative remarks with regard to it. The Frenchman used the method to some extent and, realizing its value, resolved to call the attention of his countrymen and the medical world to this very helpful aid in diagnosis. It was at this time that he came upon Auenbrugger's original monograph. Instead then of writing himself on the subject, he translated Auenbrugger's little book into French and made a commentary on it.

Corvisart was Laennec's patron in medicine, his favorite teacher, and the man to whom the great French physician owed much of his early inspiration. It is no little merit in Corvisart's career thus to have been the connecting link between the men who did most for the practical science of medicine, and especially for the important but obscure chapter of diseases of the chest. He did not attempt at all to claim for himself any of the merit that he felt should rightfully go to Auenbrugger, and while his own observations and writings established percussion upon a firm basis and extended

its knowledge, he shares the immortality of his discoverer, and comes down to us in medical history as an example of the reward of having rendered faithfully what was due, where it was due. It has been the custom to praise Corvisart for his justice toward Auenbrugger. Mere justice seems scarcely a worthy reason for praise of a great man, yet the history of medicine is so full of failures on the part of subsequent observers to acknowledge priority of discovery, that perhaps the praise does not seem quite as futile as it otherwise would.

It is not surprising then that Corvisart's pupil Laennec should have appreciated very thoroughly the value of Auenbrugger's discovery. In the preface of his book on Mediate Auscultation, Laennec bewails the fact that men are generally neglectful of discoveries made in their own time, and fail to give them the attention they deserve. He attributes this neglect rather to the well-known carelessness of men than to any deliberate failure to recognize the merit of contemporary work. He says:

> "Lack of attention is an extremely common failing of all men. What it takes years and hard labor to acquire, is not infrequently passed over without notice. Auenbrugger's method, published some fifty years ago, though capable of being learned in a few days, and without difficulty, and of being put into practice without the use of any instruments, although snatched from oblivion by my illustrious preceptor, Professor Corvisart, and made clearer than it had been left even by the author himself, is not as yet in ordinary use among physicians. Even the wonderful invention of the illustrious Jenner, though received with so much praise, and with regard to whose efficaciousness numberless confirmatory observations have been made, is already somewhat less prominent in the minds of men than it should be, or at least it would be, only for the fact that the governments of many countries, provinces and cities, the foresight of the clergy, of the authorities of all kinds, and the advice of the best physicians have exerted all their influence to keep it at public expense constantly in practice."

After about ten years of service at the Spanish military hospital, Auenbrugger resigned his position there and took up private practice. In this he was eminently successful, being, as might be expected, especially in demand for cases involving affections of the thorax. His practice appears to have been to a great extent among the better class of people, but he seems never to have neglected the poorer patients whom he had come to know during his hospital experience. There are traditions in Vienna of his unfailing willingness to assist the poor and even to put himself to considerable inconvenience in order to be of service to them.

Tradition tells that he was very conscientious in the pursuit of his vocation as a physician, and among the family relics there is preserved a small lantern which he kept always by his bedside, to light him on his visits to the sick when called out at night. It must not be forgotten that city streets were not regularly lighted at the end of the eighteenth century, and night calls even in city work must have been a source of great annoyance and discomfort. There is a family tradition, too, that the night bell at his house was connected directly with Auenbrugger's room, so that the others of the household might not be disturbed when night callers came for him. Every tradition points to him as a man among men in his unselfish readiness to save others trouble, and do all the good in his power.

Auenbrugger was, according to well-grounded traditions, especially admirable in his relations toward other members of the medical profession. This may not seem a very significant sign of amiability to those outside the profession, but it is well recognized that even great physicians have not always been known to get on well with brother practitioners. Auenbrugger has, besides, the pleasant reputation of having been of great material assistance to a number of needy medical students during the time of their university careers, and to have frequently lent a helping hand to young practitioners in the city, who probably found it quite as discouraging, beginning practice in those days, as any of their young confreres of this generation find it at the present time.

