

**An introductory lecture delivered at the Massachusetts Medical College,
November 6th, 1849 / by Henry J. Bigelow.**

Contributors

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from the author.*

AN

INTRODUCTORY LECTURE,

DELIVERED AT THE

MASSACHUSETTS MEDICAL COLLEGE,

NOVEMBER 6TH, 1849.

By HENRY J. BIGELOW, M. D.

PROFESSOR OF SURGERY IN HARVARD UNIVERSITY.

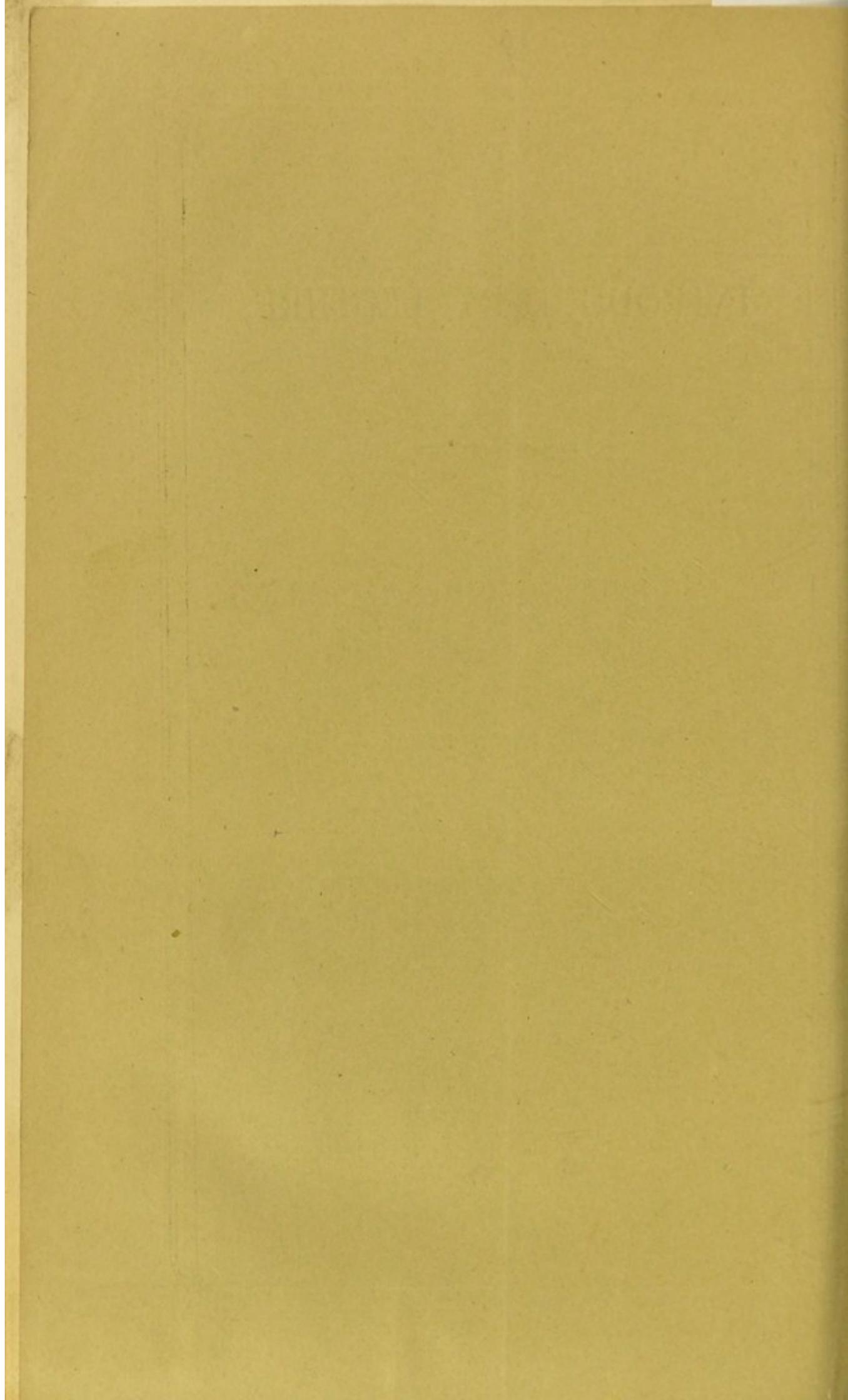
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No. 29 CORNHILL.

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BOSTON, Nov. 9, 1849.

To the Professor of Surgery in Harvard University.

SIR: — At a meeting of the Medical Class of Harvard University, held yesterday morning, a Committee was appointed to request, for publication, a copy of your Introductory Address, delivered at the commencement of the present course of Lectures.

The undersigned have the honor to constitute that Committee; and in the hope that the solicitation will be agreeable to yourself and complied with at your earliest convenience,

Are, with the highest respect and esteem,

Your obedient servants,

HENRY CLARKE,
C. H. HILDRETH, } COMMITTEE.
R. N. HODGES, JR., }

GENTLEMEN: — I have the honor to acknowledge the receipt of your note of the 9th inst., requesting, in behalf of the Medical Class, a copy of the Introductory Lecture delivered before them.

I beg to assure you of my high appreciation of this honor, and it gives me great pleasure to comply with the request.

With great respect,

Your very ob't friend and servant,

HENRY J. BIGELOW.

TO HENRY CLARKE,
C. H. HILDRETH, } Committee of the Medical Class.
R. M. HODGES, JR., }

NOV. 10th, 1849, 5 CHAUNCY PLACE.

INTRODUCTORY LECTURE.

GENTLEMEN OF THE MEDICAL CLASS:—

WE are assembled in obedience to a healthy custom. It is well that those who are interested in this institution, should meet together once in the year, to testify their good will to it, and to indicate by their presence that they feel an interest in its prosperity. We recognize here the guardians of the University; the flourishing condition of which is ample evidence of the fidelity and wisdom of their administration. There are those who, at no remote period, were actively engaged in teaching the lessons of our art; indelibly associated with a pleasant period of our lives, and bound to many of us by claims to more than our regard. Some who look back, as if it were yesterday, to the time when, like yourselves, they stood at the threshold of our profession; when they imbibed at this fountain the early teachings of our science; come here to be reminded, by each recurring year, of the lengthening interval which separates them from a period

which never can return, and to awaken its memories. Winter has assembled you from various distances and with various motives; animated by curiosity or impelled by duty; determined to accomplish an end, or yielding to a customary routine; but all imbued with a good and friendly spirit, and ready to unite with the well-wishers of our institution, to promote its best interests.

Occupying a relation to you, gentlemen, new to myself, and of the honor of which I am deeply sensible, there may be a propriety in devoting an hour, usually allotted to considerations of a general character, to an exposition of some of the principal topics suggested by this relation; and it is my intention, with your permission, briefly to review our subject in its connections with science, and with the community.

The Institutes of Surgery are its settled principles; and if we consider the character of the phenomena which are presented to us in the study of this science, and reflect how unappreciable are the agencies which constitute disease, we have good reason to be satisfied that there is any thing in a successive generalization so remote as to be called a principle, or so unequivocal in its character as to be considered settled, in our science. In this division of our subject, where generalization is broadest, let us avow that we still linger upon the lower steps of scientific progress. The phenomena of fever or of convulsive action, bring us but little nearer

to their immaterial cause. More than this, we are but little nearer to their material machinery. A man dies of tetanus, and in a large proportion of cases you can find no lesion of his nervous organism. Fever has been grouped into inflammatory, irritative, and hectic, because febrile symptoms tend to recur in certain groups characterized by one or more constituent symptoms, predominant in intensity and duration. Perfect knowledge should demonstrate the intimate mechanism of each symptom ; yet we possess no such knowledge. The inward fire is kindled, and the thrill and the restless play of an unknown machinery warn us of a never-ceasing elaboration ; but we stand without the edifice, and only gaze bewildered at the complicated manifestations of its exterior. We have only learned that certain occurrences are probable, but do not know why they are probable.

