

# THE AIM OF MEDICAL EDUCATION. AND ITS RELATION TO RESEARCH WORK, BY MEDICAL STUDENTS.

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The work of the medical colleges twenty years ago was such that almost any change in it was a change in the direction of improvement. The result was that as changes were suggested, they were hailed with delight, and adopted as rapidly and as thoroughly as the different schools could accommodate themselves to them, until it has now almost become a habit to accept as good and desirable any innovation in medical college work which may be suggested. The last two decades have seen a general extension of the time of medical study from two courses of five months each to four courses of eight or nine months each; this period has seen introduced into the curriculum many branches of study, previously never attempted; it has seen the standard of admission raised, and the requirements for the degree, and for the right to practice made more stringent. During the same time the subject of

their dangers; their products are not always solid. A mere glance at the changes show that they involve standards of admission to professional study, subject matter of such study, methods of teaching, and the relations of the profession to the community. Each of these factors is complex; it has many sides and many relations, pedagogical, professional, and social, not all of which are apparent at a glance, and some of which can only be determined as time and experience reveal them. It would seem, therefore, wise

to stop occasionally and review the situation broadly and compare our position with fundamental landmarks, to take our bearings and determine if possible if our progress is all that we fondly think it to be.

I propose here to take bearings from just one fundamental landmark, for the light which it may throw on the situation, and compare it with one proposed innovation. The landmark to which I refer is the one which defines the province of the physician and thereby establishes the functions, duties, and scope of the medical college, the place where he is prepared for his life work. The province of the physician is to prevent and relieve sickness, and to prolong life. To perform his functions he must be familiar with the nature and cause of disease—pathology; have the skill and

