in our exhibition, the one illustrating Servetus, the other Ulrich von Hutten. Valuable as they are from the standpoint of the professional bibliographer, this is nothing to the interest awakened in the men themselves, in their aspirations, their labour, and their tragic fates. For the amateur this personal note clothes the dry bones of bibliography and makes them live. And my other principle is this: a student of the history of medicine, I look out for books which have left their impress on it in some special way. If one is particular to examine carefully into the claims of a book before admitting it to the select company on your shelves, you here again cultivate a due regard for purse and space. For example, five or six books illustrate the whole subject of auscultation and percussion, only the masterpieces are chosen. I confess there may be a certain satisfaction in tracing out the biography of a book, but it is cold work unless you love the author.

Judiciously cultivated, bibliography has many advantages as a pastime for the doctor; a little patient care, a very small expenditure of money, and a constant look-out for the books wanted are the essential requisites. Nor is there ever any difficulty in the choice of a subject—anything he may be interested in has its bibliographical side. One friend (Dr. Turrell), a very busy man, is a keen fisherman, and has found the time to collect a library on this subject, and has written the article on it for the *County History of Oxfordshire*. Another man has kept up his classics, and collected everything relating to Horace. Another has a library relating to the order of St. John. Another friend in large general practice has found time to make a collection of the masterpieces of English literature, which has not only been a diversion and an education, as it has brought him into the best company of the past four centuries, but he tells us there is another side—it has been a better investment than life insurance. A member of our profession, the late Professor Corfield, made one of the best modern collections of bindings, the sale of which at Sotheby's in 1904 was one of the bibliographical features of the year. Once in a subject it is extraordinary how it grows and develops. As Atkinson says, "It is an art of itself, which is not easily sought into or acquired, but which, if so acquired, may stand both his pleasure and profit in very great stead in a very long or a short life." And the busiest general practitioner may find the time for first-class work. Many of you may have seen a book issued two years ago from the Oxford Press on Greek and Roman medical and surgical instruments, the only separate treatise on the subject which has appeared in English. It illustrates the hobby of a very hard-worked practitioner in the town of Hartlepool—John Milne, whose spare time and whose vacation have been spent in studying this aspect of Greek and Roman archaeology.

We shall hope to have in our society both the professional and the amateur—the man whose life-work is in libraries, and those of us who are fond of books, either from a biographical or a bibliographical standpoint. We should be able to encourage library organization, and once established as a common meeting ground for all interested, the society should be of great value to the profession. We look for a large membership, and many will join who do not belong to either of the above-mentioned groups, the men who feel that, as a matter of policy, such a society should be supported. *Non sibi sed toti*—let us work in the spirit of this motto, and our future is assured.

In starting an organization of this sort the work always falls on one or two men. We have to thank Dr. Stanley Hall, of Bristol, and Mr. C. E. A. Clayton, of the Manchester Medical Library, to whom is due entirely the success of this preliminary meeting. We have also to thank the university authorities for allowing us to meet here, and furnishing us with rooms for the exhibit.

REFERENCE.

- ¹ *Some Aspects of Bibliography*, Edinburgh, 1900.

UNDER the will of the late Rev. Edward Llewellyn Adams, a Congregational minister of Scarborough, sums of £4,000 are bequeathed to Manchester Royal Infirmary and the Scarborough Hospital, for the endowment of wards to be called the Elizabeth Adams Ward and the Sophia Adams Ward respectively. A sum of £500 is also left to the Smedley Memorial Hydropathic Hospital at Matlock.

A PLEA FOR A MORE LIVING PATHOLOGY.

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It is universally acknowledged that a diligent frequenting of the *post-mortem* room, supplemented by a careful study of the shelves of its annexe, the pathological museum, is essential to the education of the student of medicine and surgery. Admittedly it is not possible in any other way to gain that fuller insight into the problems set by disease, without which that fuller solution of these same problems, the final objective of the art of Hippocrates, must wait. Yet even now, in this twentieth century, after so much earnest labour and such an abundant ingathering, it is questionable whether we do look at the subject, pathology, from the right point of view; whether we utilize to their fullest the treasures of the dead-house and museum.