And leaving the symptoms, which are the result of lesions, for the material lesions themselves, we are, indeed, nearer to the fountain-head of morbid action. But here, too, the investigation of the simple fact, divested of its relations to proximate cause, is the boundary of our research. Phlegmon, and erysipelas, and ulceration, represented in color and in outline, in duration and transition ; scrofula and cancer, each uniting somewhat heterogeneous groups of very various phases ; these furnish subjects of what may be called the institutes or settled principles of surgery. That they are combinations of frequent occurrence cannot be denied ; and we

may concede that, from the constancy of their recurrence in a state of combination, they may be fairly inferred to have some common bond of union maintaining to them the attitude of cause; but we have not extracted or identified this common principle; and science falls short of its perfection, by the wide interval which separates suspicion from a certainty.

The broader generalizations have often reached a second class. Thus, having grouped the different symptoms of inflammation, we again unite the phlegmonous and erysipelalous varieties by whatever is common to them both; still it may ultimately prove that their discrepancies preponderate; that we have not yet touched their real point of sympathy or of difference; and that we misappreciate the actual value of characters which may prove accidental. It is a striking fact, that a writer of the Augustan age should have indicated the marks of inflammation as four — “redness and swelling, together with heat and pain;” and that, till within a very recent period, medicine has added little to elucidate this fundamental process of disease. But medicine must ever follow behind Chemistry, and Physiology, and Anatomy; it may propel, but it can only follow them into the threshold of discovery.

Palliate it as we will, few pathological principles are entitled to that name. There is a broad line between material phenomena and their immaterial cause. The pathologist scrutinizes the gross tissue,

subjects it to mechanical force, and to chemical reaction, he disintegrates as much of it as will lie upon a needle's point; he bends the rays which emanate from only a small portion of this particle, until the image of a single cell shadows a large portion of his retina; and still the surrounding fluid is reflected pure and crystalline. Far more impalpable than this hyaline fluid, is some heavy air, and far more subtile still is light, and again, at an unmeasurable interval, the vital force. Short of this point, our generation may surely rest satisfied; and content itself, for years of progress yet to come, with such investigation of material changes as exaggerated vision may afford, and such improved speculation upon them as it may make through the aid of collateral progress in the kindred sciences.

It has come to be questioned how far Clinical Instruction is essential to a course of medical teaching. Local interests or local exigencies have led to a discussion of the value of this method of imparting knowledge, and as seriously as if there were some doubt about it. Surely those who hesitate, do not consider the difference between words and things; between the aspect of a man himself and such a detailed description of him as the police might give; between visible and tangible disease, and a written history of it. No doubt an original fact and its description both gain access to the understanding; but there is a difference in the

quality of the knowledge thus obtained. To value a possession, the mind must first have felt the want of it. Curiosity must first stimulate both its perception and its ability to retain. The mind asks a question, and is then polarized for the reception of a direct answer; and it is balked and wearied by an irrelevant reply. Now every protracted description, especially a lecture, is of the nature of a series of replies to which no question has been asked. A whole audience cannot ask nor be answered at one time, and the alternative is to distribute information in bulk, that each may select something which will approximate his purpose.

On the other hand, exhibit a case of actual disease, and every observer will put and answer in his own mind, and with the rapidity of thought, an endless variety of queries upon points in which, perhaps, he alone is deficient, and for the reception of which his mind alone is stimulated.

Another point is more important. Sensible qualities must be described by reference to acknowledged standards; and we can thus measure heat, and space, and weight; but not shades of color, nor the attributes soft and hard, nor the varying outline of a curve. In the same way a personal examination will yield the qualities of an odor, a pulse, a tumor, an expression of the features, which pages of tedious description might fail to do. And the mind which painfully contemplates an abstraction, will seldom fail, at such a

moment, to arrest some tangible association by which the abstract quality is permanently fixed.

Clinical study is bed study. Here the student closes and grapples with the malady of whose Protean forms he has as yet only read. Here he learns at once the language of disease and the language of suffering humanity; and if his scientific sense is educated, his kindlier feelings are also developed. He learns to listen patiently, to sympathise; he learns to reëstablish a facility in the manifestation of that stratum of kindly feeling which is generally upon the surface in early youth, but which sometimes, in the process of education, gets imbedded beneath a show of indifference and insensibility.

The dialect of disease is an especial object of clinical study. Is a fever settled? Is a cough seated on the lungs? Is there water on the brain? Such questions are as significant as if conveyed in the language of recondite science. On the other hand, there are propositions less intimately according with modern views. What is the cause of this? asks one. Is this a scrofula humor? Is it in my constitution? These, or even the vexed question of biliousness, may well perplex the votary of rigid science. Such querists suppose the physician to possess a truly intimate knowledge of the human frame. In the words of Sir Thomas Browne, two hundred years ago, "They foolishly conceive we visibly behold therein the anatomy of every particle, and can thereby indigitate their diseases; and running

into any demands, expect from us a sudden resolution in things whereon the Devil of Delphos would demur; and we know hath taken respite of some days to answer easier questions."

The language of symptoms leads us directly to the threshold of our science. The evidence afforded to the physician by signs and symptoms, may contradict the positive assertion of the patient. But it is not on that account to be rejected. The rigid exactitude of Louis would not overrate the statement of a patient when it contravened a probability derived from previous experience. Disease has been observed for a great length of time to repeat itself in certain forms. Cancer of the breast precedes the affection in the axilla. But suppose a patient to insist that the reverse had taken place; it is quite evident that a fact so unusual must be well established before we can accept it. Nature, indeed, is under a tacit contract of probability always to do as she has already done. Her character for honesty of performance is established, and the burden of proof is on the individual to show, by collateral or some other especial evidence, that nature is this time at fault.

It is then quite evident that, in questioning a patient, whose testimony is not exempt from human fallibility, I must have some standard with which to gauge the accuracy of his statements; to compel him, as it were, either to conform, in his rendered account, to some one of a series of regular moulds

of disease, which I alternately present to him, or to show good reason for not doing so. It is therefore necessary that I should be familiar with the standards by which I am to gauge his statements; and these standards are the result of my researches into the previously recognized order of nature. I have thus learned that nature is in the habit of grouping certain symptoms together, which we then call by the names of individual diseases.

To illustrate this: if a man has certain symptoms of laryngitis, I examine him to ascertain if the lungs are the seat of a primary tubercular affection. If not, I abandon this hypothesis, and treat the affection as a local one. If treatment is again without success, I may form a new hypothesis, perhaps, in favor of an aneurismal tumor pressing on the nerves of laryngeal motion; a disease of which Mr. Liston actually died. Let it then be well established, that in studying a case the mind is active; that it is not the time bestowed upon its examination; especially that it is not the protracted consideration with which a pulse is held and counted, nor the attention with which a tongue is examined, that throws light upon the disease; but a previous and full knowledge of the usual combinations of symptoms, enables the observer to recognize any especial combination as one which has occurred before, and which has been before identified. On the other hand, it may be satisfactory to know, that certain symptoms are sometimes united, which have not been before observed to-

gether, and which the assembled faculty of the civilized world could not interpret.

