THE VALUE OF THE DENTAL LIBRARY AND MUSEUM TO THE TEACHING OF DENTISTRY.

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(Read before American Institute of Dental Teachers, Pittsburgh.)

THE LIBRARY.

IN PRESENTING this subject for discussion, it seems desirable to make some classification as to material resources that we may make such distinctions as to the relative importance of each class as shall place the matter logically in our minds. And for lack of any precedent, we would suggest the following order of consideration:

1. Historic Literature.
2. Scientific Research.
3. Published Books.
4. Current Literature.

HISTORIC LITERATURE.

Under this title we would include all literature pertaining to dentistry that more or less directly sets forth the development of dentistry from its crudest forms to its present practicable usefulness and professional standing. We are fortunate in having creditable records except perhaps of the earliest ages when nothing of scientific consequence was produced and even the art was so elemental and chaotic as to have little value of a pedagogic character. The writings of Guerini and Koch furnish us all the dependable history necessary for presenting the essentials of dental activities up to the time of the publication of these works, and our current magazine literature, where available, supplies neces-

sary details for special readings or class presentations.

Few students have the necessary training to make good use of libraries without special direction. They lack incentive and because of inexperience cannot read with proper discrimination. For this reason it would seem that the only way this material can be made available to students is to present it in the form of a lecture course that is didactic in form, with citations and expositions that will enable such students as may care to make further personal research to find the material necessary without too great effort. It is curious to notice how students will become interested in particular subjects and want to know more about some particular phase of the subject. Whatever may be the reason, the instructor should be ready to direct such a student to the sources of information which may not only satisfy his curiosity, but which may also give him a keener desire to know more of the whole subject. He is almost sure to be led into collateral readings by this means, that tend to widen his knowledge and stimulate his intellect. This will, of course, necessitate access to the literature involved; and means that every college should have in its building as complete a file of dental literature as possible, that opportunities for developing literary inclinations may be quickly apprehended. It

may happen that the instructor is not always able to cite references that will satisfy a student's desire for conclusive statements on his matters of inquiry; but this very fact may be the best chance for inciting a student to dig up the information for himself if he can be directed to the best records available. If this is not done, there will be little stimulation of the imagination and no intellectual interest in even the most exact matters.

It is obvious that the lecture course, or the text book, on any subject must discuss that particular topic only in its essentials with no intention of exhausting it, or of making a complete exposition of it. Lectures so elaborated would be tedious and uninteresting, and little enthusiasm would be generated even by the most scholarly instructor. In dental history, for instance, it would require all our printed literature, and more perhaps, to exhaust the subject, and very few persons would care to spend so much time on it; but it is necessary that we have access to *all* of this literature that we may have correct information about *some* particular part in which we may be most interested. Therefore we cannot see how any properly equipped dental college can exist without a complete file of our dental journals, even tho it may not be generally consulted by the student body. Neither can we conceive of a progressive teaching staff which cannot have access to a complete dental library.

If there is a fundamental starting point for the development of an intelligent and progressive professional dentist, it certainly must be found in the history of the development of the profession, such as can only be found in the profession's literature. It therefore seems necessary that our libraries shall not only be as complete as is practicable, that our students may become acquainted with the vitalizing traditions of the profession, but that we may start new impulses for

making our profession more learned as well as more useful.

If it were practicable to trace back to its original source every accomplishment made by our profession, we have little doubt that somewhere in our literature will be discovered the *seed thought* which is responsible for every discovery or invention that we so proudly claim as original. We should, for instance, need to go back of Horace Wells to Priestly to find the starting point to one of the world's greatest treasures. The study of the history and the ultimate benefits of practical anesthesia makes for culture, and it is all recorded in our books. We must have such history available to students and they must at least know it in outline, and it will be still better if they can know it in more detail than it is practicable for the usual lecture course to present it.

DENTAL SCIENTISTS AND THEIR WORK.

What we have said above in regard to our history and its usefulness in developing professional *esprit de corps* may, with perhaps more justice, be cited as a reason for a literary record of the lives of the men who have produced our scientific knowledge and our technical discoveries. We are also indebted to the men who have done so much to develop our calling into a respected and honored profession. It may seem sentimental to hold up the lives and works of these men and to commend the records of their lives and works to students with the idea of making these students more efficient dentists. But what better method have we for inspiring our students with proper professional ideals than to point out the work and character of some of the men who have given us our place in the world as learned and skillful servants of humanity?

One of the most widely known and highly esteemed men in our profession

once said that he left his home in a distant country and located for practice in a large city of this country that he might be near to the men about whom he was reading in the dental journals. He said he wanted to know them personally. His faithfulness to this leading resulted in his becoming not only an honored teacher in a dental college, but one of the most useful practitioners of his art, and a writer of distinction and force. What dental student can read the works of G. V. Black and W. D. Miller, and know of the heroic sacrifices of these men for the cause of dental health, and not be inspired with a hope to one day make some worthy contribution to the calling which he has espoused? While it is true the lives and characters of such men are portrayed in the students' text books, and they are the common knowledge of our instructors, who recognize their work by proper references and citations in the class room, let us hope their personal biographies may some day be put into permanent and accessible form for dental students of all time.

The knowledge that such men have helped us to accumulate we have on file in our literature, and it is highly important that it should be accessible to every earnest student. While it is true that the essential matters are kept alive by our class text books, it is usually in the abbreviated form and is not always kept associated in the personal relation that serves as "the touch of the vanished hand" to vitalize and inspire to a like consecration and achievement.