In the remarks which follow, those pathological changes which are discernible by the naked eye will have chief consideration, but the remarks are applicable to all changes in whatever scale of magnitude they present themselves.

Do we, then, look at the subject from the right point of view? The question is fundamental, but to its answering another question must be put—namely, What is the object of the *sectio cadaveris*? The reply seems obvious enough—the cause of death. But death is a negative quantity, and the search after negatives is apt to be unfruitful; moreover, the ultimate objective being the healing art, it is not apparent what bearing negative quantities can have upon this art—what appeal, that is, the *materia medica vel chirurgica* can make to this variety of nothingness. Can we define death more positively? Yes, death is the cessation of life; and, substituting this definition, the object of our search now becomes the cause of the cessation of life. Ah, that is more illuminating. We wish, then, to know why life tripped here, stumbled there, now slackened its pace and *rallentando* came gradually to a halt. Is this a real difference, or is it only a matter of words? It is a real difference in the *point of view*; for, whereas in the former case we looked at death, now we look at life. Let us, therefore, enter the *post-mortem* room or the pathological museum, looking at life and seeing not inanimate structures, not pictures of still life, but the instruments, more or less faulty, of life, the impediments, more or less obstructive, to life. Let us endeavour to conjure back the vital spirits, and see these in active play, within the organs and tissues, up to the moment when the play ceased.

The ordinary procedure of the pathologist is to seek out the spoiled organ or organs, and having found, to set apart in some suitable fixative, fixing so rigidly that it becomes a difficulty to conceive how these tissues ever moved; the epitaph follows in due course: *obit*, he died, for reasons plain to view; note the want of proper gland tissue here, the structural disturbance there. The comment of the intelligent reader of epitaph and specimen is inevitable: What, in the face of this disintegration, could any self-respecting man do, one priding himself upon being *integer vitae*—what else but die?

Is, then, the method of the pathologist wrong? No, so far as it goes it is all right even to the fixative; the fault is that it does not go far enough; it stops short just at the point of real interest. The method would show abundantly why the man *is* not, but just why he *was*, a few moments, hours, days, before his tissues put off vitality, that is not apparent; yet that is the one thing which interested himself and his family before *dies illa funesta*. In commenting thus we are not alluding to such major catastrophes as a massive aneurysmal rupture, or a smaller haemorrhage at a point of vantage, as in the medulla oblongata, or an embolism of the trunk of the pulmonary artery—in cases such as these the reason of the event is seen at a glance; but to those deaths, more or less gradual, which reveal to naked eye as well as to microscope changes we are wont to regard as essentially chronic in their development—for example, fibroid, fatty, caseous, or calcific changes. If these are the causes of death, then, as they have gradually amassed themselves by increments which from day to day must have been imperceptible, a summation of infinitesimals, should not life have dwindled in the same propor-

tion and have disappeared by an insensible efflux? But do these cases die like that? Is not life often at full swing in semblance up to within six months, a month, a week, twenty-four hours of death? True it is always possible to escape from this predicament and to take refuge behind the toxin, since nowadays we are barely permitted to live, much less die, without it; but, if a toxin is the cause of death, then it must be allowed that the specimen before us is not illustrative, since it is silent concerning it.

Clearly we must approach the problem from another point of view, and seek to discover how the man lived in spite of the obstacles which the specimen exhibits; how vitality triumphed over the want of gland tissue here, the structural disintegration there, *until* the resistances grew to such a height that the vital spark could no longer overleap the interval and complete the circuit—the round of life.

The formula of Life may be thus expressed:

$$\text{Momentum} \xrightarrow{\quad} \text{Resistance,}$$

"Momentum" standing for the sum total of the living momenta of the several parts of the body, organs, and tissues; "Resistance" for the sum total of the inertias and resistances within and without the body, in opposition to the momentum. The formula shows that life is when momentum preponderates over resistance.

The formula of Death, similarly expressed, shows us:

$$\text{Momentum} \xleftarrow{\quad} \text{Resistance.}$$

Resistance now preponderates, the sign is reversed, and life as a particular kind of momentum ceases.

