

DR. J. M. SPELMAN, of Anaconda, Montana—I desire to say a few words because I find that the gentlemen who live in the Ohio and Mississippi valleys find it difficult to secure a skilful surgeon. In Montana it is impossible to get Dr. Deaver, or any other noted surgeon out there; it is impossible to do anything but take right hold of these cases yourself and, I promise you, we do it. We find no difficulty in performing operations for appendicitis, but we do find difficulty in treating them on medical lines. It seems to me that the discussion that arises year after year in the American Medical Association does us more harm than good, because it often has been the cause of delay in cases that required immediate operation; the idea has become prevalent among the people that operation should not be performed at once and so they will not allow it sufficiently early. I feel that this operation is as much an emergency operation as tracheotomy or herniotomy as we were formerly impressed and that every good practitioner should know its technique.

DR. W. H. CHRISTIE, of Omaha, Neb.—As a general practitioner, I wish to speak briefly. Gambling, whether done as a private individual or as a professional man, is a bad business so far as the pocket-book is concerned in the former and one's standing in the community in the latter. These patients that died from the operation when it was performed in the latter stages might have lived if they had been operated upon at an opportune moment. Waiting before operating is gambling with human life. We can not tell, nobody can tell, what is going to happen when the appendix becomes diseased. Therefore, I do not believe in gambling with human life; we should urge operation immediately, as soon as the diagnosis has been made.

DR. JOHN B. DEEVER, of Philadelphia (closing the discussion)—So far as the value of the blood count is concerned I do not question it, not for one moment; but, where there are no facilities for such work, and where time is necessary in order to profit by such an examination, causing delay, then I am opposed to it; the patient's welfare will not admit such a delay.

I can not agree with all that has been said relative to the medical treatment of appendicitis. In cases that have recovered from an attack I believe that it is wiser to operate between attacks than to wait till another attack is ushered in; operate in the interval. I do not believe that there is a man living who can tell whether A., B. or C. can recover.

I maintain that it is all right for a surgeon, if properly trained and an anatomist, with experience and common sense, and with the facilities for operating, to operate so soon as the diagnosis of appendicitis has been made. I also maintain that the surgeon is better able to read the conditions inside the belly than a medical man.

I wish to congratulate Dr. Bailey; with his silver locks, he can teach all of you; I admire a man at his time of life who is abreast of the times, and I pray that we may have him with us for many years to promulgate views such as he has to-day, which must accomplish much good.

PRELIMINARY WORK.*

EUGENE S. TALBOT, M.D., D.D.S.

CHICAGO.

Many years ago it occurred to me that physicians could follow generally with advantage both in pathology and physiology the example of neurology and study the human body from the standpoint of both its embryonic and post-uterine evolution and from the standpoint of its degeneracy as well. It was long recognized that health simply constituted a balance and that disease meant the destruction of this balance with resulting undue predominance of some healthy function and the undue depression of others. Practically the same rule is followed by the chemist who controls his analytic

experiments by his synthetic, and vice versa. Physicians and dentists generally in studying man as an entity, view the differences between the normal and the abnormal as of kind and not of degree. To avoid this error, I have studied the degenerate phases of man from the standpoints of etiology, physiology, and lastly and most important from the standpoint of embryology and post-uterine development periods. The result of these studies has been the general discussion of degeneracy as a phase of evolution, in "Degeneracy: Its Signs, Causes and Results," published in London in 1898. The local degeneracies either as an expression of general advance or its reverse have been outlined in my works upon "The Etiology of Osseous Deformities of the Head, Face, Jaws and Teeth;" "Irregularities of the Teeth and Interstitial Gingivitis or so-called Pyorrhea Alveolaris;" "Degeneracy of the Alveolar Process." It is now my intention to discuss one of the most important of local degeneracies so far as dentistry is concerned: Degeneracy of the Pulp. Last winter I arranged with Chicago dental surgeons that extracted teeth should be saved for me. My assistant collected from their offices every afternoon at 4 p.m. The teeth were then cracked open at my office, the pulps removed and placed in Müller's fluid and 1 per cent. formalin before 6 p.m. From 1958 teeth obtained, 1017 pulps were removed. Macroscopically the pulps were thus divisible: Normal, exposed, inflamed and suppurating, mummified, calcified and calculous; fungoid, with exostosed roots; loose teeth abrasion; pulps destroyed with arsenic and deciduous teeth pulps. Sound erupting third molars and bicuspid extracted in regulation had been placed in Müller's fluid ere they came under my observation.

In nearly every case the pulp could be lifted out of its chamber so far as the apex of the root. In every case, the root had to be crushed before the pulp could be detached. Pieces of the cementum almost invariably adhered to the pulp, which required considerable force to detach. The slight adherence of pulps to the chamber was due to anatomic construction. This peculiar relation of the pulp to the walls of the canal becomes obvious when attempts are made to remove it in single-rooted teeth, after application of arsenic. The nerve broach not infrequently carries the pulp with it in passage toward the apex. The pulp often comes out in doubled-up contracted mass. Sometimes it comes away in pieces, and sometimes the pulp is not entirely detachable from the end of the root. The claim that pulps immediately removed from the teeth after extraction adhere to the wall of the canal is not borne out by experience. If nerve fibers radiated from the pulp and extended into the dentine it would be impossible to remove the pulp from its chamber. The pulp, however, can not be removed from the end of the root without breaking; it therefore seems evident from a macroscopic standpoint that nerve fibers as such do not enter the dentine. In removing the pulp it always remained *in toto* on account of the strong connective tissue.