To physicians and medical students when ill, Auenbrugger was almost unceasing in attention. Two or three physicians of the generation immediately after his attributed to his unselfish care and devotion to them their recovery from what would otherwise have been mortal illnesses. In this way Auenbrugger seems to have been a man whom everyone who came to know him, even slightly, learned to love and respect. His relations to his family and relatives were always of the most happy, kind character, and family traditions show that his fatherly care was befittingly returned to him in his old age. The number of his friends was very great, and he counted among them some of the most distinguished inhabitants of the Austrian capital.

Notwithstanding his devotion to his practice, Auenbrugger did not cease to make observations that occasionally he considered worthy of being committed to paper. He was especially careful in the study of his cases, and left fully written records of over 400 important cases that he had studied very faithfully. His attention seems to have been attracted particularly to certain mental diseases. This work was done half a century before even the first beginnings of the modern classifications of mental diseases were attempted. He wrote a short article with regard to mania and its treatment, and a longer article on melancholia. How well he recognized the essential feature of this latter affection and the main symptom that must be guarded against, can be gathered very well from the title of his paper, which he called "The Still Madness, or the Impulse to Self-Murder."

It is about the time that he was engaged in the study of melancholia, perhaps as a contrast to sadder things, that he wrote a comic opera, of which we shall have more to say presently. His description of the conditions that he saw during an epidemic of dysentery that occurred in Vienna show how exact and careful a clinical observer he could be, and that the demands of his practice did not absorb all his attention to the detriment of his faculty for observation. He seems himself to have suffered from a severe attack of typhus fever which raged epidemically in Vienna in 1798.

Auenbrugger had a wide circle of interests beyond the subject of medicine. There is a family tradition that he had a magnificent library. He seems with true Viennese spirit to have been a great devotee of the opera, and to have had an especial liking for music. He wrote the text, score, and libretto of a comic opera with the title, "The Chimney Sweep." This operetta evidently enjoyed more than a ***succes d'estime***, and further writing in this line was confidently expected from him by his friends. There is even a story to the effect that the Empress Maria Theresa, of whom he was an intimate friend, and who made use, it is said, of his counsel in political matters more than once, asked him why he did not follow up his first success in operatic writing. His blunt reply shows how intimate must have been his relations with the great empress. He said he had things much better with which to occupy himself than the writing of comic operas.

Seeing that he was so favored at court, it is not surprising to find the family tradition that Auenbrugger was associated with many of the most prominent persons in the Austrian capital during his lifetime. He was a special friend of and spent a great deal of time with the famous philosopher, Werner. As he grew older he delighted especially in music, and spent many hours at the house of Baron Zois, where many of the distinguished European musicians were to be found and where famous matinee concerts were given every Sunday from twelve to two. The day and the time may seem strange to foreigners, but Vienna still has concerts at this time on Sunday, and after the Viennese have gone to Mass in the morning they think that they could not occupy themselves better than with listening to good music in the middle of the day.

Toward the end of his life, Auenbrugger lived during the summer time in the suburb of Rossau and cultivated a little garden, taking the greatest pleasure in spending his time at this simple occupation. It is a source of satisfaction to find that though Auenbrugger's medical work failed during his life to attract the attention it deserved, he had his reward, for his patient investigations in earlier life, in a peaceful and contented ending to a career that had been so worthy of what was best in the man. He lived to celebrate his golden wedding in 1804 and was especially happy in the almost constant companionship of the good wife who had proved so faithful a helpmate during her long life.

After her death, which took place the year following the celebration of their jubilee, his vitality and his contentment with life seemed to abandon him. He was a changed man and kept himself for the most part to his room. He went to bed very early and did not care to see anyone but his near relatives. His last illness was the result of a cold, and his advanced age, eighty-seven, left him little resistive vitality. He retained his consciousness until the very end, and said the day before his death that the next day would be his last.