It is unnecessary to catalog all the men who have helped to build our literature, or perhaps to make more extended comment on the enormous influence their writings may have had, or may yet exert in the future development of our professional life; but we feel that a knowledge of this literature and the opportunity to freely consult it should help to quicken immensely our present professional ac-

tivities, and be one of the great forces for stimulating personal development on the part of dental students.

REFERENCE AND TEXT BOOKS.

It is the general custom in most schools to require students to buy all text books used in the course, and so far as they are willing, to urge the purchase of other books on the various allied subjects. In some instances the owning of a text book is made the requirement for admission to the classes. I will not take your time here to discuss the abuses or rather the prevalent neglect on the part of the students in individual ownership of competent text books on all subjects. It is a somewhat vital subject, as no student can do himself or his instructor justice who does not possess and study his text book along with his course. In some subjects there are several books to choose from, and it can hardly be expected that all approved text books on every subject of the curriculum will be in the possession of all the students. It therefore becomes necessary for the college library to have a sufficient number of reference books not required in the course in its reading room that students may look up citations by the instructor. These books should be available at such hours as students may have time to consult them. This involves a sufficient number of such books as to make it possible for students to either withdraw them for home reading, or the constant attendance of the librarian and an open reading room. Perhaps the open reading room at stated hours with an attendant will meet most situations better than the loan plan; because by the loan system books are badly used up and are often lost entirely. In spite of the expense involved, we believe it would add enough to the general advancement in scholarship, to justify the expense of providing students with every possible facility for access to this literature.

CURRENT LITERATURE.

Included under this heading would be the periodical magazines and other occasional contributions that cannot be classified as books. It is the custom of most colleges to display in the college reading room, copies of the monthly dental journals, but in very few colleges, so far as we know, is there any definite plan of calling the students' attention to special articles, or to a systematic reading of the journals. There is nothing that could be done to promote the reading of our current literature so much as the organizing of a course of systematic journal reading under the direction of a competent instructor. It would establish a helpful habit for the future and it would create a live interest in the studies especially of the upper class men.

It is a well known fact that dentists do not read their current literature adequately or in the best way to get the most out of the time devoted to its reading, and the lack of proper training in college is no doubt much to blame for this.

It would not be an expensive matter to have on the tables of the college reading room several copies of all the journals published. In fact, the publishers would be glad to make liberal concessions if assured that their journals were to be made useful in the development of literary habits. Students ought to be shown how to read with discrimination, and also to record for future reference articles that may be helpful for consultation in writing papers for dental societies and for use in research, or that may be utilized in practice.

In dental college libraries, and in occasional private libraries, sets of journals are saved and bound, but as a rule few private practitioners care to bind more than one or two journals. It is possible, however, to preserve by some such means as a card index or letter file

case, articles taken from magazines, which may be classified in the file so that they are easily and quickly found when wanted. A student can be shown how to preserve his readings so that he will not only take pride in his collection, but he will become a discriminating collector as well as have the satisfaction of being known as a well posted and intelligent professional man, and all because he has learned to read and collect only those things having scientific and professional values.

THE MUSEUM.

In considering the museum as an educational factor we should think of it as a collection which shall serve the purpose of recording facts that illustrate and have influenced in some way the development of our science and art. It should contain exhibits primarily that serve to illustrate the typical and normal. The abnormal and atypical where they illustrate frequent deviations, especially when the causes can be prevented by remedial agencies, are also important. Just how far effort is justified in the collection and exhibition of the monstrous in pathology, or the errors of the practitioner in technical treatment, we shall have to decide on the basis of individual merit as to its helpfulness as illustrative material.

A museum showing only the anatomically perfect specimens may not be so interesting because of its monotony of perfection; and on the other hand, remarkable contrasts such as are exhibited in extreme deformities attract attention and accentuate the ideally normal.

The interest of the average student in dental museums is claimed by the exhibits of the peculiar or monstrous, and it may be wise to cater to this taste in order that exhibits of greater significance may be brought to his notice.

Dental museums ordinarily seem to be the result of chance, or to express the

individuality of an enthusiastic member of the faculty for a particular subject. It is therefore difficult to outline a classification except on a theoretical basis, which no considerable number of teachers would probably accept. For the purpose of this discussion we would classify the dental museum that shall have an instructive value for students in accordance with the following scheme.

1. History and Curios.
2. Anatomy and Pathology.
3. Illustrative Material for Class Purposes.
4. Collateral Science and Art.
5. Technical Material.

HISTORY AND CURIOS.

Historic material of dental concern may be of great variety and limitless almost in quantity. Pictures of the founders and promoters of our science and art can be of great value, especially if accompanied with adequate explanatory information. The ideals and works of our great men ought to be held up to our students, who some day will do great things perhaps, if the right incentive appeals to them. As we value mostly the records of our great men, why not keep their works perpetually before our students? A picture gallery would attract and might inspire some young men to higher ambitions. The books such men have contributed to the cause, and their casual contributions which may have served to develop some technical principle or scientific fact of more or less value, if attractively exhibited should contribute to the general culture of students coming under such influences. Pictures, books and other illustrations of these men of character are obtainable to a limited extent, and reproductions in lantern slides or reprints could be had of the more rare specimens, provided any interest in this direction were developed and the need were demonstrated.