There is a word in frequent use, in connection with medical practice, the true value and import of which it is essential to understand — the word *opinion*. It is used to indicate the sentence passed upon disease, and is popularly said to be *pronounced* by the physician. A man's medical opinion is quoted, in the community, in proportion to his combined force of character and professional notoriety. Yet these elements of popular position are often quite distinct from pure scientific ability, and it is important to separate them from it and to understand them. Scientific acquirement, which is sometimes quite separate from professional notoriety, should be the only standard of professional opinion, and would be so were medicine an exact science, or could medical opinion be at once tested. An opinion is, in fact, the result of judgment, and judgment must be informed and enlightened. Opinion now differs from that of former days, because science is now built up of many accurate facts, which must be known, to form a ground of inference; and it is valuable just in proportion to a man's natural ability for judging, and to his knowledge of the rules of disease by which the case is to be tested.

Let us consider the process of forming a diagnosis; presupposing the observer to be sufficiently familiar with disease to identify with certainty, any common union or succession of symptoms. If

such combination actually exist in the case under consideration, the question is settled, and the diagnosis is made up from positive evidence.

But it more frequently happens that certain signs are wanting; that a part only of the usual symptoms are found, and that the case is proportionably obscure in its indications. A certain tumor often resembles many other tumors; and we find no obvious characteristics to identify it. Instead of looking further for positive evidence which cannot be had, the observer then avails himself of what negative evidence the case may afford, and makes what has been called an eliminative diagnosis, a diagnosis by exclusion. He considers what diseases are capable of presenting the actual symptoms before him, and examining each in its turn, rejects or eliminates the less probable. A difficult case is thus brought, in general, within two or, at most, three alternatives; time often supplies additional evidence, which serves to complete the indications, or if not, it is impossible to get nearer the truth. The comparison of symptoms which resemble each other, and especially of similar combinations, is called by the French the "*diagnostic raisonné*," in which the question of similarities and of differences in the symptoms of disease, is stated with reference to the application of the eliminative diagnosis in any especial case.

It is quite obvious that the observer must possess a knowledge of all the possibilities in a case before he can choose among them; that if he fails

to identify a tumor by its positive signs, and is then in consequence obliged to select among the entire range of lesions of this class, he must possess a comprehensive knowledge of all tumors, in order that he may invoke each in its turn, and test by it the affection which is ultimately to be identified.

A rounded tumor of the cellular tissue, not peculiar in its appearance, was presented to Velpeau, who avowed his belief that it was a foetal growth; in other words, that it was material belonging to the body of another individual, which was accidentally buried beneath the skin of the patient under examination. So remarkable an opinion excited much attention, especially when the extirpation of the mass verified the diagnosis. But examine the evidence upon which it was based. This tumor was completely destitute of sensation, and was invested with a most singular skin. All ordinary growths are susceptible of cutaneous sensibility. This tumor was then not likely to be a growth of any ordinary description. So far the evidence is negative. But a lock of hair projected through a fistulous opening from its interior. It was doubtless this lock of hair, not uncommon in foetal growths, that laid the ground-work of a positive hypothesis, which the facts of insensibility and of peculiar skin, negative in regard to all other tumors, now confirmed. Add to this the tumor was congenital, it exuded an oily matter, neither serum nor pus; and to answer to the well-known

fact that such tumors often contain bone, there was a central density which might well be osseous. Such facts led to the belief that this lesion was identical with a few others, of rare occurrence, which the wide study and tenacious memory of this surgeon supplied to him ; and upon this probability, the diagnosis was founded.

Thus the mind, laden with a group of symptoms, oscillates among the combinations with which our experience of the rules of nature has furnished it, attracted by resemblances, repelled by differences, again returning, in despair of finding better, to hypotheses which, at first, seemed to be untenable, until at last it settles where the probability is strongest. And it is the part of clinical instruction to indicate these journeys of the mind in words ; to detain thought, which ever tends to hurry on, and is loth to retrace its steps, while the obliquity of its original wanderings is made evident. And the student may be safely abandoned to himself, when he is at once master of the few well-beaten tracks of daily diagnosis, and familiar with the system upon which they are projected.

Before leaving the subject of clinical study, let us consider the value of the popular assertion that it educates the senses. How does it educate the senses ? Is the eye of an artist, who should chance to study medicine, likely to be educated by the blush of inflammation, or the red of hectic ? Will the capacity of an average olfactory be probably developed by an experience of gangrene or of por-

rigo? Is the tactile sense refined by the wave of ascites, or the fluctuation of an abscess? Consider this very point of tact, by which the fluctuation of deep-seated fluid is detected. To doubt its existence will be cardinal heresy in the eyes of many, who consider it a leading attribute of a skilful surgeon. According to my own humble experience, fluid cannot be identified by the touch alone. A cyst may be so hard that it differs in its sensible properties from a solid body, in translucency alone, fluctuation being entirely wanting. On the other hand, a solid fibrous tumor, especially an encephaloid growth, may offer a fluctuation so unequivocal, that no man, from this sign alone, would be justified in doubting the existence of subjacent fluid.

This must be obvious. Fluctuation implies displacement. The parietes of a contained fluid may be so tense and unimpressible, that you can displace nothing; while, on the other hand, certain soft solid and elastic tissues, may perfectly fulfil the required conditions. So it is with the blow of a blunt edge upon the scalp. The tissue of each side may rise in such a way, that while an inexperienced person would be quite sure of the existence of fracture of the bone, when it did not exist, a skilful surgeon could only pause and doubt. Whence comes, then, the accuracy of diagnosis, which in general is referred to tact, and which characterizes skill?

Leclerc, who wrote more than one hundred years

ago, draws a line which in these latter days seems to have been lost sight of. He says,

“How may it be discovered that the two tables of the skull are broken?”

“By inspection and by reasoning.

“Are not the eyes sufficient alone, and are they not more certain than reasoning?”

“Yes. But forasmuch as things are not always seen, there is often a necessity of making use of rational deductions, to find out that which the eyes cannot discern.”

When probability is substituted for certainty, an informed judgment is our only resource.

In the kindred and beautiful science of auscultation, a new rôle is learned like a new landmark; not by any especial development of the sense, but by a repeated act of observation, and a corresponding effort of the memory. And wherever two or three of these landmarks can be observed, an immediate inference can be made with respect to the condition of the patient. An experienced auscultator decides rapidly and at once; not because his ear is more acute, but because his memory is better stored; and he can thus assort and appraise more readily his hypothetic combinations. A skilful surgeon detects fluid, not because his tactile papillæ are more sensitive, but because his ready knowledge furnishes him with natural groups of symptoms, which now exaggerate and now discountenance the value he would attach to the indications of

the tactile sense. Surgical tact, like social tact, is not only the delicate impressibility which apprises the observer of some manifestation in the individual with whom he is in relation, but it is a correct inference of its true cause and character, leading to appropriate action, and based upon a knowledge at once of collateral circumstance, and of man's physical and moral constitution.

Operative Surgery is another department of our art. Here "Anatomy and Mechanics," in the words of Boerhävave, "both better and more universally understood in our Days, have laid the Foundations, and spun the Thread of our Reasonings; both of them sure!" In operative surgery we occupy more directly what is popularly considered to be the province of the surgeon. The surgeon, with the public, is associated with surgical operations; and his notoriety is in measure with the belief which the world may entertain of the number or magnitude of the operations he may perform. Singular as it may seem, a surgical operation, even in the medical world, is apt to be looked upon with an undue appreciation; and even eminent physicians concede an unquestioned position to a skilful operating surgeon. So true is this, that for acquiring the notoriety which is a nucleus for surgical practice, a surgeon had better sometimes be known as the hero of extraordinary operations which have proved unsuccessful, or even fatal, than as a follower of the usual routine of ordinary treatment.