Now, if an organ die in part, for instance, a liver or kidney become cirrhotic—and it is a partial death when a tissue of a lower functional order replaces the proper secreting cells of a gland—then the new fibroid elements may be said to add themselves to the internal resistances of the body. The vascular system affords the best illustration of this statement, for if we suppose the branchings of the arterial tree to become cirrhotic upon a large scale, then the momentum of the circulating blood, into which the ventricular contraction has been converted, will meet with an additional resistance, and forthwith death threatens, nearly or remotely, according as the reserve of ventricular contractility is small or large—according, that is, as the powers of cardiac compensation are small or great.

In the past it has been customary to look at the resistance side of the formula to the exclusion of the active, momentum, side, and for this reason the pathologist has tended to become the sceptic. Busy with the obstacles to living, he has overlooked the fact that life did obtain; confronted with the spoiled organ he has been apt to exclaim, "But what could you or I have done? What appeal was possible to that fibrosis, that calcification?" He is wrong, in the first instance, from his own point of view, for if we are to credit modern teachings, even fibrous tissue can be appealed to. The use of fibrolysin may be given in illustration, and though this drug should disappoint us in the extent of its serviceability, yet it opens the door to possibilities along this line of approach. He is doubly wrong in that he ignores the appeal to all those living tissues which a little reflection will assure him have been in triumphant operation for so long.

At the *post-mortem* examination, therefore, at the same time that the obstacles to life are being demonstrated—nor can this be done too forcibly—let the student's attention be directed in the next instances to the fact of life, hitherto, against such odds; then, if possible, let the compensatory reactions which the obstacles have called forth be made evident: here will come the hypertrophies, the vicarious workings of functionally allied parts, the anastomotic adjustments and so forth. Thus, having shown where the system is unsound, let it be shown next where it is sound, since it is upon the last named, the sound elements, that we shall have to lean in practice.

In pursuance of this method let us first examine the spoiled organ, and, having carefully inspected the morbid elements—fibrous, fatty, amyloid—and in these elements seen encumbrances only to function, let us next inquire in how far these changes did actually spoil the working of the organ. To that end let us obtain the living data secured in the wards. We shall then learn that this

fibrous kidney, for instance, was secreting so many ounces of urine, of such a specific gravity and holding in solution such and such ingredients; that this fatty heart was maintaining such and such a blood pressure, was driving the blood through its circuit with or without evidence of stases or capillary oozings (oedemas)—in fact, was circulating it more or less satisfactorily; that, so far as could be judged, this amyloid liver was, functionally, surprisingly little impaired by the pronounced degeneration. In this way we shall discover to what extent the damaged organ has preserved its functional capacity, shall determine (to borrow of the physicists) its functional coefficient, and shall have to admit, without any question, that the naked-eye and microscopic appearances are insufficient criteria of functional capacity, and that the working powers of the spoiled organ are often far in excess of that which these appearances would have led us to expect. The conclusion to be drawn will be that the spoiled organ may still be appealed to therapeutically; nay, that it must be so appealed to if we would do our best for the patient, since it is our clear duty to make call upon all the available powers of the system. Experiment alone can determine the limits of this power of appeal, which must be gauged by a cautious advance.

The first reform to be advocated is, therefore, that each specimen exhibiting the spoiled organ shall be so labelled as to set forth, as briefly as clearness will permit, the functional coefficient of the organ, that is, the amount of life it possessed. There will be revelations in store for us little short of marvellous when in this way we come to look at the residual vitalities of damaged tissues: before our eyes these dead structures will become living mechanisms in active movement.

In the next place we shall endeavour, both in *post-mortem* room and museum, to demonstrate the interaction of living parts. I have already touched upon this subject, but inadequately. In order to do this we must associate as many parts as are concerned in the interaction to be shown. Let us take, for example, a case of chronic Bright's disease of the fibroid type. We shall now bring together first the fibroid kidney and the sclerosed artery as exemplifying either a primary concomitance or sequence; next we shall add to the preparation the hypertrophied left ventricle, which the widespread vascular degeneration, as an added circulatory resistance, has called forth; and next we shall show in the same preparation the cerebral haemorrhage which has been the immediate cause of death, if possible exhibiting the degenerate artery which was unable to withstand the powerful contraction of the left ventricle. Such a specimen need not be of undue size, and certainly will not exceed the size of the preparations of anatomical dissections; its advantage will be obvious, it will be a lecture in itself, and whilst following its teachings we shall sit at the feet of that great physiologist and pathologist, Isaac Newton, and see his law of action and reaction in active operation.