Shortly before noon of the day of his death he looked at the clock in his room and said that when the hands would point to two o'clock he would be no more. His prophecy came true.

Vienna has never had the reputation of honoring its great geniuses during their lifetime, unless they happened to belong to the higher nobility. The exclusiveness of court society at the capital made itself felt in all circles, and the consequence was that genius sprung from the lower orders was almost sure not to receive its due share of attention. The comparative neglect of Auenbrugger does not seem so bad when we recall the case of Mozart. Music has always been one of the special fads of the Austrian and the Viennese pride themselves on their appreciation of it. Mozart, however, perhaps the greatest musical genius that ever lived, received some attention during his life, but passed away almost unnoticed at the early age of thirty-five, was buried in a common trench with the poor people of the city, and now Vienna cannot find his resting place. There is a magnificent monument to him, but his bones lie with his own people forever.

Outside the circle of his personal friends Auenbrugger did not receive much attention, so that even the year of his death was until recently more or less uncertain and the resting place of his remains continues to be unknown. The present generation of medical men has done more to afford the due meed of praise to Auenbrugger than any preceding generation. The interest in tuberculosis particularly has led medical men to appreciate all the significance of Auenbrugger's work, and the practical importance of his discovery for the early recognition and consequently for the cure of the disease. The appreciation of Auenbrugger in our time has been so flattering as quite to make up for previous neglect. His name has been linked with that of Laennec as the great discoverers of physical diagnosis in chest diseases.

At the opening of his address as President of the American Climatological Association, some five years ago, Dr. Edward O. Otis, of Boston, said:

> "It is quite improbable, I think, that we should be here to-day, or, indeed, have an existence as a society largely devoted to the consideration of diseases of the chest, were it not for the methods of thoracic examination which Auenbrugger and Laennec have given us in their discoveries of percussion and auscultation. Without these two precious methods of investigation we could scarcely have arrived at any degree of precision or certainty in thoracic pathology and might have been not unlike the old physicians and surgeons, 'who would swear,' as Morgagni says, 'that there was fluid in the chest when in reality there was not a single drachm, or perform paracentesis of the thorax upon a duke for an empyema which did not exist.'"

His tribute is only an echo of many others not less appreciative of Auenbrugger's important original work than have been expressed by modern medical men of all nations. The simple old German practitioner, who had the annoyance of seeing his discovery neglected by his contemporaries for so many years, has at last come into his own. There is scarcely an important medical meeting held anywhere in the world in which diseases of the chest are discussed without a mention of Auenbrugger's name. This is not surprising in Germany, but is quite as true of France, and England, and America. As Dr. Otis said, in closing the address from which we have just quoted:

> "Although we possess but meagre and fragmentary records of Auenbrugger's life, there is yet enough to enable us to fill in the lines and gain a distinct idea of his personality and character. With some persons one does not need to be acquainted

with much of the detail of their lives in order to know what manner of men they are; a few characteristic illustrations here and there in their career redeem the spirit and motives of their lives, and show the kind of men just as they are, quite as well and clearly as an extended and continuous biographical narrative. Always enthusiastically devoted to the study of disease, Auenbrugger escaped the not infrequent misfortune of the student, a loss of sympathy with one's kind. His love for his fellow-men, for suffering humanity, for struggling students in his own profession, kept pace with his love for medical study. He never sacrificed the man for the scientist, nor did he lose his interest for other things in life, as happens sometimes with men intensely devoted to one pursuit. A man of original powers, as some one has truly remarked, can never be confined within the limits of a single field of activity.

"He was interested in music, philosophy and the drama, and well illustrates what Dr. Da Costa has so happily styled 'the scholar in medicine.' With dignity, sympathy, enthusiasm in his profession, even to the last; ever seeking to improve and add to his art; modest, like most great men; never refusing to give what is best to suffering humanity, he richly lived out his long life. As we teach our students percussion, as a matter of just recognition and due honor let us tell them something of the life of the discoverer, and at least his name, which I fear but few, who avail themselves of the result of his long and arduous labors, know."