This has always been true of the surgeon. In earlier times, when the art was in its infancy, the successes of the surgeon were more exclusively than now connected with manipulation. Besides, the art was confined to few, being, in a measure, hereditary, or transmitted from master to some favorite pupil. It partook of the exaggerated and exclusive spirit of alchemy, being admired rather than exactly estimated.

Much of this spirit of exaggeration still invests the science. Why is the amphitheatre crowded to the roof, by adepts as well as students, on the occasion of some great operation, while the silent working of some well-directed drug excites comparatively little comment? Mark the hushed breath, the fearful intensity of silence, when the blade pierces the tissues, and the blood of the unhappy sufferer wells up to the surface. Animal sense is always fascinated by the presence of animal suffering. It is the trace in man of the emotion which the sight of blood, or of laceration, or of death, produces in the lower animals. But, beyond this, there is an arbitrary interest and an arbitrary importance attached to the performance of most surgical operations, in my view disproportioned to their intrinsic merit. It is rare that supply does not respond to demand; and, in obedience to a general expectation, the surgeon is prone to foster and to encourage the undue appreciation which the public is ready to concede. The error, indeed, if it be one, lies with the com-

munity itself, which offers a sure market for surgical pretension; but the effect upon the professional world is not less to be regretted. From a habit of modifying his standard to an eager curiosity, a surgeon may easily lose his own standard, and fall into the mistake of exaggerating a case in the presence of those who are competent themselves to judge; an error growing out of an habitual illusion, and entirely dissonant with his tact and good judgment upon other subjects.

As we have now perhaps reached the kernel of our proper subject, let us inquire, somewhat in detail, what is the actual and intrinsic merit of a surgical operation. I do not hesitate to avow a belief that the great majority of mere surgical manipulations require less skill and less manual experience, than the nicer mechanical manipulations of daily industry, which excite little attention. This estimate does not include the three years of preparatory study, common both to the physician and the surgeon, but only the peculiar and usual training of the operating surgeon. Few, who have studied our art in Paris, can have failed to be struck with the number of aspirants singularly adroit in the various methods of performing surgical operations upon the dead subject, still practising manipulations, week after week, and year after year, but never destined to make their skill available; and who soon sink beneath the surface in the tumult of competition, to be succeeded by others of equal skill. The operating

surgeon should add something to mere dexterity of manipulation. "A surgeon," says Celsus, meaning an operating surgeon, "ought to be young, or, at most, but middle aged; to have a strong and steady hand, never subject to tremble, and to be no less dexterous with his left than with his right hand; to have a quick and clear sight; to be bold, and so far devoid of pity that he may have only in view the cure of him whom he has taken in hand, and not in compassion to his cries, either make more haste than the case requires, or cut less than is necessary; but do all as if he was not moved by the shrieks of his patient." "These irregular operations," says Liston, speaking of tumors of the neck, "require, on the part of the surgeon, correct anatomical knowledge, prudence, coolness, decision, and some share of dexterity; qualifications only to be gained by practice and experience." Here is something beyond manual adroitness. I have noticed in Europe, where opportunities for comparison are frequent, that the crisis of an operation, — when the wound gapes and the bleeding is free, and the end is not yet in view, — sometimes induced in the operator a constitutional excitement and haste, a want of steadiness which threatened to hazard success, were the operation protracted beyond its natural and anticipated period. Fortunately, at this time, difficulties are surmounted, and the end begins. This contrasts unfavorably with the physical immobility, the unimpressible steadiness, that may be relied

on at a critical time ; or with the self-possession which may be directed, at a moment's warning, to the quiet contemplation of some new exigency. I should place a constitutional, or acquired imperturbability, at the head of the qualities to be prized by the operating surgeon. Decision and self-reliance are next, and then a fertility in expedients. Bell describes an operator, destitute of these qualifications, as "agitated, miserable, trembling, hesitating in the midst of difficulties, turning round to his friends for that support which should come from within." "Although the chair of surgery has been, for seventeen years, entrusted to me," says the renowned Haller, "although I have frequently demonstrated the most difficult surgical operations upon the dead body, yet I could never bear to cut a living man, fearing that I might do him injury." With such evidence of its attendant excitement, it will be conceded that there is a fascination in a game where life is a not unfrequent stake, in the presence of a breathless multitude, or in the solitude of an appalled household. It is not wonderful that Wiseman wrote of "the nobility and dignity of chirurgery," and Hildanus of its "grace and splendor ;" neither is it remarkable that surgery, in these days, should offer a resistless charm to the majority of students. And yet these attractions can be abated. It should be remembered that, with some operators, a natural insensibility, and even brutality, is a substitute for the simple steadiness of the humane surgeon. And besides this,

there are shoulder-joints and hips amputated, and extraordinary operations satisfactorily done by those whose names are not destined to outlive the number of the Journal which reports them, and whom accident or temerity has urged into an unwonted position. Again, the result of an operation is often no test of the skill invested in it. Nature is a great leveller, and among a hundred amputated limbs, it would be difficult to distinguish the original result of consummate skill, from that of only moderate ability. A traveller upon the lakes tells us of a thorough-bred Indian, who, when a tree had fallen across his leg, took out his knife, cut off his own leg, bound it up, and paddled himself home to his wigwam, on a distant island, where the cure of his wound was completed. Johannes Lethæus, having sent his wife to the fish-market, extracted from his own person a calculus weighing four ounces. Nature is the great surgeon, and art is at best but an assistant. It is also well to remember, that a dexterous operator might perform single-handed, and in a few weeks, a large proportion of the operations occurring in a large city, in the course of a whole year; so that, as a question of mere expediency, based upon the frequency of surgical opportunity, it is profitable for the student to throw his labor into the scale upon whose preponderance his daily occupation will, for a long time, depend. Such considerations will not discourage genius, which is talent with a marked taste to direct, and a strong driving power to work

it; nor should they dissuade those whose deliberate judgment may have determined them to pursue this art. It is, however, unquestionably better for most students to aim at being competent pathologists and physicians, than to devote a disproportionate time to the various methods of performing an amputation of rare occurrence. Besides, in estimating the true position of an operator, we are to weigh the contingencies of an operation, and not its regular and successive steps. It is quite obvious that a novice might attain exquisite adroitness in any given manipulation; but unexpected deviation of anatomy or disease, abundant and sudden hemorrhage, violence, syncope, the panic of bystanders, the lack of aid, these adventitious circumstances call for distinct qualifications; and it follows that a patient is actually less safe in the hands of one who is not familiar with exigencies and expedients.

It has been proposed to separate the Science from the Art of surgical manipulation. This can never be; the involved interests are too great; and, although we meet in other walks of life presence of mind and ready concentration of the faculties to which are apparently entrusted equal interests with slighter guarantee, yet the helmsman or the engineer stakes his own life with that of the passenger, who confides not in his skill alone, but in his instinct of self-preservation. The surgeon risks nothing; and the patient confides in a character to which the lapse of time has testified.