Curios of Literature and Art also have a definite value, and the variety and quantity of such material that can be accumulated by persistent effort is surprising. Every dentist who has been in practice for a number of years will have accumulated something of great interest as a curio if not of considerable historic interest. Books, literary articles, instruments and appliances, incidents of practice, and other data of historic interest should, to a limited extent, form a part of every college collection not only for the sake of preserving as complete a record of our profession as is possible, but also that these matters may serve to give students a broader view of the dental field of achievement. If such material is wisely collected and displayed, it will be an educational factor of definite, tho perhaps, not of ostensible consequence.

If this historic material is used by the teaching faculty in illustration of class work, as it can very well be used occasionally, it may be made of much greater value than when it is simply displayed in a glass covered case.

ANATOMIC AND PATHOLOGIC EXHIBITS.

As anatomy is the fundamental science on which our knowledge of the human body in health and disease is based, it would seem that every possible help to a complete understanding of that part of the human body in which the dental student is particularly interested should be made available. We take it for granted that the necessity for a collection of human crania in the possession of every school is evident whether any attempt to have a complete museum is made or not.

We should include under the head of anatomy, all the biologic studies, such as physiology, histology, etc. A complete anatomic museum of the human head and face may not be

within the reach of many dental colleges, but every college museum can and should have a display of human crania and teeth with the muscles and the nerve supply. Such, for instance, as the jaws and teeth with muscles, nerve and blood supplies. To this can, and should be added, when practicable, a complete exhibit of the developing teeth from the pre-natal to the senile period of life. Sets of these preparations are available at moderate cost, and they are of exceptional value for class room purposes as well as museum specimens. Lantern slides and pictures are also procurable at much less expense and are fairly good substitutes for the actual specimens. Charts and drawings are sometimes used, but as a rule they are not interesting unless displayed in an attractive manner.

In dental anatomy there is a great opportunity for displaying specimens of teeth in the different stages of development with their environments. These may be shown by prepared specimens of typically normal conditions. Specimens showing the teeth in typically normal developed arches, with normal occlusion and articulation, should be shown in special exhibits apart from malformed teeth and arches. In another exhibit a similar exhibit may be made of the most usual malformations to bring out the normal in type by contrast with the abnormal. A great many colleges have exhibits of these specimens, but so heterogeneously arranged that they have little value as material for instruction. As dental anatomy is one of the most important subjects taught in colleges, it can hardly be overdone, except that sometimes the mistake is made of confining it almost entirely to the study of surface form of whatever extracted teeth may be available rather than of selected typical teeth.

It is possible to accumulate a complete

collection of teeth showing typical as well as the usual abnormal forms. These, if properly mounted and arranged will be most convincing and they can be photographed and shown enlarged by lantern slides to larger classes when desirable.

Cut sections of typical teeth, both longitudinal and transverse, properly mounted and labeled, are shown in normal order of position in the arches and will make a useful and desirable illustration of the internal structure of each tooth. Such specimens are procurable and should have an important place in every dental museum.

Of less value perhaps, but of great interest, is a collection of malformed teeth and of casts showing the teeth in malposition. The malformed teeth can be mounted in such a way as to permit of identification by suitable labels, and of inspection of every surface. The number of such specimens need not be limited, but the collection would be more valuable if some system of classification that will bring out most distinctly to the student's eye and mind the lesson each group or individual tooth is intended to show.

In comparative anatomy there is an extensive opportunity to impart most valuable information by an exhibition of only a few well selected specimens which show the modification of teeth in nature to meet the various environments and food habits of the different classes of wild and domestic animals.

It is a most difficult matter to impart to the average student the functions of human teeth without reference to the forms of teeth in various animals as compared to man. It is so much easier to teach not only the anatomy, but the nomenclature of the human dentition by comparison with the anatomy and function of animal teeth, that it is almost essential that a course in comparative

odontology should accompany the course in human dental anatomy. The instruction in comparative anatomy is greatly facilitated by a wisely selected collection of animal crania, or by good lantern slides or charts of the same. Where the masticating functions are highly specialized, the anatomical forms are greatly accentuated to meet this condition, and it is easy to make plain the comparative functions of similar organs in man, where the organs and their functions are not so well defined. Therefore, a museum of comparative odontology or its equivalent should be an important item in every dental museum.

Pathologic specimens are always interesting as curios and the tendency is generally to exaggerate in this direction, because such specimens are plentiful. Every one saves the curious and the unusual specimens, and many times the histories make these specimens of great value for the bearing they have on diagnosis and therapeutic treatment. There is usually a temptation to overload museums with this class of material, which it is difficult to classify or make valuable as teaching specimens. It takes up valuable space and for exhibit purposes it requires careful labeling to give it instruction value. It is more valuable in the hands of the teacher, as he can point out the direct as well as the related bearings on disease and its treatment. An extensive collection of exostosed roots, pulp nodules, or bifurcated single rooted teeth are not necessary to demonstrate the frequency of these conditions, while perhaps a large collection of impacted third molars might be better justified because of the variety of technical procedures needed for their removal.

Whether these collections are small or extensive, they are not valuable in the teaching process unless they are properly classified and displayed with legible labels. Incidentally we would observe

that this mounted labeling is an art by itself and should be done by one who not only has a knowledge of all the values of the specimen, but has had experience in making effective this phase of the museum. We can learn much here from the taxidermist.