Auenbrugger's German biographer, Professor Clar, of Gratz, says of his early life that from his parents he received an excellent early training, especially edifying because of the exemplary Christian family life he saw about him, the piety of his father and mother, and of the other members of the family. The baptismal register of the parish church at Gratz is one of the important documents in his life history, for there is some dispute as to the exact date of his birth, as there is also with regard to his death. In 1798 he suffered from a severe attack of typhus fever, which at the time was epidemic in Vienna, and some of his biographers report his death in this year as a consequence of it. His descendants, however, have shown, by the burial register of the parish church in Vienna, that his death did not take place until May 17, 1807; from this church, of which he had been for half a century a faithful member, he was buried.

Few of the lives of the great discoverers in medicine have in them more of encouragement for the busy practitioner of medicine than that of Auenbrugger. He began his medical career by a series of practical observations that stamped him for all time as one of the great geniuses. When his discoveries failed to meet with the acceptance they deserved, he was not disturbed, and, above all, he did not insist on acrid controversy. He took up the practice of medicine and demonstrated how much his discovery could help in the diagnosis of the obscure chapter of the diseases of the chest. In the mean time he went on his way placidly doing the good that he found to do, taking care of his poor patients and faithfully tending brother-physicians who happened to be ill. He found an avocation to fill the moments spent apart from his vocation, and added to the pleasure of humanity by his work in music. All the time he remained a simple, faithful believer in the relation of Providence to man, and considered that somehow the inexplicable things of this life would find an explanation in the hereafter. He was probably the best-liked member of the profession in Vienna during his lifetime, and the profession of his native town are very proud to recall the example that he sets physicians generally in all the ethical qualities that make a physician's life not only successful in the material sense, but also in inspiration for those around him to do their duty rather than seek the fulfilment of merely selfish aims.

EDWARD JENNER, THE DISCOVERER OF VACCINATION

"It helps a man immensely to be a bit of a hero worshipper, and the stories of the lives of the masters of medicine do much to stimulate our ambition and rouse our sympathies. If the life and work of such men as Bichat and Laennec will not stir the blood of a young man and make him feel proud of France and of Frenchmen, he must be a dull and muddy-mettled rascal. In reading the life of Hunter, of Jenner, who thinks of the nationality which is merged and lost in our interest in the man and in his work! In the halcyon days of the Renaissance there was no nationalism in medicine, but a fine catholic spirit made great leaders like Vesalius, Eustachius, Stenson and others at home in every country in Europe."
--Osler, Aequanimitas and other Essays.

A very striking life in its lessons for the serious student of medical problems is that of Edward Jenner, who first demonstrated to the world that a simple attack of mild, never fatal, cowpox, deliberately acquired, might serve as a protective agent against the deadly smallpox, which before that time raged so violently all over the civilized world. His successful solution of this problem has probably saved more lives and suffering than any other single accomplishment in the whole history of medicine. While this fact is apparently not generally appreciated, Jenner's discovery did not come by mere chance, but was the result of his genius for original investigation, which led him to make many other valuable observations covering nearly the whole range of medicine; nor indeed was his activity limited to medicine alone, but extended itself to many of the allied sciences, and even to scientific departments quite beyond the domain of medicine.

In medicine we owe to Jenner the first hint of the possible connection between rheumatism and heart disease. He pointed out, at a discussion in a little English medical society, how often affections of the heart occurred in those who had suffered from previous attacks of rheumatism. He was among the first, perhaps the very first, to hint at the pathological basis of angina pectoris. While Heberden's name is usually connected with this discovery, there seems good reason to think that already Jenner had independently noted and called attention to the frequency with which degenerative affections of the arteries within the heart muscle itself were to be found where during life heart-pang had been a prominent and annoying symptom.