Still, upon ground peculiar to the surgeon, we arrive at another consideration of importance — the evidence which, in each case, determines an operation. And here, again, is a field for the exercise of the higher faculty of sound discrimination. It is unnecessary to allude to cases in which the propriety of action admits of no doubt. Common sarcoma and common lipoma, in active state, and in a healthy patient, are usually extirpated, and with permanent relief. Cancer, on the other hand, as inevitably returns at a subsequent period, and generally to prove fatal. In such a case, the contingencies on either side may be thus briefly stated. In default of excision, acute pain wearing the patient down, recurring and exhausting hemorrhage, the apprehension or actual existence of local disintegration with its accompanying calamities, which, together or singly, may render life a burden; — on the other hand, a chance of a permanent local removal of these terrible local symptoms, with a chance of their local return, — a chance of not affecting the duration of life, with a chance of abbreviating it, — these are the difficult elements of the question which it often falls to the lot of the surgeon to determine. Human life is a question of deep responsibility. “You must die as you are, and an operation will give you a chance,” or more exactly, “You can live but a few months in your present state, and with an operation you have an equal chance of sudden death and of permanent recovery,” — this is a frequent and responsible al-

ternative. To one man, life is inexpressibly dear. He would live a short month longer for himself, for his child, for his estate ; while the defenceless woman, whose existence is embittered by disease which awakens a groundless but withering suspicion, would give a world to cast off a weary burden, and strives, by sophistry, to make the surgeon her executioner. Here the physician and the surgeon occupy a widely different ground. While the physician so adjusts his remedies, that if they do no good, they do no harm, the surgeon is unhappily compelled to see many a death accelerated, or directly caused, by his remedial agents.

Pain, but recently an object of insuperable terror, once prohibited many operations. The quivering and straining muscle and the deep groan of fortitude, or the thrilling shriek of agony, which resolution could not stifle, then invested surgery with a sad solemnity. In these days, the surgeon has a lighter task. The rising vapor stimulates and stupefies the intellect, whose fantastic clamor may excite a not uncharitable smile ; but the operator, with a conviction that alarms are groundless, lulls his patient to a quiet slumber. In other times, a fear of pain coöperated with a fear of death, to resist an indiscriminate attack upon the stronghold of disease. In the annihilation of pain, let not an equal force be now brought to bear against vitality alone. The balance of surgical right, has been shaken to its centre by the annihilation of an element whose preponderance may be truly said,

in a majority of cases, to have turned the scale ; and years must elapse before a standard of expediency can be adjusted. In the meantime, let the burden of proof lie with the patient ; let the surgeon avoid operating when he can do so ; and, at least, let him consider how far he would himself be ready to encounter, in his own proper person, the risks presented by each recurring case. Years, too, must elapse before the surgeon will cease, as he must ultimately cease, to be identified with pain ; and, as years elapse, the anæsthetic will excite as little speculation upon mysterious agencies, as now the quill which shields the individual from a pestilence. But it matters little that a great principle should cease to excite remark because it is of vulgar application. I care not whether the well-worn story, fretted by hostile pertinacity, palls upon the ear. When the petty jealousies which opposed, and the obstinate consistency which still makes show of doubting, shall have been forgotten ; when we, with our estates and our institutions, shall be scattered to the winds of heaven ; when nations shall have been disintegrated, and their material wrought and re-wrought into the organism of successive ages, it will be remembered that the discovery which annulled the physical suffering of man, was made at Boston, in America.

I wish, in this connection, to allude to another subject which is acquiring an increasing import-

ance in our community. I allude to the practice of deciding questions of a purely medical and scientific character, by appeal to a legal, and medically unqualified, tribunal. A man receives a blow upon his watch or upon his window, and submits to a jury the following three questions: first, the fact of the blow; second, the connection between the blow and the injury received; and lastly, the extent of the injury. It is plain that the second question, of the causal relation of the blow to the injury, is, in this case, absurd; the effect of a stone upon a pane of glass, is too obvious to be discussed—it is a question of every day experience. But suppose that a severe blow has been received upon the head, and that a man thus assailed has fallen dead. The connection between the blow and the ensuing death, though quite obvious, nevertheless trenches upon peculiar ground. It is customary, in such a case, to invite the opinion of an expert, who would not however hesitate here to recognize a frequent cause, and an equally frequent effect. But let us go a step further, and suppose the blow to have been followed, instead of death, by some derangement of the physical or mental functions. A man shown to have previously possessed less than an average share of intellect, complains after such injury of an impairment of the memory. A sickly child, with many symptoms of diseased spine, finds that the disease is unequivocal, sometime after receiving a slight concussion. These are cases which have

actually gone through the courts, claiming remuneration. An accident happens; a man receives an inconsiderable jar; and if he subsequently experience obscure pain, or short breath, or epileptic fits, or any symptoms of which the proximate machinery is utterly and profoundly inexplicable, he does not hesitate at once to accuse individuals, railroads or towns, and to prosecute for damages. It is plain that, to establish his case, he must show the connection between cause and effect; between the stone and the broken glass; between a blow upon the shoulder and a permanent pain perhaps in the leg. Before whom is the question brought to issue? Not before a jury who have spent a lifetime in acquiring an intimate knowledge of the physical mechanism of the human body and the causes and consequences of its derangement; men who have ascertained that nothing in medicine is certain, and that, for the lack of certainty, every question must be decided, if at all, upon its probabilities, and who are accustomed to the balance of these probabilities. This intricate question is not thus brought to issue; but is laid before twelve average minds, taken at random from the common walks of life, profoundly ignorant of medicine, or equally imbued with prejudice, and who are to be educated in a few days upon points which most intelligent students, after two or three years' exclusive study, would avow themselves unprepared to decide. This is not a question of the rights of inert property, nor of the modifica-

tions of mechanical force, nor of abstract right and wrong, nor of a fact of occurrence, nor of any other subject which the general education of daily life renders men competent to settle ; but it is a question of recondite and peculiar knowledge. And to submit such a question to most men, is to submit the figures of the planet Neptune to an optician because he owns a telescope, or to refer the question of pregnancy to a jury of matrons.

Unable itself to draw any inference from medical facts which it cannot comprehend, a jury is supposed in theory to make an average of the results at which experts have arrived in informing itself of the opinions of physicians and surgeons. Here, however, is another fruitful source of error ; on the one hand, human testimony is not rendered less uncertain in an uncertain science, by the insensible influence of conflicting medical interests, especially in small communities ; and on the other, the public at large is totally incompetent in any case, to estimate the relative scientific value of medical testimony. There is also a tendency among juries taken from the mass of the community, to side with the professedly oppressed. Wealth, incorporated or unincorporated, does not invite equal sympathy. Here is a bias. And in this refracted light, medical opinions of unequal value readily neutralize each other. Probability, too often the substitute of certainty in medicine, is exaggerated ; or still worse, it is in some cases enough to show

that a symptom might possibly have followed an accident, and the burden of proof is virtually thrown upon the defendant to show that it actually did not. The defendant is then guilty, until he proves his innocence.

Now almost any thing may occur in medicine. The most fantastic possibilities actually do occur. For instance, a good sized crowbar was shot through a man's brain, and he recovered. Another patient had an ulcer itching excessively upon his thigh; whenever he scratched it, he experienced extreme tightness of the chest and dyspnoea, and only then. The father of Lord Cavendish had a pain in the left arm connected with a stone in the bladder, and the only knowledge which he had of the necessity of micturition, was the recurrence of this pain. With such facts as possible, and these are perhaps solitary instances of their kind, what can be absolutely denied? Now, let two or three doctors testify before a jury, that, when a railroad car stops suddenly, it is barely possible that any passenger may be taken, for the first time, with an epileptic fit; and let as many medical witnesses testify, on the other side, that it is indeed possible, but that causal evidence upon this point, is altogether wanting; let them avow with John Hunter, in an analogous case, that they "can give no decided answer," and the verdict, as in that case, will very likely go against the defendant, and this in default of any corresponding medical probability whatever.