Microscopic slides of developing teeth and jaws enlarged and colored, and made up as transparencies, may be exhibited in cases with electric light illumination to show specimens of the normal as well as pathologic conditions. Such material is usually in the form of microscopic slides and consequently not available for the student. This form of showing such specimens is better than the preservation of them by the old method of exhibiting them in glass jars, altho there are certain preparations that cannot be exhibited in any other way. While these preparations are largely used by class instructors and are not usually considered museum material, there is here a chance to enforce the class room and laboratory instruction very decidedly and at the same time make the museum a more vital influence than it is ordinarily. Special exhibits of this kind can be made at such times as the classes are engaged with the subjects exhibited. This may be readily done by having suitable cases in which the material can be changed when needed. If properly taken care of, such exhibits may become centers of continual interest and thus justify their preparation.

ILLUSTRATIVE MATERIAL FOR CLASS WORK.

One of the best methods of enforcing class instruction is by means of drawings, charts and samples of technical construction. Very often there is little time during the class hour to study specimens shown and while not all students would take the trouble to more carefully study such illustrations when put on

exhibition, a considerable number would if the exhibits are made so popular as to cause talk among the students. Of course all class material could not be profitably used in this way. By mixing technical and scientific with other educative material in succession a live interest would be generated in the museum exhibits, and a new incentive would be created for individual thinking, reading, and perhaps in investigation. One of the most serious criticisms that has been made on much of our teaching is that students are not trained to think for themselves, may it not be that we are to blame for this because we enforce the system of memorizing unduly, and at the expense of stimulating the imagination by appealing to other senses. There is no other sense that makes a stronger appeal to the intelligence than sight and we may cultivate it to very good purpose by such exhibitions.

EXHIBITS OF COLLATERAL OBJECTS.

Just how far we are justified in giving space to curios and museum specimens that have little or no relation to dentistry, it may be difficult to say. Should it be permissible, for instance, to exhibit the taxidermic specimen of the hen or the turtle to illustrate a form of jaw that has a kind of masticating function and yet no well defined tooth organ? Or how far are we justified in giving space to stuffed birds and animals even tho they enable us to a clearer understanding of the food habits of such animals? All such specimens have educational values, but they require space for proper display and may divert attention from the more desirable and essential features of dental instruction. There is ample justification for exhibits of the human skeleton or its various bones even to the bones of the hands and feet, altho they have no immediate relation to dental functions of any kind. There are also good reasons for including specimens of normal as well as some patho-

logic tissues of the head, thorax and abdomen, as these are closely related to dental functions, as their anatomic and physiologic form in health and disease is a matter of considerable importance to the dentist. Specimens or pictures of tumors, benign and malignant, especially about the head and face, may very properly have a place in a dental museum. The extent to which museum material of this sort may be desirable will of course depend on the size of the collection or the character of the instruction attempted in individual schools, and the opportunities for adequately displaying it or making it accessible to students. This kind of material deteriorates more rapidly than the hard tissues and it requires periodic attention or renewal and it may be questionable whether it should be attempted except in a small way.

TECHNICAL MATERIAL.

The great variety of available and useful technical material make this perhaps one of the most important classes of instructional exhibits. It may be divided into two sections for classification; the *Historic* and *Modern*.

Historic Technic. Owing to the fact that there has been preserved much technical material, it is not difficult to secure collections of this class of material that are not only attractive, but that have positive educational value. Such material has been used often to show priority of invention or use of technical procedures. While the temptation here is to display this material in excess of a proper classification, confusion and little advantage often results from such collections. It is possible by judicious selection, to make such a collection as shall give a chronological history of technical procedures from the earliest technical dentistry to the present time, the value of which is so obvious as to need no further comment. A miscellaneous collection of even very good specimens of technical art not properly displayed and labeled has

very small instructional value. There is no more reason for making a miscellaneous display of historic technics than for collecting our magazine literature in a miscellaneous form. A file of dental journals that is not complete and properly bound and indexed is not accessible or valuable. A collection of dental technical processes or facilities that is not orderly arranged is not as valuable or comprehensible as when it is properly and orderly arranged, labeled and adequately described. It may be true that a large number of old fashioned pearl handled instruments with gold and jeweled mountings displayed in a beautiful mahogany case will attract attention and have an educational value, but two or three cases of such materials serve no good purpose, no more than innumerable duplications of the same instrument, however interesting the instrument or the period and practice it represents.

It would be interesting and valuable to have a historic collection of gold foil pluggers, but a complete set of all the different sets of foil pluggers that have been used from the beginning to now would cost quite a sum and take lots of space, and after all be of no great value as a teaching factor. A much smaller display properly classified and described would be much more instructive. This statement may be applied to all other instruments and dental equipment. We have seen at least half a hundred differently made turn-keys, each one interesting in itself, but two or three would illustrate all the essentials necessary to a faithful representation of this class of instruments and their uses.

It would seem that a more orderly and adequate presentation of technical exhibits would be to make a chronologic exhibit of each class of instruments rather than to attempt to show all the instruments of the different periods of technical progress or activity. In harmony with this idea it would be consistent to

make an exhibit of the development of any process of a technical character showing the development of the instruments and technic. The development of the porcelain and gold inlay technic could be exhibited in its essential features, but it might be more difficult to present such subjects as oral prophylaxis, conductive anesthesia, or root canal treatment and filling. The aim should be always to present each article or subject in a comprehensive form but at the same time it should be as free as possible from confusion with other and related objects or subjects. In short, a museum, especially of technical objects, should be an exhibit of all that is known of any subject that may serve to picture our knowledge of the technical art of dentistry.

