Introductory Address

ON

RESEARCH IN MEDICINE AND WOMEN IN RESEARCH.

DELIVERED AT THE LONDON SCHOOL OF MEDICINE FOR
WOMEN

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LADIES AND GENTLEMEN,—I imagine that an Introductory Address a century ago afforded the hospital staff the opportunity of welcoming the new students and of giving them some idea of the scope and nature of the work which lay before them. And I have no doubt that the orator did sometimes tell the young men that the profession they sought to enter was a great and noble profession, and of an interest sufficient in itself to repay them for their labours. A hundred years ago there was ample reason for the address, for, once admitted to the school, the student was left much to his own resources.

In these days the Introductory Address needs justification. What with students' numbers of the journals, what with resident colleges, wardens, tutors, and demonstrators, the student has no need of an address of welcome or of warning or of general advice. My own school (St. Bartholomew's) recognized this many years ago and abolished the Introductory Address; it has never regretted that it did so. But the custom still exists in most of the schools, and the orator, not being tied to the one subject, selects any subject which pleases him, usually without any reference to the opening of the winter session, or to the new students, except for a few words at the beginning or end of his address. In truth, it is difficult to find use or excuse for the Introductory Address in this twentieth century—except at the School of Medicine for Women, where the conditions are wholly different. The entrance of women into the medical profession, the foundation of this school, the success of women at examinations and in the honours lists, the story of the pioneers who fought so bravely, the story of the positions which women have captured, the financial success or otherwise of the movement, the lines of practice which are likely to open to them, and a number of other subjects, all of which might perhaps be treated at another place or at another time, are nevertheless much more fitly treated here. The story of the struggle cannot be too often told to the students of the school. Nay, more, it is scarcely over yet, and those who may have to fight have need to be heartened up to wage the battle bravely. When I was invited to deliver the address I therefore accepted gladly—first, because I was very proud of the compliment; secondly, because your school, individually and collectively, has been more than kind to me; thirdly, because, in the language of the day, I thought I had a "soft job" in hand. It seemed as if nothing could be easier than to select any one of the subjects I have mentioned and deliver an interesting address upon it, and I set the whole matter aside much longer than I ought to have done, for I have been heavily occupied this year. Finally, before deciding on the subject, I thought I would look through the addresses of the last fifteen or twenty years to see what had been done. Imagine my dismay when I discovered that every conceivable and appropriate subject had been dealt with, and by persons who knew far more about each one of them than I could ever know. They were experts in them. They had borne a part in the fray. They had fought with purse and pen, if not with sword. And they had naturally been listened to, when they thought fit to speak, with that profound attention which the hero commands when he describes his own experience and offers advice and counsel which are founded on it.

When I discovered the trap into which I had fallen I was very sad. I had so earnestly desired to deliver an address which should be worthy of you—at least to offer you my

very best. And it seemed that I had really nothing to offer. But about this time I attended a committee at the Lister Institute of Preventive Medicine. Visiting the laboratories after the meeting, I saw one or two women at work, and learnt that they were engaged in research, and I wondered whether they were good at it. I had previously been introduced to a woman worker in the museum of the British Medical Association last year in London, and was pleased to find that some of the most beautiful microscopical exhibits had been prepared by her. The sight of these ladies interested me, and I thought I would find out whether medical research has been embraced by women to any large extent and whether they have succeeded in it or are likely to succeed in it. I am going to tell you what I have learnt, but the information is very scanty and would not fill or justify an address were it not that I am anxious to direct the attention of medical women, both qualified and unqualified, to research in medicine, and that to do so will give me an opportunity of making some general remarks upon research in medicine.