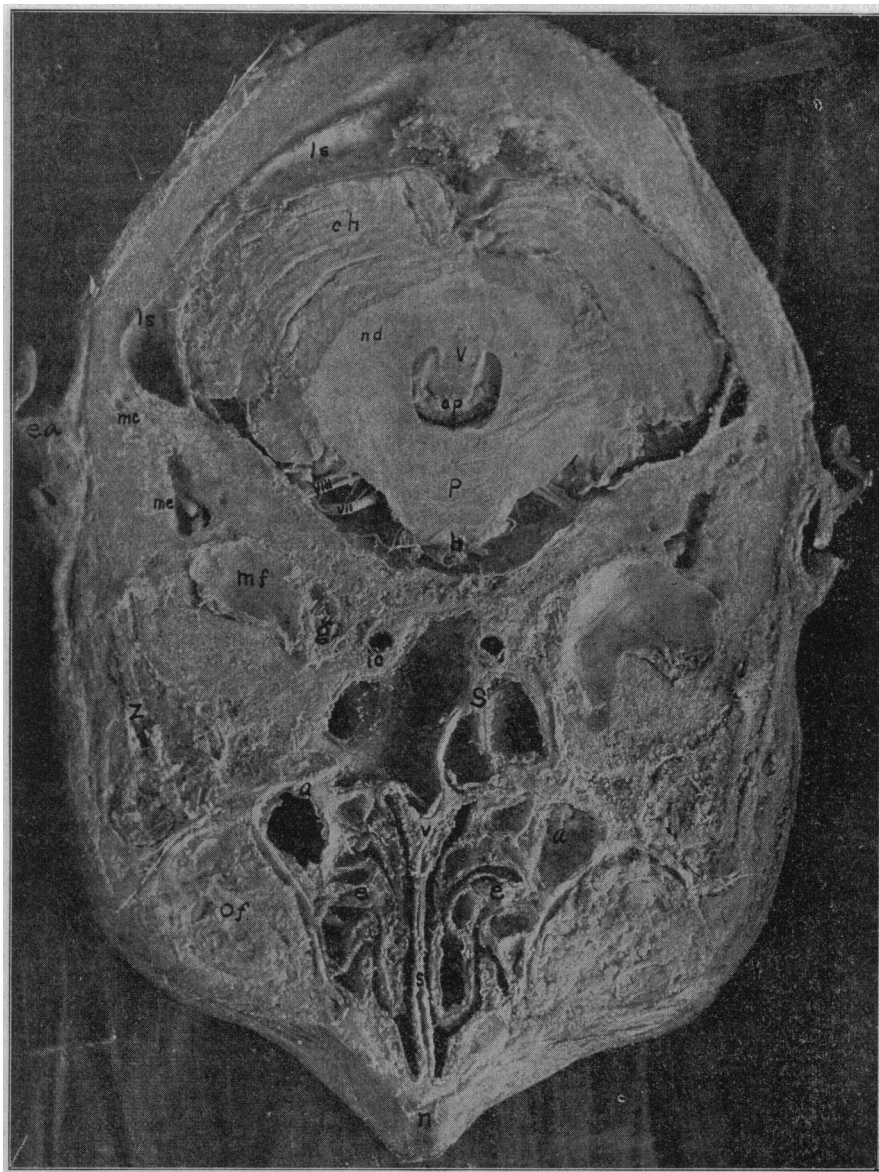


Fig. 7.—From photograph of horizontal section, viewed from above, of the head at the level of line VI, in Figs. 1, 2 and 3. This section passes below the cerebrum, striking the cerebellum middle ear and lower part of the orbit. *ea*, External ear; *z*, zygomatic arch; *n*, nose; *of*, orbital fat; *s*, nasal septum; *v*, vomer; *c*, ethmoidal cells; *a*, antrum of Highmore; *sc*, sphenoidal cells; *ic*, internal carotid; *b*, basilar artery; *g*, Gasserian ganglion; *mf*, middle fossa; *me*, middle ear, showing chain of bones; *mc*, mastoid cells; *ls*, lateral sinus; *ch*, cerebellar hemisphere; *nd*, nucleus dentatus; *v*, vermis; *cp*, choroid plexus of the 4th ventricle; *p*, pons varolii; *VII*, 7th cranial nerve; *VIII*, 8th cranial nerve.

laboratory work has practically had its whole development in our American schools, excepting only certain work in dissection, and some very rudimentary chemical work. The didactic lectures of the older days have been severely criticised, and the recitation method has found many advocates, and some application. So numerous and far reaching have these changes been in so short a time, that we must admit that we are in the midst of "boom times" in medical education. And "boom times" are not without

means for determining its various phases—diagnosis; be armed with the best means for combating it—therapy; and be possessed of good professional judgment to guide him in his art. His pathology must be based upon anatomy, physiology and chemistry, the two former of which must be acquired within the walls of the medical school, simply because they have not yet become subjects of such widespread study for purposes of general culture that they can generally be acquired in other institutions, and

not because they are subjects of exclusive medical interest or use. For the same reason that chemistry, to have its truly medical aspect emphasized, is still taught in medical schools, anatomy and physiology will probably also continue to be taught there even when their study in institutions of general learning becomes much more extensive than it is now. The pathology of the medical student must always be taught in the medical schools. It constitutes a very large percentage of the subject matter of the curriculum, and demands a large part of the student's time. The subject is divided among many chairs, the etiological portions going to one or more departments, the general and comparative aspects to other departments, while special features are presented by the so-called practical chairs, or what should more properly be spoken of as the philosophical chairs. In

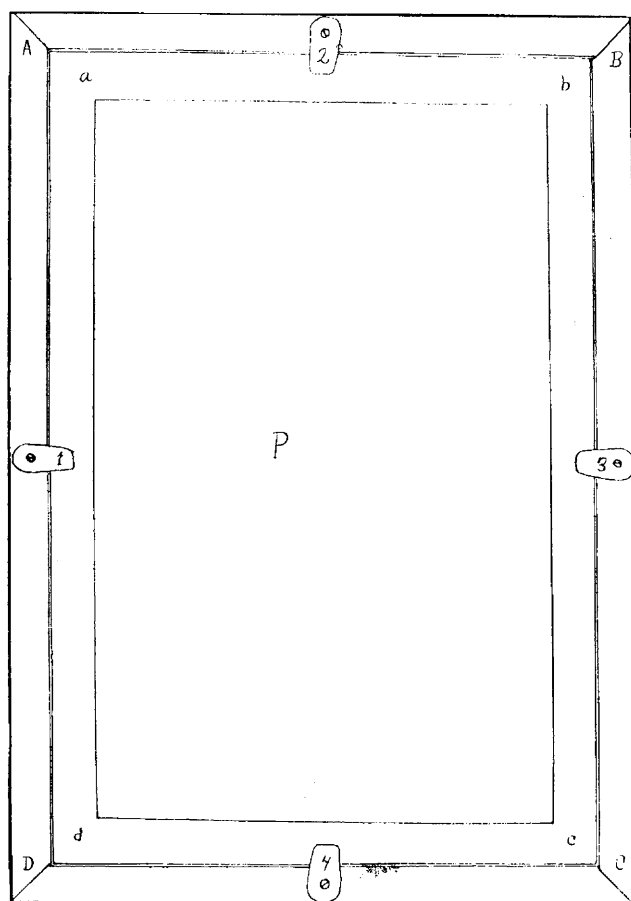


Fig. 8.—A diagram of the Drawing Frame. *abcd*, The outer frame, which resembles an ordinary picture frame, in which the glass and drawing paper are placed; *abcd*, the inner frame, which fits into the outer frame behind the glass and drawing paper, holding them firmly in place; 1, 2, 3, 4, wooden "buttons," fastened each by a screw into the outer frame, and serving, when turned as in figure, to hold the inner frame tightly behind the glass and paper; *p*, space occupied by the glass and drawing paper.