Most dental colleges have more or less of this material on display in the technical laboratories or class rooms, but it is usually not accessible to students for study and is not so arranged that it pictures the subjects in a scientific form. Most modern forms of technical procedure can be placed on exhibition where the student has free access to view and study at his leisure and to his entire satisfaction. By such exhibits attractively displayed, a much better conception of right methods can be given to some students than any word pictures by the average instructor, especially since few of us possess the rare qualification of eloquent and picturesque portrayal.

Our vision therefore of the useful dental museum is one that is not a mere junk shop, or a haphazard collection of every conceivable article of near or remote interest to dental science or art, but a scientifically classified exhibit of such articles as may be classified or grouped to more clearly show what we now know about the correct practice of the art of dentistry; and it may serve to enlarge our knowledge and intelligence of the subject, to exhibit the various steps

which have been taken to lead us up from the crudest beginnings to our present ideals and practices.

ACQUIRING MUSEUM MATERIAL.

The question which naturally arises in the mind of every one who contemplates the realization of such a vision is, how is it possible for all our colleges to accumulate so much material as would be required to make even a moderate accomplishment on such a basis. The expense of collecting and mounting for exhibition purposes and its housing and adequate care would seem impracticable even if the material were to be had, much of which would not be at all available for all our fifty or more dental colleges.

We should not expect that every school would have the means or inclination to make the investment required. Nevertheless, it can, and should, be demonstrated that this feature of instruction is of sufficient importance to justify its cost. Some colleges that are in sympathy with this idea should complete the ideal dental museums. However, we fully believe that it is practicable for every dental college to qualify along this line in a very much larger degree than at present prevails. And further, many colleges have at the present time enough material to make a fairly respectable beginning, which will grow sooner than they think into one of their most important factors. The one great advantage of this kind of instruction is that it makes its appeal to all kinds of students and by the most natural and effective pedagogic method. When once installed, it increases almost automatically and is not a great expense burden. It is never cranky or troublesome, and does not resign, or be continually demanding a salary or grade advance. It receives all proper advances graciously, does all the teaching it can with a consistency and persistence that no other member of the faculty attempts to imitate. It furnishes material for illustrating every subject in

the dental curriculum, if adequately equipped. It conserves the time needed for didactic instruction and is therefore economical in the highest sense. The time and expense therefore necessary for its procurement should not interfere with its realization in a larger degree than at present obtains in most dental colleges.

If this ideal should ever become popular in our dental colleges and the systematic collection of material were earnestly begun, we are confident the alumni of the various colleges would send in the needed material for this purpose as fast as it could be mounted and displayed. Besides this, the more colleges that take up with this idea, the more likely duplicates will accumulate that may be exchanged with other museums for specimens that may be needed to complete special collections, which may be difficult to obtain otherwise.

A museum cannot be bought—it must be created. It will take time, and perhaps it may never be entirely completed; but we have all the accumulations of the past and we shall have all the future in which to save and create. If there are not enough of the rare and needed specimens to supply all our museums, there need be no missing links in any displays, as we can use picture illustrations, or we can manufacture duplicates if necessary. There is nothing impossible except perhaps our lack of desire for a satisfactory realization of this vision.

HOUSING AND CARE OF THE LIBRARY AND MUSEUM.

If a room is set apart for a library, museum and reading room, it must be of ample proportions and properly fitted for this purpose. Of course all the fixtures for future needs may not be provided but enough to show that it is intended to be a permanent and important feature of instruction. If this is done, and someone who is interested to the extent of a good degree of enthusiasm is put in charge, it will be an agreeable surprise how rapidly material will begin

to come in. Often too, from unexpected and possibly disinterested persons contributions will come, all of which of course may not be useful, but enough additions will be made each year to soon make the library and museum a permanent fixture. Occasional opportunities for purchase and exchanges with other libraries and museums will soon add enough valuable material to make it possible to use the library and museum as a direct means of imparting instruction. If it is not practicable to purchase, create or secure contributions of the more rare specimens, it is possible many times to secure photographs, or lantern slides, models, or even descriptions of rare things that would help to make this feature a place where things may not only be seen and examined, but a place where information about rare articles in other museums and libraries may be found. Catalogs of all museums might to good advantage be made with full descriptions of unusually rare treasures. Such material would often be useful for instruction purposes and as a help in securing data for literary and scientific research. In connection with such a catalog, a most helpful plan of clipping and filing the important articles published in the current periodicals, with double card index reference cards of the titles and authors would classify and make easily available all magazine and casual publications. This of course would necessitate a library attendant who was capable of keeping such a system up to date and in proper order. But any library or museum which does not have such an officer cannot serve adequately, and to the extent it is lacking in this respect it is relatively inefficient.

A library and museum that is suitable for the needs of the dental college as it is organized today must be kept up to date in material and sources of information on every subject that is taught in the curriculum. It is asking more from teachers than they are ordinarily able to do, to expect them to provide material

for illustrating their lectures and class work; and because the courses in practical dentistry are so nearly related, it is impracticable for most teachers to provide such libraries as are required to keep up with the progress of their own subjects. The loss to the college in the quality of instruction by lack of proper illustrative material or inadequate preparation by its teachers would be immeasurably greater than the actual financial outlay needed to provide this helpful material and making it available to both teachers and students.