In my young days we spoke of such work as "original work," and very little encouragement was shown to it. At the present time it goes by the name of "research," and is very much in evidence and receives considerable support. The object of research is to discover something which was not previously known, or to correct or confirm some previous observations. There are two methods of research—the one by *Observation*, the other by *Experiment*. In medical research the method by *Observation* is much out of fashion; it is slow and may be often interrupted for want of material. The imperfection of the material is often very disappointing. The method by *Experiment* (not by any means limited to experiments on animals), on the other hand, is the fashion of the day; it is quicker, less liable to be interrupted, and may yield brilliant results in a very short space of time. It is, therefore, naturally beloved of all young research workers. But it is a two-edged weapon, and needs to be used, and its results to be accepted, with great caution. Mr. Hunter, who was a confirmed and most ingenious experimenter, said in the course of his evidence at the trial of Captain Donellan: "I apprehend a great deal depends upon the mode of experiment; no man is fit to make one but those who have made many and paid attention to all the circumstances that relate to experiments."¹

I should not trouble you with these remarks on the two methods if the young workers were the only persons who preferred experiment to observation. But it is quite otherwise. Within the last few years I was associated with Mr. Shattock, whom you know as a distinguished pathologist, in the selection of a pathologist who would be expected to engage in research for a well-known cancer institution. Mr. Shattock was insistent that the pathologist should be an experimenter, and gave me to understand that, in his opinion, clinical pathology was played out and that nothing more was to be learnt from it, and that our knowledge in the future must be gained by experimental investigation.

Let me give you my experience of these two methods in the investigation of cancer. Many years ago there was great confusion in the minds of pathologists and surgeons regarding the differences and resemblances between sarcoma and carcinoma. I made a diligent study of them by observation of the cases at my hospital, the cases at other hospitals, and the cases recorded in the literature of many countries. The research was very long, very tedious, and very disappointing by reason of the small number of cases which were sufficiently recorded to be available for use. The results formed the subject of the Erasmus Wilson Lectures thirty years ago, and proved that the life-history of the varieties of malignant disease does not depend merely on their structure, but upon their seat of origin, and that the varieties of malignant disease of every part of the body must be separately studied if they are to be treated with success. Observations of a similar kind have been made by other clinical pathologists, with the result that the most successful operations for cancer at the present time are based on the results of clinical pathology. For no part of the body has this been done with greater success than for the breast. Charles Moore and Mitchell Banks urged the importance of very

¹ Palmer's *Works of John Hunter*, vol. i, p. 195. London, 1837.

large operations many years ago, but surgeons fought shy of them because they lacked that which was supplied many years later by Heidenhain and Stiles—a scientific basis. Recently, Handley has again added valuable information on the same subject, founded on clinical and microscopical observation.

I have never engaged, personally, in experimental investigation on account of the difficulty of doing so thirty years ago. But I have been associated with the Imperial Cancer Research, and in touch with its staff from the foundation of the Research, and have been a member of the Publication Committee of all its scientific reports. It has done nothing on the lines in which observation has been so useful. It has not unfolded the life-history of a single variety of cancer, so that we can base our operations on the information. It has not even discovered whether spontaneous cancer of a particular part of the body in the rat or mouse runs a similar course to spontaneous cancer of the same part of the body in the human subject. These problems are not suited for experimental investigation: they are determined by observation. On the other hand, within the space of eight or ten years it has definitely settled a matter of dispute which was discussed and fought long before I became a student, perhaps for centuries. It has proved, beyond the possibility of doubt, that cancer in its early stages is a local, not a constitutional or blood, disease. It is impossible to overrate the value of this knowledge to the surgeon. So long as he believed that cancer is in the blood and that an operation only removes the local manifestation of it, he was hopeless of the results of his operations, and removed the tumour solely to afford the patient temporary relief. Now he goes to his operation filled with hope that, if the disease is limited and in an early stage and his operation is well designed and skilfully carried out, it may be quite successful. Thus, it will be seen that the two methods, *observation* and *experiment*, have their special values in relation to cancer, that each is supplementary to the other, and that neither is fitted to take the place of the other.