all of this work the student is gathering data, is securing information, of the importance of which he is but illy qualified to judge.

Having acquired a knowledge of the nature of disease, he is next introduced to the means of combating it. He is shown that therapy includes drugs, dietetics, and surgical, psychic and social factors, and the mastering of the data of this vast armamentarium is a work truly prodigious. And thus far, the work has still been wholly a collection of data. Now comes the work of the philosophical chairs whose duty it is to present the subject of diagnosis; to show the correlations of the data of pathology and the data of therapy, and to crown

all with the training of the professional judgment. The art of diagnosis is necessary because diseases do not come labeled. Diagnosis is a purely logical procedure. In each of the great departments of human thought, the logic of that department has peculiarities of its own, and so the logic of medicine is peculiar to it. Certain methods of reasoning are especially fruitful of results; certain fallacies are apt to recur frequently, and to use the one and avoid the other requires training. It is convenient to group the peculiarities of medical reasoning under the term "medical mode of thought." I can not here undertake to prove the truth of these latter assertions, but am content to refer any who question them to Bain, who in his chapter on the Logic of Medicine, in his "Inductive Logic," has fully and conclusively set the matter forth.

Among the more recent innovations in medical education upon which divergence of opinion and practice exists, is that of completely separating the teaching of the basic sciences, usually presented in the first two years of work, from the remainder of the instruction. Closely associated with this, is the tendency to offer to undergraduate medical students, opportunities for original research in these basic sciences. It has been said that, "When a physician makes a diagnosis he follows precisely those methods of observation, comparison and experiment which are employed in original research." Granting the verbal accuracy of the language, the statement is still misleading. The statement is in principle true of every investigation from original research to common gossip. It is, therefore, too broad to be of any peculiar utility. It is misleading in that it implies that in original research, and in diagnosis the methods of observation, comparison, and experiment are identical, and that the fulness of diagnosis, conclusion, and that the end of research, truth, more general than specific, are both reached by similar acts of judgment. So long as the logic of medicine has its own peculiarities, its methods of observation, comparison and experiment can not be absolutely identical with those of anything else, not even with those of one of its basic sciences. But it is in the latter parts of the two methods of reasoning that the great differences occur. I shall endeavor to make this appear by analyzing the two processes of original research and medical diagnosis. Original research has for its object the determining of new truths of a more or less general character. The new truth may first exist merely as a creature of the imagination, an hypothesis. This hypothesis is then subjected to verification by experiment and observation. If the experiments and observations confirm the hypothesis so fully that no alternative or modifying hypothesis can be conceived of to limit the original hypothesis, that original hypothesis is accepted as a truth, but not until it is so completely verified. New truths may also be derived by direct comparison of data established by observation and experiment. A characteristic feature in research work is deliberation. The supposed new truth waits for its announcement, certainly at least for its acceptance, until a sufficiency of data has been collected to establish it beyond doubt. As Huxley<sup>1</sup> says: "There is one guiding rule by which a man may always find this path [to truth] and keep himself from straying when he has found it. This golden rule is—give unqualified assent to no propositions but those the truth of which is so clear and distinct that they can not be doubted." Any so-called re-