The finest collection of museum and library material in existence will be of comparatively small value, unless it is utilized to the best advantage. And of equal importance with the material possessions is the officer whose business it is to see to it that every teacher is kept posted as to new accessories that may be used advantageously in his courses of instruction. Of little value would be a hundred microscopes, or a thousand lantern slides if no teacher ever used them, and the students only knew from the college catalog that they were housed in the museum somewhere.

A library and a museum go out of style periodically, as well as fads in education; and unless some one intelligent enough to keep posted as to the latest things in literature and exhibits of technical art, is in charge of a museum and library, the dust and cobwebs will accumulate in the intellects of the instructors, and the enthusiasm in the class room dies down to an uninteresting performance, and education becomes forced and perfunctory, except in spots where there happens to be a live wire on the rostrum.

My plea is for as good a library and museum in every dental college as it is practicable to secure; and that it be kept as nearly as practicable up to date in every department; and that a capable custodian shall have charge of it; and also that every instructor shall have enough interest in his department of the

museum to keep it up to date; and finally, that every instructor shall make the most use of it that is possible for the benefit of his students and the generation of a universal attitude of inquiry and learning in the college.

DISCUSSION.

Arthur D. Black, Chicago.

Dr. Hoff has presented one of the most important papers that has come before this Institute in many years. We have reached the time when, with the introduction of the four-year course, we should pay more attention to things which are not only of great assistance in our routine instruction in the various departments, but also of tremendous cultural value. The library and museum of an institution should be the hub around which practically all the activities of that institution should revolve. There should be a teaching connection between the library and museum, and every department of the institution. The library should be the place where the student will be attracted when he has no other definite assignment. It should be made so attractive that he will naturally drift there when he has leisure time.

The better classification and more intensive use of our dental literature in the school should develop a closer relationship between the dental student and the practitioner. We have not as a rule brought the student up to as definite a realization as we should of what he is going to meet and be up against when he gets out in practice. We have generally taught him one thing along one line. We have not given him the broader view. Our curriculum should be so planned that our senior students should do much of the thesis work. At stated intervals each student should present a brief theme or thesis covering a certain number of articles assigned to him. This should be read before the class, or a section of it, and discussed by other students.

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The museum collection should not be in a room where we have to unlock the door when we take the student in to show it to him. It should be wide open and inviting. The collection should not be entirely confined to a stated room. In the operative technic room there should be an exhibit of the selected work of students for a number of years. In the prosthetic technic room, there should be a similar exhibit, many photomicrographs should be on exhibition in the histologic, pathologic and bacteriologic laboratories, etc. Every department should have exhibits which will create interest and help to instruct. We have a mouth hygiene exhibit showing the history and development of various forms of tooth-brushes, also the steps in their manufacture. Another exhibit is of scalers used for removing calculus, from the time when it required a large chisel and mallet down to the smaller and smaller scalers that have been employed thru the years. The gradual reduction in the sizes of scalers is an indication of the progress that has been made in teaching mouth hygiene. As people have taken better care of their teeth, the large scalers have fallen into disuse, because they were not needed.

Dr. Hoff referred to the value of keeping alive in our schools the memory of the work and of the men who have gone before us. I do not know whether they have it or not, but it would be fine if the Baltimore College of Dental Surgery had an exhibit commemorating the life and work of Harris and Hayden. Every school ought to have a collection representing the work of those men who were the pioneers in dentistry, and each individual school should have a collection for the men who helped to make for it a place in the sun. In our own institution, some time ago, one of the graduating classes presented the school with a bust of my father. The Alumni Association has decided to present, in June of this year, a bust of Dr. Koch.

Our students and alumni are glad to do these things.

H. E. Friesell, Pittsburgh.

I want to take this opportunity to compliment Dr. Hoff on his paper. It is certainly the best paper dealing with this subject that I have ever had the pleasure of reading or listening to. I also agree with Dr. Black that it is a very appropriate paper at this time. The library and museum have come to be recognized as one of the most important departments of a dental school. Certainly the essayist has given the matter exhaustive treatment and has presented many things in connection with a library and museum that the speaker in particular is glad to learn. At our school we have for twenty years past been attempting to build up a library and a museum, and we now have what might be called a potential one. Many of the suggestions that have been made by Dr. Hoff will certainly prove of value to us. We have had in view the ultimate value of this library and museum during all the years we have been attempting to collect material. However, when you visit our school tomorrow afternoon you will not see much of either library or museum. There is, in a small room available for the purpose, just a sample, but we have authorized the construction of a new building which will give us four times the floor space of the present one, and in that building we have provided space for a library and museum 40'x80'. This will indicate what we in Pittsburgh consider a library and museum worth in dental teaching.

We have had the good fortune to be assisted in this work by Dr. Wm. G. Holland, who is the Curator of the Carnegie Museum in this city. His interest in the work has been of much help to us in building up our library and museum. While you will see only a small portion of our collection, we have probably 300 dry goods boxes full of material and no place at present to put it.

We are praying and hoping that the war will soon end, and when we have our new building we shall be able to make some adequate use of the collection which we have been building up.

The essayist states that a museum cannot be bought. If he can show me where one exists that is for sale I will prove to him that it can be bought.