It will be noticed that I have dwelt on the use to which these researches have been put in the treatment of cancer and of the value of them to human beings. You may fairly think these ought to be the immediate objects of all research in medicine, and that researches which are not likely to be immediately useful should be discouraged. But while I freely admit that my sympathy is in favour of this view, I am bound also to admit that it is wholly erroneous. I have fought this question on the platform at the annual meeting of the British Medical Association on several occasions and referred to it again in July of last year, and I shall not repeat the arguments which I used or the examples to which I referred. I would merely say that the investigator should be solely interested in discovering the truth, and that his attention should not be diverted and his judgement warped by the desire that his research should terminate in a particular manner because that might seem likely to be more useful to medicine and surgery. It is notorious that some of the researches which have seemed to fulfil no useful purpose have yielded the most valuable practical results, while other researches, pursued with a useful end in view, have furnished nothing good. If a utilitarian value were considered essential to research many young investigators who have later produced the most brilliant work would have been choked off and discouraged, so that they might never have persevered in original research. I need only give two illustrious examples—Pasteur and Lister.² Their first researches had no utilitarian object. What a lamentable thing it would have been if they had been discouraged from research on that account! The great thing is that young people who are fitted to do so should be encouraged to search. What they search for is of comparatively small consequence. On the other hand, I would not have it supposed that a utilitarian research is derogatory to the dignity of the worker or necessarily damages his *morale*. Sir Humphry Davy deliberately worked out the problem of coal-gas and explosions, and invented a safety-lamp at the urgent request of the coal-owners. Professor Pasteur investigated the nature of the Pébrine disease of silkworms at the request of M. Dumas, and moved by pity at the

wretched condition into which the silkworm industry had fallen. He discovered that it depended on a parasitic protozoon, and devised a successful method of stamping it out.³

Just a few words on the cost of research. Dr. Leonard Hill⁴ pointed out some years ago what great results could be achieved by an able worker with the simplest materials and at the smallest cost, and that fine laboratories and costly apparatus are not essential to research in medicine. All this is very true, just as it is true that David killed Goliath with a stone cunningly hurled from a sling. I do not think David at the present day would sally forth with a sling to oppose a foreign host. And our profession is continually urging on the wealthy public the financial claims of research. In order to justify our demands let me give you two concrete illustrations of the cost which attends certain researches. The Imperial Cancer Research is provided with laboratory accommodation, free of rent, by the two Royal Colleges. I think we also provide heat and light and water. But the annual cost of the research, including salaries and wages, amounts to little short of £6,000.

A rich man of business who is interested in acoustics in relation to the human ear found that his views could not be proved unless he possessed accurate measurements of the dimensions of the cochlear passages of the ear, and that no such measurements have been recorded. In the course of last summer he wrote to ask me whether the Royal College of Surgeons of England would administer a certain sum of money which he was prepared to supply for the research, and referred me to our conservator, Professor Keith, for information on the subject. Professor Keith told me it was quite a proper subject for research, and advised that my old pupil, Mr. Sydney Scott, should superintend and direct it. I was disposed to recommend the Council of the College to accept the trust. But, before doing so, I thought I should like to know whether the sum proposed by the gentleman was likely to cover the cost. If it would not, we should then be obliged to abandon the research without having obtained any tangible result, or the College might have to complete it at its own proper cost. It was well I inquired. Mr. Scott made a rough estimate for me. The material would really cost nothing. But the research involved the cutting of an immense number of sections of the bone by an expert workman, and Mr. Scott only knew one workman in London whom he would care to entrust with the work. If a single section went wrong, all the other sections made from that bone might be useless. Every fourth section must be drawn to scale. Moulds would have to be made, and this could be done only by an expert. Finally, an exact model, mathematically correct, would be constructed. Mr. Scott estimated that this research, which I had thought quite simple, might require one year or two years to carry through, and that the cost would not be likely to be less than £1,000.

In order to determine whether women are likely to be useful and successful in research it is necessary to consider the qualities which should be looked for in an investigator—I mean, in an investigator who has the sole charge of a research, even though it be carried out in a laboratory where other persons are at work. I am not speaking of an expert assistant or even of a joint investigator.

For (1) experimental research (including experiments on animals) I should set down: dexterity and neatness in manipulation; a knowledge, not only of the principles, but of the practice of aseptic and antiseptic surgery; and certainly humanity, so that the experiments which are necessary should be performed with as little suffering to the animals as possible.