Besides these important advances in medicine made by him, and his great discovery of the identity of cowpox and smallpox, Dr. Jenner was an interesting observer of phenomena in all the biological sciences, and in geology and palaeontology. He was a great friend of Dr. John Hunter, who frequently suggested to him the making of such experiments and observations as were more likely to succeed in the country than in the city, and one cannot help but be struck with the determination evinced all his life to take nothing on authority, but to test everything by actual observation, and above all not to theorize where he did not have the actual data necessary for assured conclusions; and even where he thought he had them, his wonderful faculty for waiting until they had properly matured, and their true significance had become evident, stamped him for all time as a model for scientific investigators.

Undoubtedly Jenner's greatest work was that of determining the value of vaccination. His patient investigation of this subject, the thorough conservatism with which he guarded himself from publishing his conclusions until he had tested them in every way, the absence of that haste to rush into print so characteristic of most present-day medical investigators, and which is the cause of so much disappointment in modern medicine, all distinguished this country physician as one of the greatest investigating geniuses that medicine has produced. His life is a mirror for the medical student and the

investigating practitioner of medicine. His discovery was so complete when he finally announced it that but very little has been added to it since. His invention came from his mind as Minerva from the brain of Jove fully armed for the conflict that was sure to come. In this Jenner resembled very much Laennec and the other investigating geniuses in medicine. As a matter of fact only one improvement has been made in the preparation of vaccine material since Jenner's time, and that is the incorporation of glycerin in very recent years, which gradually destroys any micro-organisms that may be present, leaving the vaccine virus itself unimpaired in its efficacy, though without the possibility of inflicting those secondary infections which for so long cast a shadow on vaccination.

Dr. Edward Jenner was the third son of an Anglican clergyman, his mother being the daughter of a clergyman who had been at one time prebend in the cathedral of Bristol. The family held considerable property in Gloucestershire. He received his early education at Wotton-under-Edge and later at Cirencester, the old Roman town in Gloucestershire. While he acquired a good working knowledge of the classics, from his earliest years he was interested in natural history. Before he was nine he made a collection of the nests of the dormouse. The hours that other boys spent at play he devoted to searching for fossils or other interesting natural curiosities.

After his preliminary education had been finished he was apprenticed to Mr. Ludlow, an eminent surgeon at Bristol, and after two years here he went to London, where he had the privilege of residing as a favorite pupil in the family of John Hunter for two years. At this time Jenner was in his twenty-first year, John Hunter in his forty-second. Hunter was not then a public lecturer, but he had been for two years surgeon to St. George's Hospital, and for nearly five years had been engaged in studying the habits and structure of animals in a menagerie and laboratory which he had established at Brompton. The inspiration of Hunter's original genius meant much for young Jenner. He learned not only to respect the teacher but to love the man. In Hunter's unquenchable desire for knowledge and love of truth there was something very congenial to the spirit of Jenner, who was himself, above all things, an inquirer.

After completing his two years of work with Hunter he still remained intimately associated with him by letter. Though later in life Jenner's correspondence became very voluminous, these letters from Hunter were always very carefully preserved in a special cover, and they serve to show how stimulating to the young man must have been Hunter's virile enthusiasm for truth as it could be deduced by observation and experiment.

It was to Hunter that Jenner once wrote that he had heard it said in Gloucestershire that the dairy workers who suffered from a certain disease caught from the udders of cows and called cowpox were protected thereafter from attacks of smallpox. He added that this tradition interested him very much and that he intended to think about it. "Don't think," wrote Hunter to him, in return; "make observations, investigate for yourself the truth of the tradition." Jenner did so, and the result is now known to all.

These letters from Hunter contained many other interesting suggestions. For instance, it was under Hunter's direction that Jenner succeeded in finding out that in hibernating animals the temperature is very much reduced and the respirations are very slow, while the rate and force of the pulse are often so much diminished as to be scarcely more than noticeable at the extremities. Between Hunter and Jenner it had already been discovered that the sap in trees will not freeze at temperatures much lower than that at which the same fluid freezes when withdrawn from the tree, and the same thing seemed to be true with regard to the blood of hibernating animals. He learned that notwithstanding the low temperature to which it is reduced the animals are not affected particularly by the cold, though their store of fat is consumed and they awake very hungry in the spring-time.