Dr. Hoff has presented a plan upon which to lay out both of these departments. I agree with him that it is essential to devise some means of training students how to use the library, and I think we will have an excellent opportunity to do this in our course of dental rhetoric or English or whatever the individual school prefers to call it, and also that we can make much use of the library and do much of this training in connection with the course in dental history. Every teacher should give with each lecture or class recitation an assignment of reading to be carried out by the students covering that particular subject, and this might include older work as well as current literature. In this respect, one activity that the Institute has for several years had under consideration will come in very handy in connection with the library and its proper utilization, and that is the Dental Index Bureau. We started on that work about ten years ago and it is getting in pretty good shape, and by the time we in Pittsburgh have our library installed I trust that we may have a Dental Index so that real live use can be made of the library.

I also wish to speak of the value of a collection of anatomical and pathological specimens. This can serve as a very important adjunct to teaching in these departments, and we have been trying to do something of that kind here in Pittsburgh. Proper classification and arrangement of the specimens in a museum is just as important as is possession of the specimens, and I hope that some of us will be able to get in touch with men in the dental profession who are as much

interested in this work and as capable of serving in the capacity of librarian and of custodian of a museum, as is Dr. William Bebb, of Northwestern University. Very shortly the modern dental school will be unable to get along without a good library and a good museum, and there will be a place on every dental faculty for a man whose entire time will be devoted to building up the library and museum, and devising means of making them useful to the students and to the teachers.

E. H. Mauk, San Francisco.

I was particularly interested in what Dr. Hoff had to say about getting the value out of a library, and also what Dr. Black had to say about the plan which we have already put into effect in the University of California Dental School to help bring this about. As a result, I can truly say that for the past two years at least, we have gotten a fuller value out of our library than we were ever able to do before, tho the plan I am about to mention has been applied to only one phase of teaching dentistry, the subject of prosthesis.

Recognizing the fact that thruout the course of dental teaching, students became possessed of bits of knowledge which were more or less promiscuous, and in many cases not related in the student's mind, we wanted to devise a means whereby the student might pick up these loose ends. As the University regulations permit of a thesis being accepted in lieu of a final examination, after considerable thought we found that this could be applied very appropriately to stimulating the students use of the library, and give him a broader grasp of the subject than could be obtained thru an examination.

I think we will all admit that the ordinary examination, whether it be a mid-year, an ordinary quiz, or even a final examination, is more or less perfunctory. A student "crams" for it and usually speedily forgets what he has

crammed. Therefore, I feel that the advantages of the plan I will outline here are obvious.

We divided the class into small groups, last year about five in a group, and assigned to each group a thesis topic on which each student must write. This list I will read.

It does not cover all aspects of dental teaching, but bear in mind that this is only one phase of dentistry, dental prosthesis, under which head we include both crown and bridge work and the so-called prosthetic dentistry, or plate denture making.

Subjects were assigned as follows:

Group No. 1. Clasps and special attachments having the function of clasps.

Group No. 2. Bar bridges.

Group No. 3. Inlay abutment bridges.

Group No. 4. Removable facings and teeth.

Group No. 5. Anatomical articulation.

Group No. 6. Compound vs. plaster impressions.

Group No. 7. Rubber and vulcanite, including obturators.

Group No. 8. Dowel crowns.

Group No. 9. Removable bridges.

Group No. 10. Casting, applied to dentistry.

In presenting these theses, the students are required to list all reading references and indicate them by numbers in the body of the text. Subjects were assigned for this year on Dec. 20th, 1917, and are to be presented on March 11th, 1918, the time available for preparation, therefore, being about ten weeks. There is considerable difference between that period of time and what is usually spent in preparation for the ordinary examination, for which one week or less is probably a big average.

The best thesis is selected out of each group, and the writer is required to read

it in class, at which time another group of students, previously assigned, discuss it, one at a time, in a formal discussion, criticising freely, or adding new points. Thus no student escapes without preparation on at least two subjects. He is marked not only on the general excellence of his own thesis, but also on his discussion of some other thesis to which he is assigned, and in addition, hears all the other theses read and discussed. From all this he is bound to absorb more than would be possible with a hurried examination and no opportunity for later inspection of the results or comment by others.

Further detail in regard to the manner of presenting the theses would probably not be of value here.

As an aid in their composition, the student is furnished with a list of sub-topics with each theme, so that he gets a somewhat defined idea of what he is to write upon. He can select his own material in general, but must at least touch upon these sub-topics.

The interest that has been aroused in Dental Prosthesis in our school since this plan was put into effect is most gratifying. The meetings at which the papers are read are similar to dental society meetings and many of the papers are certainly worthy of being read at any dental society meeting. If a student plagiarizes, this act is usually exposed and criticized by the others. I know of nothing in my sixteen years of teaching that has afforded so much satisfaction as the outcome of this method, and the resultant use of the library. The discussions afford great interest and often provoke great amusement. We also consider these theses a valuable addition to our library, keeping them on file for the guidance of future students.

Alfred Owre, Minneapolis.

Referring to Dr. Mauk's discussion, we in Minneapolis have used the system outlined for about as many years.

In regard to Dr. Hoff's historic course and the use of the library, I would like to say that there again we are in danger of narrowness unless we associate these special historic events with the general movements of mankind. I know that Dr. Hoff is very fond of giving a course in the history of our men. That is, of course, of great cultural value, but unless it is related to the great historic movements of the world it loses something. For instance, the idealistic value of it is enhanced greatly by references, for instance, to the platonic ideal. That point we should bear in mind. It can be made use of most widely to connect up with a variety of cultural subjects.