For (2) every kind of research I should look for personal

² *Histoire d'un savant par un ignorant*. 5me édition. Paris: J. Hetzel et Comp. P. 173. "Le Sénat fut saisi d'une pétition désolée, signée de trois mille six cents maires, conseillers municipaux et propriétaires fonciers des départements séricicoles. La grande autorité scientifique de M. Dumas, sa connaissance de l'industrie de la soie, sa sympathie pour les souffrances d'un des départements les plus frappés, —le Gard, son pays natal—tout contribua à le faire nommer rapporteur de la commission. Pendant qu'il rédigeait son rapport, l'idée lui vint d'engager M. Pasteur à se livrer à des recherches pour conjurer l'épidémie dont personne ne pouvait triompher. M. Pasteur commença par décliner cette offre."

³ *BRITISH MEDICAL JOURNAL*, 1907, vol. i, p. 960. "Men of science are not made by institutes, money, or apparatus. Helmholtz did his best work on £120 a year, and modelled his inventions out of spectacle lenses and his wife's sewing gear. Faraday did his epoch-making work with bits of wood, glass, and wire. Claude Bernard filled his pupils with enthusiasm in a laboratory little better than a cellar."

⁴ The first researches of Pasteur were on the crystallization of tartaric acid and its salts. The first researches of Lister were on the contractile tissue of the iris and on the muscular tissue of the skin.

cleanliness; cleanliness of habit; industry, which must be extended to mean continued industry; patience, and a large stock of it; perseverance, and a determination to pursue the research to the end; extreme care in observation and strict attention to detail; careful recording of observations, which should be done at the earliest possible moment; thorough belief in the importance of the particular research, amounting even to enthusiasm; conscientiousness.

Many of these desirable qualities will at once commend themselves to you: they need no more than enumeration. But you may wonder why I have set down others of them. For instance, what has cleanliness of habit to do with research provided the investigator is cleanly when at work? Well, preserve me from investigators of careless habits. How many years ago—not very many—is it since poor T—slew himself, a servant in his mother's house, and a laboratory attendant owing to his slovenly habits? He was a distinguished classic at his university, had been a coach there, entered medicine when he was nearer 30 than 20, qualified with ease, and then settled down to make a reputation. We all liked him, and wished him well, and when he desired to engage in research encouragement was given him. Unhappily, nothing would do but he must study the bacillus of typhoid, the last thing which should have been entrusted to so slovenly a person and so clumsy a manipulator. He used to carry his cultivations of bacilli in his lunch basket—save the mark!—with the disastrous finish I have described.

Again, what has conscientiousness to do with research any more than it has to do with any other of the affairs of life? Do I mean that an investigator should be honest and not appropriate or use unfairly the work of other investigators? Oh, no! I assume such honesty as this in every investigator. The conscientiousness of which I speak is of the worker to himself and his own work. In this way: A worker has been engaged in a research during many months. He has made many experiments and observations, and they have all gone to prove the correctness of the result at which he has arrived. But there is still one experiment which it would be well to try. He tries it, and curiously it does not turn out quite right. He put two and two together and they did not make four. And every one agrees with *The Professor on the Case*⁵ that two and two do make four, "not some times but *all* the time." Now is the moment when his conscientiousness should come into play. The temptation is overwhelming to explain the failure by some fault in technique, and to set the result of that experiment on one side rather than to repeat it again and again as he ought certainly to have done. Had he done so it would again have failed, and he would have learnt in the end, not that two and two do not make four, but that one of his twos was not a two, and he would have avoided publishing that result of his research which was afterwards discovered to be incorrect by a more careful and conscientious worker. It must always be borne in mind that the mischief of a faulty result does not end with that research, but may be the starting point of a long series of equally faulty results.