A point of great interest in connection with pulp adhesion to the root is that not only the degeneracy of the pulp, but also of the tooth likewise. In development of the tooth, calcification begins at the crown and extends toward the apex. Calcification takes place at the periphery of the root and extends toward the center. A marked opening results with a large primitive organ (the pulp) until the apex is reached, when it closes. This closing often continues after the crown has erupted. The foramen is almost completely closed. What was

* Read in the Section on Stomatology, at the Fifty-second Annual Meeting of the American Medical Association, held at St. Paul, Minn., June 4-7, 1901.

once a large pulp containing nerves and blood vessels tapers down to the minutest size with but only one or two blood vessels and nerves remaining. In the lower mammals teeth have open ends with large pulps. These furnish sufficient nourishment to the teeth and resistance to decay. Of the 1017 pulps collected 131, or 11.9 per cent., were more or less mummified. While no special attempt was made to determine the extent of mummification, 75 per cent. of the 131 seemed mummified. The remainder had varying degrees of mummification beginning at the apical end. The extent of blood-letting at the time of extraction governed the degree of mummification. The question further arises, What amount of blood did the pulp contain at the time of extraction? Did the closure of the apical end of the root cut off the blood supply? It is certain that teeth with mummified pulps were hard, dense and comparatively difficult to crack. In pulps partially mummified there was a demarcation between the part filled with blood and the dried end. In the dried end, mummification was complete. The dried specimen was removed from the end of the root with as much difficulty as the normal pulp, while the main part could be readily lifted out of the chamber as there was no adhesion. The pulp can become completely mummified in six to twelve hours. All the teeth from the same mouth were sometimes mummified. The pulps in abraded teeth had receded and been almost obliterated. Recession is sometimes followed by obliteration of the pulp chamber. In most cases, the filling of the pulp chamber does not follow. Blood supply is almost if not quite exhausted. In cases where the roots were exostosed the pulps were often almost obliterated with corresponding filling in of the pulp chamber. In other cases mummification of the pulp occurred. There were seventeen (1.5 per cent.) calcified and calcaeous pulps. In some the tooth had to be completely crushed to remove the calcified mass which had adapted itself to the walls of the cavity. In others the pulp could be removed in its entirety, so complete was the calcification inside the pulp itself. There were four fungoid pulps of 1017 pulps. In all four, pulp stones could be felt. The percentage of minute pulp stones can be determined by the microscope alone.

In interstitial gingivitis, where the alveolar process has receded and the roots of the teeth have been exposed for some time, the pulp recedes and the canals become filled with dentine. Although the pulps are alive, the substance in the tubuli decomposes and the odor is more penetrating than that from dead pulps. The dentine becomes dark and twice as much force is required to break open the tooth than in the normal variety. These teeth are brittle and fly to pieces, while the normal tooth splits lengthwise.

The tooth is the lowest structure in the body since it is formed of material which can be destroyed by disintegration only. The pulp is a temporary organ, having attained its normal size and hence been at its best when it commences to form the dentine. The apical foramen is largest in the lower vertebrates. Pulp stones or secondary dentine are the commencement of degeneracy. No lymphatics (Sudduth) exist in the pulp, since it is a formative as well as a degenerative organ. One hundred and thirteen, or 11.1 per cent. of the pulps examined, were exposed, infected with pus infection and sloughing. The inflammation sometimes extends throughout the entire pulp. Sometimes one part or side only is affected. In the case of a molar, inflammation often extends upon the side of the pulp and into one root. The other side

of the pulp root or roots remains normal or is but slightly affected.

These teeth and pulps were turned over to Drs. Latham and Anderson for cutting, staining and mounting for the microscope.

THE LITERATURE OF THE PULP.*

VIDA A. LATHAM, M.D., D.D.S., F.R.M.S.

CHICAGO.

In reviewing the work done on the dental pulp, it appeals very strongly to the operative side. In other words, the majority of the papers concern themselves with the pathologic conditions, which include special and general pathologic states from inflammatory to degenerative, and bacteriologic gangrene to formation of pulp-stones and the treatment of the same. One noteworthy point is the constant effort directed to the "killing of the pulp" by every known means and the very little encouragement to try to save the "formative organ." In these days of advancement of the histophysiologic research and the introduction of new methods and chemicals, it seems strange the dental pulp appears to have been considered as either completely worked out or not so important an organ as enamel or dentine or even the peridental membrane. Yet its development, structure, functions and variations are hardly understood—and we expect to cure its ailments. It is true a great deal has been investigated and many essays and papers presented from all parts of the world, but very little truly scientific work has been completed. Take the latest works on dentistry and see in what small space the dental pulp is mentioned and the debatable points occurring in almost every line. Even the dentine seems to be of greater importance, and yet the question may be asked: "Should we have a dentinal layer if the pulp were not formed early and were not of primary importance as a formative papilla for its development?"

In this paper, so far as possible, references to the operative treatment of the pulp have been excluded, and in considering the anatomy, histology and especially the development of the pulp, many authors have described the neighboring structures of odontoblasts, dentine and enamel, it being impossible to separate them wholly from the pulp. Anyone wishing to study the latter must be willing to examine also the former.

Dentists are now waking up to the fact that we must have more preliminary training in the elementary branches, and schools of dentistry are constantly improving. It would be a worthy object to found grants, scholarships and opportunities for original research work to post-graduates or advanced workers, instead of such memorials as oil-paintings, busts, etc. The former would carry far more weight, would perpetuate memory in a nobler way, and reach to almost every clime and class by constant quotation, thus enriching science and benefiting thousands of suffering humanity. How many libraries contain works on dentistry accessible to the student that are of recent date or valuable in looking up the subject? It has been said that publishers object to giving the large medical and scientific libraries a copy of a book for fear of lessening its sale. Personally, I think this objection should not be sustained, as many people who note a new book in a library or store, finding it suited to their needs will buy a copy to have at hand. Hardly any one man (even if he could afford it) cares

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