Every course in the university, and especially our dental course, should have its reading matter. And that should be assigned to the student as the teacher outlines his course. There should be no excuse for a student not having this material at hand; having been instructed in the use of the library he should have no trouble in finding his data.

We use the term "museum" somewhat in an ambiguous sense also. I think Dr. Hoff has included in the term a great deal of teaching material, technical exhibits, etc. The museum should have in it things of cultural value, the created possessions of the past and present age, things that are really created. To that institution we should relegate such things, and to the exhibit of technical procedure we should have teaching material relegated.

J. H. Kennerly, St. Louis.

I am always interested in anything that pertains to a dental library. Any library is interesting to me, but as I spend practically all of my leisure time in working in a dental library it becomes very fascinating work. The only trouble is that the hours one has are so limited. As Dr. Hoff said, it seems nearly impossible to show that you have accomplished anything. It is tedious in a way and

long drawn out. However, we can see from year to year that something has been accomplished. What its value is in a teaching way I think cannot be estimated.

What I wish particularly to say is that in the storeroom of the library at Washington University Dental School we have about 10,000 surplus journals, and they are at the disposal of this organization or of the dental profession where they are needed by your asking for them and paying the freight on them. So that, as far as those journals are available you are welcome to them. They come to me from all sections of the Mississippi Valley because I have offered to pay the freight from any destination in that locality to the school on any number of journals a person will send. I do it for this reason: I have practically all the journals of the country complete to date, and the journals of the last year are in the hands of the binder. Within a very short time the journals for 1917 will be in the library, as are all those preceding. The surplus I store away, and while it is a good deal of trouble to hunt them up, I am always glad to do it because I believe that I am thereby doing some good for my profession.

In passing I simply want to remark on Dr. Mauk's plan of thesis writing. A few years ago in the city of St. Louis there was great rivalry between certain medical schools as to which one could secure the most appointments in the City Hospital on competitive examination. Finally in one of the schools a change was made in the faculty by the introduction of a number of new teachers. They immediately decided that they would hold no examinations, that they would depend entirely upon written theses, and they would grade and graduate a man according to the work he did in his thesis. The result was that they did this for only one year. At the close of the first year, when the examinations for appointment of internes to the City

hospital were made, this school, which had formerly secured about 75-80 per cent of the appointments, did not get one. They claimed to have found the cause in the fact that no examinations had been held in the school and that consequently the student had not become accustomed to writing examination papers or answering questions. So they failed to get a single man into the City hospital. Since that time they hold more examinations than they ever did before.

Dr. Friesell: I ask one moment to add a little to my testimony. One reason why the University of Pittsburgh has placed the course in dental rhetoric in the third and fourth years is to enable us to make proper use of the dental library in the seminar system as explained by Dr. Mauk. The student does not have the preparation or time to do this earlier in the course, so we have passed it on to the third and fourth years.

Dr. Hoff: I am very sure from the comments that have been made by the gentlemen who have discussed this paper and cited instances wherein the use of the dental library and museum has proven of advantage in cultural as well as educative achievements, that if you had library facilities available such as I have tried to idealize in my paper you would find more illustrative material than you ever dreamed of and you would get a deeper interest in the work itself. In communicating your ideals to your students, you would find it easier and more delightful, and I am convinced your students would become more interested in the work.

The plan Dr. Mauk has outlined I have used in a little different way in my own work in attracting the interest of my students. My students during my absence are having a final examination along this line in which there has been assigned for each day a topic upon which they are to write an essay. And these topics will not allow them to utilize the

instructive forms in which my class work has been given; they will have to use their imaginations, their knowledge and skill in writing those topics. To those who are a little doubtful of your ability to accumulate library and museum material, I wish to say that if you will simply take this incident that Dr. Kennerly has given us wherein he has accumulated so much valuable material, and magnify the results of his efforts by those which have been accomplished by a dozen other schools in the country similarly situated, you will find that every college has more or less material it is not using and which will be very helpful and valuable in creating a library and museum collection. I am sure that when you once begin this work you will receive more help and encouragement than you anticipate, and that you will find the task less difficult and burdensome than you imagine.

I wish to take this occasion to recommend to you that you visit the Northwestern Dental School in Chicago for inspection of their museum and library, and you should go when Dr. Bebb is there. He has put a lot of work and time in the classification of the collection which comprises this museum, and in organizing it into a form which gives it an instructional value. In fact, he has crystallized the subject in a way there that I never have seen attempted any-

where else. I hope the Institute will meet in Chicago next year and that you all may have an opportunity to see that museum and meet Dr. Bebb. And incidentally, while writing this paper I have had this thought running in my mind: Why not have a man like Dr. Bebb visit all the schools in the country and help to institute libraries and museums in the proper way? There is nothing which the dental colleges of this country could do to better advantage than to secure the services of Dr. Bebb for the purpose of going to the different schools and organizing this department of our work. He would certainly do it better than any one I know, for he has the proper conception of what is needed and the experience to carry it thru, and he would do it profitably to every one. He could institute and organize this most important department so that it would become, if properly developed, a popular means of instruction. I have understood from Dr. Bebb that he possibly would retire from the profession before a great while and go to farming. It would be a great loss to dentistry to let him drop out of this important work. I do not know of any teacher in the country that we could spare with greater loss than that very man. If he could spend some time visiting and advising our college faculties, he would do invaluable work for us, and I trust that his talent may be sometime utilized in some such way.