1. On Descartes' "Discourse."

search less critical is unworthy of the name. It follows, therefore, that a research must often wait, and wait indefinitely for the collection of the necessary data to round it out, and bring forth a just conclusion. A so-called conclusion to an incomplete research, hedged with the adjective "tentative" is no conclusion at all; it carries no responsibility. The time element therefore is an important feature in original research, and the time may be indefinitely prolonged. In medical diagnosis the problem is to determine the state of affairs in a given patient. The particular methods of obtaining the data are those peculiar to medical investigation. When obtained these data are often insufficient to afford a positive basis for any conclusion. Occasionally, conditions are such that time may be spent waiting for additional data, but much more frequently the decision must be made at once, for action is demanded, and that action is determined by the decision as to the meaning of the data. Frequently, it is quite impossible to obtain a sufficiency of data, because original research in correlated branches of knowledge has not yet formulated laws governing the conditions. But nevertheless a conclusion must be made, for action is necessary. The time element is here important also but the time must be short, or life may be the forfeit. It follows from this, therefore, that the tentative conclusion is common in diagnosis, and unlike the tentative conclusion in research, it is one involving great responsibility. Inasmuch then as tentative conclusions must be made in diagnosis, and as it is essential that those diagnoses be as accurate as possible, great care must be exercised in the methods of thought used in reaching these conclusions. To this end we have recourse to the Logic of Medicine, which has become the logic of medicine, precisely because experience has shown that it is the most potent in reaching the truth under such circumstances. The "medical mode of thought" therefore ought to be inculcated throughout the whole of the medical student's career. When the diagnosis is made, it must then be compared with the data of therapy, in order that a second conclusion may be reached, and this second conclusion is the one which formulates the specific action to be taken, and in making it, psychic and social factors must be considered as well as the purely medical, and here again the "medical mode of thought," the trained professional judgment, comes into action.

So far as research work trains observation it is good, but powers of observation can be trained equally well on pulse and tongue, facies and feces, as with the aid of balances and microtomes; so far as research work trains the judgment, it trains it in a bad direction for the young medical man. It tends to establish modes of thought which hamper rather than help him at the bedside. For anybody to do research work on problems formulated by some one else is largely child's play and hardly rises above the dignity of ordinary clerical work, while at the same time it tends to inculcate a sense of personal importance which is so far from the truth that it can not but be detrimental to its victim. The clinic is the field for medical thought and action. Resting upon its basic sciences, which are for its purposes tributary and subordinate, medicine has a systematized knowledge of its own, extensive in scope, highly complex, difficult to acquire, and requiring the best efforts of the best intelligences for its highest use. The systematized, truly medical knowledge may be designated by the word clinicism, which is the true science of medicine. The time for the medical man to undertake research work is when his experience has become

sufficiently ripe for him to formulate his own problems; then his research work will have some life in it; his problems should be clinical problems, and certainly there are enough of them to satisfy the most varied tastes. The importance of inculcating the medical mode of thought and training professional judgment, is, in my opinion, so great that I would have them meet the student at every turn in his medical college career, from the very day of his entrance, and to this end I would have the teachers of the so-called scientific branches of the curriculum associated, as far as possible, with clinical work, and urge them to put themselves in constant touch with clinical men, that they may impress upon the student the professional bearings of their tributary work. The medical course is short enough now; it is difficult to find time to present all that should be presented to the student, and there is certainly no time to let him stray after strange gods. It is the business of the medical student to receive medical knowledge and to be trained in its use; he is under no obligations to add to the sum total of medical or any other knowledge. To-day an overwhelmingly large percentage of the physicians of the country devote their whole time to the application of medical knowledge to individual patients. It is right that they should. It is what the community expects of them. It will continue to be so in the future. With the few physicians who do research work, it is a side issue, and their real work is this same application of medical knowledge to individual patients. Such medical students as wish to engage in research work should limit themselves to it, and not hamper themselves with practice and they will find that their medical brethren will welcome every contribution of knowledge which they send out. If legislation should be for the benefit of the greatest number, so ought education, and to this end the medical college should keep its prime duty ever before it. It is the function of the physician to practice medicine; it is, therefore, the duty of the medical college to train him for that work. Let us make physicians rather than scientists.

#### NECESSITY OF A PRACTICAL KNOWLEDGE OF DIETETICS, HYDROTHERAPY AND PHYSICO-MECHANICAL THERAPEUTICS.

THE NEED OF ESTABLISHING COURSES OF INSTRUCTION IN  
THESE SUBJECTS IN OUR MEDICAL SCHOOLS.

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Until very recently the profession has for the most part relied upon the administration of drugs for the alleviation and cure of disease—all other means except surgery being left to the abuse of charlatans and quacks. But it is the sign of the present state of scientific development, that the attention of the thoughtful has been called to the effects that may be obtained by agents not emphasized in books on materia medica, therapeutics, or in the pharmacopeia. The value of general hygienic conditions and of surroundings; the necessity of proper and systematic bodily exercise; the curative power obtained through the placing of the patient's mind in the proper psychological attitude; the importance of the use of a diet suitable to the case and to the individual; the bearing that heat and cold may have upon the bodily functions in general, and especially on the different parts of the human organism when intelligently applied; the efficacy of massage and electrical therapeutics—