Besides hibernation Jenner also investigated the habits of the cuckoo, that crux of the biologist which insists on foisting its eggs upon other birds and allowing its orphan young to be brought up in alien nests, while the real young of the deceived foster-parents are often pushed out of their nests by

this burly intruder which grows so fast and strong. It is needless to say, this subject interested John Hunter very much and there are a number of letters which passed between them on the subject.

It must not be supposed, however, that young Jenner was entirely occupied with his scientific work to the exclusion of social life and recreation. He was one of the best-known men of the county, and was looked upon as a genial companion from whom might be expected on almost any occasion pleasant jests and epigrams, not too biting, with regard to friends and acquaintances. Some of these have been preserved and we quote several of them as indicative of his special vein of humor.

ON THE DEATH OF A MISER

"Tom at last has laid by his old niggardly forms,
And now gives good dinners; to whom pray?–the worms."

ON LORD BERKELEY'S HUNTSMAN, WHO DIED IN THE CHASE

"Determined much higher to hoist up his name,
Than Nimrod the hunter, in annals of fame,
'Hark forward!' cried Charles, and gallantly whirled
His high-mettled steed o'er the gates of the world."

DEATH AND MR. PEACH

A Short Dialogue. N. B.–Mr. P. died in April

"P.–Awhile forbear thy horrid gripe,
Do pray, dread Sir! remember
Peaches are never fairly ripe
'Till August or September."

"D.–To gratify my longing taste,
And make thy flavour fine,
I had thee in a hot-house placed,
And moistened well with wine."

"Mr. Peach had shortened his life by the too free use of the bottle."

We have said that Dr. Jenner's supreme accomplishment in science was the working out of the vaccination problem to a great humane conclusion. His discovery was no mere accident, nor chance confirmation of a medical tradition. He devoted himself for many years to the study of cowpox, as he had the opportunity to see it, and it is what we know of this investigation, his patience and care in eliminating all the factors of error, that stamped Jenner as a medical scientist worthy of honor. When he began practice in Berkeley, he made many inquiries among his professional brethren, with regard to their opinion of the protecting power of cowpox, but most of them had either paid no attention to

such reports, or shook their heads at once, and said they were at most popular traditions, due merely to coincidences and unsupported by any credible evidence. In the face of this, Jenner began to follow John Hunter's advice to investigate. The first careful investigation dates from about 1775, and it took him more than five years to clear away the difficulties surrounding the solution of the question, in which he was interested.

As Pasteur found in the next century, when investigating the silkworm disease, Jenner soon learned that there was more than one disease called cowpox, and that the confusion consequent upon the existence of at least two specific diseases and a number of skin affections of the hands of various kinds, which existed among dairy workers, made the recognition of the protective power of true cowpox extremely difficult. After he had differentiated genuine cowpox, however, there was no difficulty in tracing its apparent protective power. He soon found, however, that the protection was not afforded unless the cowpox had been communicated at a particular stage of the disease. In other words, after the true vaccinia has run its course, secondary affections of the skin of the cows usually take place, and if dairy workers became infected from these lesions, then no protection against smallpox is afforded them. Another important observation that Jenner made at this time was that the disease known as grease in horses is the same affection as cowpox, and that both of these diseases are smallpox as modified by the organism in which they develop. It may be said at once that this opinion so difficult to arrive at, more than a century ago, when so little was known of comparative pathology, is held at the present day, and was confirmed by the last series of investigations made under the auspices of the Jenner Society, in England.