It may be a matter of policy, to compel a railroad to pay for every accident to life or limb; and so to remunerate a road for travel, that it can also afford to insure the safety of its passengers. It is a very serious question, how far, upon grounds of mere expediency, a patient may prosecute his surgeon for mal-practice. On the one hand, gross injustice and ingratitude are occasionally exhibited towards the surgeon. He is made to suffer for deformities which could not be prevented.* Besides, a patient, residing in a thinly settled country, who employs a local surgeon, virtually says, "I have, on the whole, decided to place myself under your care; you may not have the opportunities of a surgeon in a large metropolis, but there is neither time, nor can I meet the expense of sending to a distance. I am therefore prepared to incur the chances of recovery with such aid as you may offer, and upon such pecuniary terms as are customary in this part of the country;" and he has no right subsequently to complain. On the other hand, the chance of being mulcted for gross inefficiency, is a chief preventive of ignorant pretension. It is the only means of hindering certain practitioners from assuming duties, to which they are not com-

* This resort to law has become so familiar, that it seems to suggest itself, at once, to every country patient who is dissatisfied with the deformity of a fracture, or a dislocation. I am persuaded that patients often leave metropolitan institutions, where they have been treated with skill and care, who would, in the country, be able to make a strong legal case of distortion which was inevitable under the best treatment.

petent. These, however, are questions of practical expediency, differing widely from that of scientific right and wrong. Tested by the single standard of surgical truth and error, I believe injustice to be often done to individuals and to corporations; and if poisoning, infanticide, and analogous crimes, have created a science of medical jurisprudence, I know not why surgical injuries do not demand an equally, perhaps more extended science, of surgical jurisprudence.

Let us establish a position in relation to Empiricism. It is usual to reserve feeling, or at least, declamation, for those who are considered hostile to the interests of the true medical faith. And there is apology for an unfriendly feeling, and reason for the antagonistic attitude usually manifested towards quackery by our profession. Those who occupy a firm position in established medical centres, unquestionably encounter it more rarely, and feel its influence less, than those whose medical practice lies in thinly settled districts, or among less educated classes. The public opinion of large communities, is very apt to be well ballasted by common sense; while, in small communities, agitated by minor interests, medical, political and religious faith are almost equally subjects of difference and change of opinion; and the interests of medical men are, proportionally often, very seriously affected. It is, therefore, the duty of every medical man, to discountenance quackery;

the only question being, how far and in what way, this may be accomplished. Laws to repress it have existed at various times. Stowe, in his *Chronicles*, says, "A counterfeit doctor was set on horseback, his face to the horse's tail, the same in his hand as a bridle, a collar of jordans about his neck, a whetstone on his breast, and so led through the city of London with ringing of basons, and banished." The present French law is stringent against charlatans in medicine. And yet quackery has always existed; and, what is extraordinary, barren of invention, treading in a monotonous round, a thousand times exposed, and as often presenting itself anew with the same threadbare pretences, yet always receiving the same encouragement. Here are the natural bonesetters of 1579. "Here," says Ambrose Paré, "I determine to treat of those impostors who, taking upon them the person of a chirurgion, do, by any means, either right or wrong, put themselves upon the works of the art; but they principally boast themselves amongst the ignorant, common sort, of setting bones which are out of joint and broken; affirming, as falsely as impudently, that they have a knowledge of those things from their ancestors, as by a certain hereditary right, which is a most ridiculous fiction; for, our mind, when we are born, is as a smooth table, upon which nothing is painted. . . . God hath endued all brute beasts with an inbred knowledge of certain things, necessary to preserve their life, more than man. . . . For it is no more

likely that any man should have skill in surgery because his father was a chirurgeon, than that one that never endured sweat, dust, nor sun in the field, should know how to ride and govern a great horse, and know how to carry away the credit in tilting, only because he was got by a gentleman, and one famous in the art of war."

Here is the hydro-practice of Petro, who flourished a short time after Hippocrates, "who," says Celsus, "as soon as he was called to a person in a fever, when the fever began to be a little abated, gave cold water to drink; and if it once raised a sweat, he pronounced the patient to be out of danger; if it had not procured that discharge, he gave still more cold water, and then obliged him to vomit. If it did not give way to these methods, he boiled water with salt, and obliged him to drink it, that, by vomiting, he might cleanse his belly. And these particulars (I use the words of Celsus) made up his whole practice; which was not less acceptable to those whom the successors of Hippocrates had not recovered, than it is to those in this age, who have been long unsuccessfully treated by the followers of Herophilus or Erasistratus. Nor is this kind of medicine not to be esteemed rash; because, if it has been pursued from the beginning, it kills more than it cures." What comment upon modern quackery is more dispassionate and to the point, than this of 1700 years ago! Read the medicine of any people or of any time, and you find allusions to the contem-

poraneous growth of quackery, perhaps elaborate efforts to repress it.

The "Art of Chirurgery," published in 1663, contains nine folio pages of elaborate argument, to prove, of those wounds that are said to be cured by the "weapon salve," "that they are cured by the help and assistance of Nature alone," and written "in regard that there are many who have asserted the contrary." "Crollius terms all ignorant and simple, that doubt of the efficacy of this medicament." Nine pages of logical argument, is an opposition abundantly sufficient to reanimate any falling cause, and, doubtless, for a time invigorated this.

Medical quackery belongs to no age, to no country, and to no people; its elements lie in the human mind. It is as certain to take root and vegetate in any country or in any age where mind exists, as cancer is to affect the material tissues. Quackery is but an unsound modification of every science and of every art. It is a false pretence of ability, or knowledge. The science of medical therapeutics is especially open to it, both from its uncertainty, and from the difficulty of testing it. You can test a piece of iron, or a plan of ventilation; but give a remedy, and how shall you know, from a single case, whether nature or your physic cured the patient? You can only infer upon various probability. "Medicine," says Celsus, "is a conjectural art, and the nature of conjecture is such, that though it answers for the most part, yet sometimes

it fails." "God and nature," says Ambrose Paré, "do sometimes such things which seem to physicians and chirurgions impossible." "This observation and some others," says J. T. Petit, speaking of hernia, "prove that cures which appear miraculous, are due to nature more than art." If nature is conceded to have so large a share in therapeutics, you can decide the effect of a single remedy only by a deliberate inference upon a series of cases. But how difficult is this act of the judgment! To many men, one personal experiment is worth octavos of recorded evidence. "I grant every thing," says one of these, "but I know that this cured me, and I think it will again." "And, indeed," adds a bystander, "if it agrees with his constitution, why should it not?" Personal knowledge of single cases, lies near the foundation of all quackery. Again, the physician frankly avows the inadequacy of his art. The charlatan promises a cure, endorsed by the statement that he has had a precisely similar case. "When it was decided that the Lord Martignes must die, Monsieur de Savoy showed himself to be much discontented and wept; and asked them again, 'if for certain they all held him deplored and remediless;' they answered, 'yes.' Then a certain Spanish impostor shewed himself, who promised on his life, that he would cure him; and if he failed to cure him, they should cut him in one hundred pieces. 'I swear to thee, by God, that before eight days, I will make thee mount on horseback, with thy lance in thy

hand ; provided, that no one touch thee but myself. Of this thou mayst be assured upon my promise. I have cured divers who had greater wounds than thine ;' and the lord replied, 'God give you grace to do it.' Notwithstanding, two days after, the said Lord of Martignes died ; and my Spaniard, seeing him in the agony, eclipsed himself and got away without bidding farewell to anybody." This is the second category of quackery, common to all ages and countries ; except that, in these days, the cancer doctors and the water doctors, find it unnecessary to "eclipse themselves and get away," inasmuch as the notoriety of a case which has proved fatal, is pretty sure to bring another.