Now, do women possess these qualities? I think so; many of them, indeed, in a higher degree than men do. Humanity, dexterity in manipulation, cleanly habits, continued industry, patience, perseverance, attention to detail—all are truly feminine qualities. Indeed, there is only one point on which I am not certain, and I express myself upon it almost reluctantly, because my doubts are founded on information regarding the ways of women which it is mean of me, perhaps, to use. There is nothing more important in relation to research than the accurate recording of observations and experiments. The making of these records is very tedious; it is often inconvenient to make them at the moment, and yet many of them must be made then if they are to be relied on. Nothing is more wonderful, to my mind, than the extraordinary care which is devoted to this part of their work by the greatest investigators. Read Lord Lister's *Collected Papers*,⁶ and you will see that I am right. Tyndall tells that Faraday left private notes of more than 16,000

experimental researches.⁷ Many men fail in this respect, largely from lack of patience. If women fail, I judge that it will largely be from lack of training. It has been told me that the lady secretaries of committees and business meetings are often astoundingly inaccurate in their minutes, that their record of those present cannot be relied on, that resolutions which were passed are not properly worded in the report, and I have even heard of minutes which recorded the wrong person in the chair; and what surprised me more than any other thing was to learn that when these inaccuracies are pointed out the secretary considers herself the aggrieved person. I am not speaking of uneducated persons, but of highly trained and even scientific women, and I wonder whether such people could ever be trusted to conduct and record an investigation. We men take these matters more seriously. Such lapses are not tolerated among us. It is of no consequence whether a secretary is paid or unpaid; he may be indolent and make very meagre records. But what he does record must be accurately recorded, and the only way to do so is to write the minutes at the time or make ample notes from which they can afterwards be written up. We have been trained in this kind of work for centuries, and I expect it has become a part of the nature of men.

Seeing the fitness of women for research, I hoped to find a good many of them at work. I can scarcely say it is so. The British Medical Association, as many of you know, awards about £300 a year in various sums to assist research workers to buy material and apparatus, but not for maintenance. The first award was made to a woman (Miss Julia Brinck) in 1890. In the twenty years since that time there have been awards to only three other women workers, and the amount of money which has been awarded to women has been £65 out of probably £6,000 to £7,000 total award. I do not think this is the fault of the Association, for it has always been very well disposed towards women workers. Only once has a research scholarship of the Association been held by a woman (Miss Janet Lane-Claypon in 1904), and she only held it for a year. I think because she was not qualified. But I am told that her work was so good that the committee expressed the wish that she would apply again as soon as the necessary conditions had been fulfilled.

The Brown Scholarship at Cambridge (for research) has been once held by a woman. And at the present time three of the Beit Fellowships are held by women. Apart from the Mabel Webb and Helen Prideaux Scholarships, which belong to your own school, and which are not sufficiently well endowed to maintain the investigator, and which can, therefore, only claim part-time work, very few research scholarships which are open to men and women have been held by women. On the other hand, there are very clear indications that the attention of women is being directed to research, and there is proof that committees and trustees are disposed to consider their claims favourably. The Brown Scholarship was awarded to a woman only as recently as 1909. Twelve women applied for Beit Fellowships, and three of them have been appointed—one in 1910, the other two this year. The Worshipful Company of Grocers has quite recently permitted women to apply for its two research scholarships (each worth £300 per annum). One woman has already applied, but her application did not fulfil the essential conditions. I trust this address may direct the attention of women still further towards research work.

I have no doubt I shall be asked whether I believe that women will be found competent for research, whether they have the breadth of mind necessary for such work, and whether they will ever be able to do more than carry out researches which have been designed for them and in which they are directed. Indeed, I do not know. They have done so many things in the last thirty years that I never thought they could do that I would not on any account venture to predict what they will accomplish in research. But I should certainly like to see them try.

⁷ *Faraday as a Discoverer*. New edition, London, 1870, p. 182. "His mode of keeping accounts excited the admiration of the managing board of this institution (the Royal Institution). And his science was similarly ordered. In his experimental researches he numbered every paragraph and welded their various parts together by incessant reference. His private notes of the experimental researches, which are happily preserved, are similarly numbered; their last paragraph bears the figure 16,041."

⁵ *The Professor on the Case*, Jacques Futrelle, p. 25 (T. Nelson and Sons).
⁶ *The Collected Papers of Joseph, Baron Lister*. Oxford, 1903.