One difficulty that confronted Jenner in his researches was the fact that cowpox was scarce in his part of the country, and he had no opportunity of making inoculations with the disease in a proper stage, so as to put his suspicions to an absolute test. He collected much information, however, and stimulated others to the making of observations, so that when his discovery was announced the mind of the medical profession was more ready to receive it. In 1788 he carried a carefully made drawing of a case of cowpox as it occurred on the hands of a Gloucester milkmaid to London, and showed it to a number of medical men, whose opinions he wished to obtain. Among these was Sir Edward Holme, who agreed that there was a distinct similarity between it and certain stages of smallpox and considered that the question of a connection between the two diseases was an interesting and curious subject. He did not share any of Jenner's views, however, with regard to the practical importance of his discovery in this matter, and gave little encouragement to the idea that a possible prophylactic for smallpox might be discovered.

Something of Jenner's enthusiasm for experiment may be gathered from the fact that he did not hesitate even to inject various materials related to cowpox into the arm of his own children. We know Mrs. Jenner to have been a very wonderful woman, quite as deeply interested as the doctor himself in securing the great benefit to humanity that would result from the demonstration that cowpox protected against smallpox, but it is a little bit difficult for us in these days to understand how her mother-heart could have permitted some of the experiments which Dr. Jenner's biographer, Dr. Baron, describes. [1]

The subject is indeed so surprising that I prefer to quote the passage with regard to these experiments directly from Dr. Baron:

> "In November, 1789, he inoculated his eldest son Edward, who was then about one year and a half old, with swine-pox matter. The progress of the disease seemed similar to that which arises from the insertion of true smallpox matter when the disease is very slight. He sickened on the eighth day: a few pustules appeared;

[1] The life of Edward Jenner, M.D., F.R.S., Physician Extraordinary to His Majesty Geo. IV, Foreign Associate of the National Institute of France, &c. &c. &c. With illustrations of his doctrines, and selections from his Correspondence by John Baron, M.D., F.R.S., Late Senior Physician to the General Infirmary, Consulting Physician to the Lunatic Asylum at Gloucester, and Fellow of the Royal Medical and Chirurgical Society of London. In two Volumes. London: Henry Colburn, 1838.

they were late and slow in their progress, and small. Variolous matter (this would mean material from a smallpox patient calculated to give that disease) was carefully inserted into his arms at five or six different periods, subsequently without the slightest inflammation being excited in the part.

"On Thursday, April 7th, 1791, variolous matter was again inserted by two small incisions through the cutis, [beneath the skin]. Then the following notes of observed conditions day after day are made: 9th, Evidently inflamed. 10th, An efflorescence of the size of a shilling spread round the inferior wound. 11th, The incision assumed a kind of erysipelatous elevation: the efflorescence much increased. 12th, These appearances much advanced. 13th, A vesicle, containing a brownish fluid, and transparent, about the size of a large split-pea on the superior incision, the inferior about twice as big; the surrounding parts affected with erysipelas. The erysipelas extended to the shoulder, and then pretty quickly went off. The child showed no signs of indisposition the whole time."

"March, 1792. E. Jenner was again inoculated: the matter was taken from a child that caught the disease in the natural way, and had it pretty full. It was inserted fresh from the pustule. The same evening an inflammation appeared round the incision, which, at the end of twenty hours, increased to the diameter of a sixpence, and some fluid had already been collected on the lips of the scratch, which the child had rubbed off."

It was not for five years after this time, however, that Jenner was able to make his crucial experiments in the matter. On the 14th of May, 1796 (the date is still recalled as Vaccination Day in Germany, especially in Berlin), vaccine matter was taken from the hand of a dairy maid, Sarah Nelmes, and inserted by two superficial incisions in the arms of James Phipps, a healthy boy of about eight years of age. The boy went through an attack of cowpox in a regularly satisfactory manner. After this, however, it was necessary to determine whether he was protected from smallpox. After waiting two months Jenner inoculated him with variolous material. The result of this experiment can best be learned from the following letter written to his friend Gardner:

Конец ознакомительного фрагмента.