Other bias of deliberate judgment may be found in a love of change, of patronizing, of originating, and especially when a quiet and inoffensive person, suddenly, and perhaps to his surprise, finds himself arrayed in the defence of some form of quackery, which consistency then makes his own cause. And, finally, the mind is often irresistibly swayed by the personal attraction and power of some representative of unsound doctrine.

Such are the disturbing elements of judgment where this faculty exists. But, unfortunately, medicine is a balance of probabilities. Fully to appreciate the leaning of medical evidence, demands capacity, simultaneously to embrace a considerable number of details, often distributed through time, and also a fair share of intellectual capital to discriminate and to combine them. Now

a mind well endowed by nature, and susceptible of stimulus upon subjects connected with the daily occupations of life for which it may have a natural aptitude, may have no taste for this especial subject, or knowledge of it, and so yields at once; or may be biassed by any of the considerations before exposed.

On the other hand, many minds cannot comprehend a logical necessity, and propound their belief quite as impressively as if they could. Expose to such a person a preponderating mass of probability, or an inevitable certainty, depending from a chain of evidence, and at the expiration of an hour you shall receive the answer, "Still the quack cured this man." "But," you reply, "Nature, and not the remedy, cured him;" to demonstrate which, you open another argument, and are again brought up by the original premises of your inflexible friend, that "the man was cured."

Such has been and will be the permanent nutriment of quacks; not of any one sect, but of all sects; not of any one year, but in all the past, and in all the future. If these views be correct, quackery cannot be repressed by any exposition of the absurdity of a theory or set of theories. It is not its local or temporary manifestation that demands our notice. Its roots lie deeper — in the defects of the human mind. Credulity and imperfect knowledge are the fermenting soil which nourishes a hundred different excrescences, modified by the local influences of disease or of

national peculiarity. You cannot abate quackery by any thing short of government restriction. Every man must have his medical, political and religious faith ; and unsound and unenlightened minds, in a free country, will have, equally, theirs. You cannot repress quackery. Let us not vitalize it by opposition. It lives by notoriety. Like cancer it is inflamed and grows by injudicious efforts to repress it. Leave it alone. I will not honor contemporaneous quackery by naming it in this place ; you cannot recall a patient strayed from your fold by exhibiting your displeasure. Maintain your philosophy. Perhaps you may ingraft into your science a hint from the total abstinent in therapeutics, which will be of service to the intemperate in practice or in drugs. Your patient may return, but it is even then quite likely you will live to be many times deserted in behalf of quackery by the same profound logician.

The progress of true medical science, cannot be impeded by the vulgar opinion of the unsound or uninformed. It is in this century steadily and rapidly progressive. Entwined with the kindred sciences of physiology and chemistry, it grows as they grow, at intervals sending forth an independent shoot. It is curious to observe the difference in the methods of its culture, at different times and in different countries ; and to note how a few standard types of medical research have been repeated. Celsus divides the medical world into two classes. "There are those," says the Roman

writer, "who declare for theory in medicine, and who look upon the following things as necessary: a knowledge of the occult and constituent causes of distemper; next, of the evident ones; then, of the natural actions; and lastly, of the internal parts." Among occult causes were classed purely theoretical causes, of the four elements, humors, &c. On the other hand, those who styled themselves empirics, admitted the "evident causes" as necessary, but "affirmed the enquiry after the occult causes and natural actions to be fruitless, because nature is incomprehensible." They held that "it is much better to seek relief from things certain and tried;" that "medicine was deduced from experiments;" that, for example, "some used a full diet in the beginning of a disease, others were abstemious; and that those grew worse who had eaten plentifully." "That these and the like instances daily occurring, diligent men observed attentively what method answered best, and afterwards began to prescribe the same to the sick." Here is the medical theorist, and here the experimentalist of all time. On the one hand, the humorist, the solidist, the Brunonian, and I know not what other disciple of false theory, ever volunteering and assuming the unproved *why*; and on the other side, the Hunter and the Louis, dealing with nature as it exists, cautious in assigning cause, inexorable in requiring evidence.

It is a little remarkable that national peculiarity should be so marked in its bearing towards medical

science. "The Englishman, while still young," says Roux, after his visit to London, "is remarkable for a certain maturity of reason and of judgment, which, when we are about to teach him any science whatever, allows us to reckon as much upon the operations of his own thoughts, as upon the simple exercise of his memory. Without being less qualified for labors of the mind, for the cultivation of the sciences, and conceptions of genius, the French youth is more impetuous, more distracted; his reason is more slow in coming to maturity; and when he sets about the study of the sciences, it is necessary, for some time at least, that his memory only should be cultivated, and that few things be left to his meditations."

French medical science strikes a foreigner as a forced growth, a business overdone. There is less claim to originality in science, than constant struggle to assert it. In this dense competition, notoriety is the great aim. Numerous scientific societies offer a market to novelty. Here is a mutual forbearance which listens patiently, on condition of being heard. A society or a train of followers thus becomes a rostrum for announcing the last remedy or surgical operation. It was complained that a gun-maker availed himself of the Academy of Sciences to give his wares publicity.

This long custom and facility of disproportionate announcement, are a constant stimulus to the medical world, who labor with an assiduity little known in this country. But the mass of labor is

not always directed by sagacious hypothesis. Medical discoveries are generally but novelties, slight modifications in routine and method, and seem to be an inadequate remuneration for the great expended labor. On the other hand, this constant review of details produces a medical precision elsewhere equally unknown. In knowledge of the usual combination of symptoms, in diagnosis, in pathology, the French are unrivalled.

The German mind is of a different stamp. Here is the same, perhaps greater capacity for labor, guided by the most ingenious and recondite theories. From Germany, we have Embryology, and the Philosophical anatomy, originating as if to stamp a current value upon the imaginative faculty, with the great German poet.

John Farey, a practical engineer, and familiar with the history of mechanical inventions, in his testimony before a Committee of the House of Commons, in 1829, expressed the opinion that "the prevailing talent of the English and Scotch people, is, to apply new ideas to use, and to bring such applications to perfection; but they do not imagine so much as foreigners." This is perhaps as true of science as of art. The general tendency of modern English medicine is not to new or subtle theory, neither have the majority of English medical writers any taste for dry and exact detail. Theirs is not the philosophy which excavates perpendicularly downward at the root of some isolated fact, to scrutinize in the ultimate fibril its microscopic point of contact with the

hidden rills of science; nor yet that which toils on the surface, to note with unwearying fidelity the germination of disease, and to chronicle in every leaf the varying type of morbid action. But there is a high intelligence and a large share of sound determination in the better part of English medical mind. It is slow of admitting novelty, a little tenacious of opinion, perhaps of prejudice, and ever leaning to the useful, to practice rather than theory, it is perhaps a little exclusive in its attention to therapeutics. But we are dealing with the practitioner as well as the pathologist, the man as well as the philosopher; and we recognize the cultivation of the higher intellectual faculties, and the balance of a strong common sense.