Again, let us take the sequence of an embolism of a cerebral artery following upon a fungating endocarditis; or of an embolism of the pulmonary artery trunk in sequence to a phlebotic thrombosis; how much more telling the teaching becomes by the association in the same specimen of all the parts involved! Here will be comment sufficient upon *abiit, excessit, evasit, erupit*.

The toxæmias will not lend themselves exactly to this associative illustration unless the chemists will come forward and separate and crystallize the peccant matter, and even then the method will be by default rather. That, however, will be exactly its merit; for let us look again at the chronic fibroid kidney of Bright's disease in a case where death was not by cerebral haemorrhage but by uræmia, and consider the value of the preparation, showing on the one hand the damaged kidney, on the other a small tube containing in crystalline form the toxin. What an incentive to the student, when the examiners have ceased from troubling, to think a little over the problem and endeavour to link up in reasoned sequence these terminals—fibroid kidney and toxin.

The method, therefore, has the merit either of demonstrating a sequence or of showing a hiatus, of signalling a triumph or accentuating an ignorance. Its possibilities in the last-named direction admit of further development; thus the toxæmia does not always give rise to the same symptoms in the same class of disease—for example, the

granular contracted kidney may in one case be attended by symptoms of cerebral irritation (epileptiform convulsions); in another by symptoms of cerebral benumbing (coma); while in yet another case the incidence of the poison may be upon another system altogether, or produce symptoms in another system, as when an uncontrollable vomiting or diarrhoea is set up. It is possible that the chemist may discover different forms of toxin in these several cases, but it is possible also that one and the same poison may declare itself thus differently, according as it selects different parts of the mechanism to work upon—according, that is, as these parts happen to differ in their susceptibilities. Now, this difference in susceptibility may be an individual matter, and belong to the personal equation.

We witness the same kind of selective incidence when we observe a case of heart failure manifesting itself now as a general anasarca, and now, predominantly, as a portal area congestion. Why should an ischaemia—a physical shortcoming—select now this vascular area, and now that? Why, except the vessels in question happen to be less resistant, now here, now there.

Reverting to the fibroid kidney—the museum shelves will be well occupied by a series of specimens which, though to the naked eye and even to the microscope appearing to be replicas only of the same essential tissue changes, do actually illustrate different modes of death, different groups of symptoms. The labels will describe these symptomatic differences succinctly, and in this way will show the dynamic differences of *apparently* one type of tissue disturbance. The conclusion follows: either the tissue changes comprise differences yet to be discovered or we must go outside the organ for the complete pathology of the granular contracted kidney. In either case the specimens will have become dynamic in place of being static.

In the past the methods which have been practised in the collection and arrangement of museum specimens have recalled too much the methods of the postage-stamp collector; the bonds uniting the individual specimens have been of the slightest, whereas the unique specimen has figured all too prominently. The guiding principle, indeed, has been dissociative rather than associative, and in this association structure has received attention at the expense of function. It is imperative that these two be reunited, and that without ignoring the use of the unique specimen, the lessons to be learnt from the average or typical specimen be inculcated with more insistence. First let us learn all we can from types, then we can proceed to exceptions.

In yet another direction we would plead for a more living pathology. We come upon a fibroid state—say, an adhesion, a cicatrix, a diffuse sclerosis. What is its date? Is there anything about which we are more ignorant? Yet the reading of the case may depend in chief part upon the answer to the question. That fibrous tissue may develop very much more rapidly than we are wont to think; that we are apt to assign a chronicity often far in excess of the actual, is most probable; as it is also probable that the rate of formation is a very variable one, in different individuals and in different states of health in the same individual. The same is almost certain to hold for fatty and calcareous changes, though these—in particular the latter—are often held to indicate great age.* Whilst, therefore, we shall be prepared for wide variations, and to admit that in many cases it may be impossible to approximate to the actual rate of movement, what we do seriously need is a hither limit, the power of saying: "Well, that change cannot have taken place in less than such-and-such time."