Louis and Hunter! the pathologist and the philosopher! The one stimulated by a passion for truth, the other impelled by genius. The labor of the one a corner stone in the foundation, which art cannot improve, and for which no other can be substituted, which may be built over as the edifice is reared, but which will resist the wear of time. That of the other, a vast and fragmentary system, sketched by the hand of a master, with here and there a thought, as of inspiration, which suggests the architecture of the whole plan.

Louis, singling out each function of the healthy man and tracking it through the labyrinth of disease, observing such experiments as nature herself might institute. Hunter dismounting the machinery of the whole animal world, ever suspecting new truth, forming new theory, and with a rapid sagacity

organizing original experiment. "For, as in ordinary life," says Lord Bacon, "every person's disposition, and the concealed feelings of his mind and passions are most drawn out when they are disturbed, so the secrets of nature betray themselves more readily when tormented by art, than when left to their own course."

Louis gauging phenomena by standard of color and form and dimension; Hunter seeking behind these phenomena to link them by some principle common to animal existence. Louis identifying occurrence, the when and the whether; and affirming truth upon this side of the verge of uncontrollable certainty. Hunter seeking cause; ever contemplating the why; transcending proof to speculate in possibilities; summoning a thousand facts from the recesses of a vast mind, to cluster them about some shadowy uncertainty, until it is revealed as palpable as if demonstrated.

In a storm of prejudice and error, Louis stood passionless and inflexible, deep in the conviction, that amidst the flashing and meteoric sophistries of Bronssais, the modest lamp of truth would arrest attention by its intrinsic beauty. His was an intellect not readily conjecturing, but sound in its discrimination between well known and recognized resemblances, and indefatigable in action. The intellect of Hunter was a gigantic mechanism in full play; capacious of a myriad of circumstances, cognizant of the loftiest and of the humblest details of the organized world. Rapidly transported to the

confines of human knowledge, and there pausing, Hunter sat, as in that noble effigy which art has bequeathed to us, for hours consecutively contemplating the memory of facts beneath an ample forehead. It was then that faculties, at other times chained to the slow progress of experiment, or diverted to the exigencies of daily life, assumed their legitimate sphere, and strove with a noiseless and impetuous energy. Gazing into the misty future, suspecting affinity from resemblances as extravagant as beautiful, devising and executing almost simultaneously the *experimentum crucis*; ever laboring; soaring from experiment to abstraction and nailing abstraction again down to the test of experiment; toiling at his art for the means of gratifying his enthusiasm for his science; such was John Hunter; and, if his books are hard to read, I question if the hardness be not the hardness of his facts, and their obscurity the depth of his reasoning.

From mind turn to matter, and regard the possibilities of human knowledge in our science. Who will assign a limit to man's future knowledge of chemical affinities? Reason indicates no barrier beyond which the analysis of inert matter may not be urged. The chemical eclecticism of the atoms of the animal tissue will ultimately be traced to the point where chemistry yields its sway and vitality begins. The cell, the point at which matter, stimulated by the vital force, first becomes sensible to the eye, is now being recorded in all its manifestations, as it yields to the mysterious influence which trans-

forms it into the animal and vegetable world. Cancer and tubercle, lesions of the cell, common to the whole animal kingdom, and terribly devastating to the human race, are upon the eve of being as far identified, as thorough appreciation of their ultimate form and a fair inference upon the forces which animate them will warrant. Muscular force, which has now been shown to animate the simple cell as well as the ultimate element of the true muscular fibril, is as yet unexplored. Its key fact, the entering wedge, the starting point from which investigation shall proceed, is not yet recognized; and unless it lie in that acknowledged fragment of what is called animal magnetism, which is said to modify or annul muscular power, it is a labyrinth without discovered entrance. Yet there is nothing in the relation which this force bears to animal existence which ostensibly prohibits its ultimate exposure. The nervous fibril of each muscle will one day be followed to its termination in the cerebral mass; and while the physiologist appropriates fibre after fibre for his sensitive and motor functions, the intellectual philosopher will analyze the mental faculties, claiming for their few dissected elements whatever tract may then remain unappropriated. The solid and the fluid, the denser and the rarer air, chemical force, light, the muscular and vital force, the intellect, the individual, successively escape one after another of our senses, until certainty becomes hypothesis, and conjecture in its turn fades into utter ignorance. Yet they all ex-

ist. The term material has relation only to the reach of human faculties. The interlacing evidence of all the senses attests the being of a resisting mass; hypothesis allures us to embody the less palpable testimony of a single sense, while that which is conceded to be immaterial lies where human imagination cannot follow.

There is a point at which religious faith makes it a duty to avow this ignorance; in conceding to infinite power the ability to act without material, and without place and time. To fix this point is simply to assign a limit to the reach of human understanding; and in the impossibility of doing this, it is neither a confession of a gross faith, nor a derogation to the attributes of matter and of mind, to run the boundaries of immaterialism close to consciousness itself; to class with the material, not only the attributes of matter, but that machinery of sense and of the intellect which is subservient to the will; and in this way to extend the possibility of human comprehension, so that it may one day unravel much that is now invisible and intangible; exposing the subtle relations of matter and of electricity, of muscle and of force, of special sense and of intellect. Analogy would then suggest in these untrodden regions continuous stages in a system of transition from palpable to less material; the development of a lofty structure, at whose foundation man now climbs.

It has been well said that, "if we are to have a correct philosophy of the human mind, it must come from physicians." As the surgeon deals with

pathological processes in immediate contact with his senses, so the physiologist is nearest the mechanism of thought. Rays of light approach the earth, bearing the image of a distant star. They are woven and interwoven by human art, they penetrate the eye of the astronomer, to be elaborated in the mind, and sweep on with the diverging rays of human knowledge to illuminate the intellectual world. The physiologist claims the narrow isthmus which unites the luminous and mental ray, and lays his finger upon the machinery which effects the first step in the system of transition.

Analyze reason itself. The working of this complex faculty divested of its adventitious circumstance and sifted to its simplest form, the syllogism, is but a recognition of equality or inequality, of identity in degree. Represent equality or inequality by units. Suppose the mind to deal with units of resemblance or of difference, and we have already invaded the science of number; an intellectual operation, which can be performed by a material mechanism with far more accuracy than by the intellect itself; and in which a unit of brass is more certain to register its due influence upon the dial, than is an abstract unit upon the tablet of memory.

A brief but grateful task remains. The office which I humbly hold, has been occupied by those whose well earned name has conferred upon it dignity and even lustre.

He, to whose hereditary claim upon our respect,

and to whose culminating and completed reputation we now yield a ready deference, but yesterday was toiling with an iron energy and unremitting will, bending to our science the best faculties of a long and vigorous life. Go to yonder amphitheatre, where the sufferer seeks in silent agony the last resources of our art; and in its wide facilities, its noiseless discipline, the absence of all ostentation, and in the calm severity which recalls the classic day of surgery, in a perfection indelibly stamped upon the organization of this arena of our science, study the impress of his ruling intellect.

Yours, Gentlemen, is also the grateful recollection of one, the echoes of whose voice have hardly ceased within these halls. The spontaneous language of regret that he should have withdrawn in the meridian of his abilities from a position which no one was better qualified than he to fill, is yet upon the lips of all who have at heart the interest of this institution. For many years identified with its history, the warm advocate of whatever was advantageous to the college, deeply interested in your well being and receiving in return a ready and loyal devotion, the loss he has entailed upon you in resigning the professorship of surgery cannot well be overestimated. To you, Gentlemen, I leave the expression of your appreciation of his teachings, and your interest in his welfare.

With unfeigned distrust in my ability, with a deep sense of responsibility, with an earnest hope of making this office in some measure useful to others, I enter upon its duties.