To solve this question we have, of course, the observations upon the surface of the body during life, which the surgeon in particular can study; but to complete the study we need all the evidence we can obtain, from all sources, of the movement of disease during the time the patient has been under observation. Here is a case of extreme hob-nailed contraction of the liver; how long has it been in active development? The out-patient record is that on such-and-such a date the liver was found to be distinctly enlarged and tender. Again, here is a case

of double cystic degeneration of the kidney in the adult, the left organ very large and very palpable in the wards; two years previously the patient was in the hospital, and, though a tumour could be felt on the right side in the kidney region, nothing could be felt on the left side. What is the rate of march of cystic disease of the kidneys in the adult? Evidence of this kind must give the answer.

In the case of tumour formation the question of primary and secondary is often of great difficulty, and anything which will mark symptomatically, or by physical sign, the site of development may be of primary import. A man is admitted into the wards some months after an operation for a growth of the testis; a large abdominal tumour is found along with crossed symptoms of pressure, namely, slight oedema of the left foot and leg, *plus* marked enlargement of the abdominal veins leading up from the right groin; death occurs, and there is found an enormous retroperitoneal mass completely compressing the left common iliac, whereas the right common iliac is only partially occluded. The examination of the partial blockage by clot on the right side suggests, however, an older mischief than the oedema symptoms on the left side, and the fact of the enlarged abdominal veins on the right side makes it certain that the tumour must have developed its pressure first on the right side. Of course, in this case the whole retroperitoneal mass was secondary, but the fact that by physical signs or symptoms it was possible to locate the march of the tumour formation teaches us that, by like evidence we may in other cases be able to determine correctly the sites of the first and secondary stages of growth development.

Wherever it is possible, then, let the labels set forth the evidence of the line of march and rate of movement of the morbid process before us.

It would be easy to multiply instances in illustration of this subject, but no useful purpose would be served thereby, the cogency of the argument would not be enforced. In brief, then, the plea is that post-mortem room and museum shall be made to teach, as I have ventured to express it elsewhere, not so much the ways of Death as the steps of Life under difficulties. As things are, our specimens are admirably fixed, they could scarcely be more fixed if Medusa herself had them in keeping, and it requires some faith to believe they were ever less stonily dead. But appearances delude, and if we cannot say of the specimen, as Galileo said of the earth, and yet it moves, "E pur si muove," it is our duty to proclaim that it has moved and to demonstrate that movement.

Is, then, the germ to receive no mention? The most prominent figure, perhaps, in modern pathology, shall it not have a corresponding prominence assigned to it in post-mortem room and museum? Well the germ is in a sense *sui generis* and therefore not capable of placing in the same class with those morbid sequences which we have been considering. It is a cause of disturbance, as a mechanical injury, exposure to heat, the incidence of a poison are causes of disturbance—the disturbance once set agoing, the lines of propagation depend upon the structure of the fabric disturbed; it is those lines of propagation which we have been considering. However, the germ is finding its place on the shelves of the museum, and we must therefore ask ourselves, Is it being regarded from the right point of view? It figures there as the microscopic specimen and as the culture in various media—that is, it figures *morphologically*, whether as unit or as colony. But it is the potency of the germ that we want, and we have reason to hold that this potency has less relation to the form of the germ than to the intrinsic qualities of its protoplasm—namely, its powers of elaborating a virus. The germ castigates less as rod or flagellum than as toxin; the morphology of the germ, therefore, should be supplemented, as far as possible, by endeavours to demonstrate the chemical nature of the poison carried, and the direction and intensity of its working. The same principles, therefore, will guide us in the demonstration of the germ as of the morbid tissue: we shall aim at exhibiting its dynamics as a *toxifer*.

* It does not take a moment to throw down an earthy deposit from its solution in a test tube. Why should it take so long to separate it from the blood or from the fluids moistening the tissues?

THE Treasurer of Middlesex Hospital has received from Miss B. Wotton a gift of £500 Consols for the benefit of the cancer charity of the hospital.