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Practical Progress

in .....

Dental Skiagraphy

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Reprinted from "Items of Interest"

Practical Progress in Dental Skiagraphy.

By Weston A Price, D.D.S., M.D., Cleveland, O.

Illustrated lecture before the Cleveland Dental Society with members of the Northern Ohio Dental Association as guests. April 1, 1901.

It is very difficult to understand why the dental profession, which is usually quite progressive, has been so slow to appreciate the great practical service which the Roentgen rays can render. This is certainly due chiefly to a lack of information and doubtless in part to a lack of a spirit of research. I am fully convinced that the general practitioner in dentistry has relatively much more use for the Roentgen rays than the general practitioner in medicine. The facts are that a very large number of the latter are using them regularly, and finding their services indispensable, while probably not a dozen of the dental profession of the world are using it themselves extensively. A very few are availing themselves of their service by sending their patients to some one else to have the skiagraphing done, but I think there are not yet a dozen expert specialists in the world, and consequently but a very few dentists can send this work elsewhere. Every city or town should have one or several experts, who, by the way, must be dentists. General electricians or practitioners of medicine cannot, for example, be expected to know anything about pulp nodules or excementosis, nor would they recognize them if they were present, and from the very nature of this new means of diagnosis the skiagrapher will be largely relied upon for the interpretation.

There is abundant reason why the dentist should do this work, and there is no good reason for his not qualifying. The public have a right to demand of him that he do so, and thereby save for them probably 75 per cent. of the teeth which he now diagnoses as incurable; besides preventing many a deformity by anticipating it, and correcting it with a minimum of effort and a maximum of success. The dentist who can do this work for himself will certainly avail himself of the information it will render much more frequently than if he has to send his patients elsewhere. He will gain a fund of knowledge of pathological conditions and the relative merits of different working methods that he cannot get in any other way. I feel so strongly that the dental profession owe it to themselves and to the public to take up this work that I can scarcely

refrain from entreating every dentist I meet to do so. No dentist with a fair practice can afford not to do so, for the patients will gladly pay for the outfit for him. Two qualities in the man are prime requisites, however, viz., that he have lots of good sound judgment, and that he be not afraid of a lot of study. Others should leave this work strictly alone, for they will certainly fail, and, worse still, will bring a sad disrepute to a good cause.

I think I am well posted as to the status of this work all over the world, for I have investigated it very thoroughly, and I find that more dentists of this city are availing themselves of the services of the Roentgen rays than in all the rest of the world together, and while I am glad to serve you, as I do so many of you, yet I urge you to put in outfits and do this work for yourselves, those of you who can, for you would use it to your great profit in very many cases where you do not now feel that you can send the patients to me for it. The range of application is nearly as wide as the variety of conditions in which we can be concerned. I shall show you only one or two practical examples of each of about a dozen branches, all from practice

Unerupted Teeth.

Let us first consider unerupted teeth. This slide (Fig. 1) shows the condition of a girl at fourteen who has retained all the second deciduous molars. Why have the second bicuspids not erupted? And will they ever? are questions requiring to be answered, and could only be answered heretofore by a destructive operation. The skiagraphs reveal a strange condition. The second bicuspids are forming in the superior arch but not in the inferior. Of those above the roots are just beginning to form though these teeth have already caused the absorption of the roots of the deciduous molars. While in the inferior arch no biscupids have formed, there is present on the left side the formative organ, and in position, and it may yet perform its function.

In the next slide (Fig. 2) we have studies in the early developing process of the teeth of both the deciduous and the permanent sets. Fig. 2 a, shows the condition of the sup[illegible]or arch of a baby boy at fourteen months of age, when none of the deciduous teeth have yet erupted. They are seen in the process of development, and just inside them you see the formed incisive edges of the permanent centrals. In Fig. 2 b, you see the same case at twenty-eight months of age. The deciduous incisors have erupted in the meantime and now their roots are formed. You also see clearly the extent of the progress of the development of the permanent centrals in fourteen months.

In Fig. 3 you see the location of a missing bicuspid. Remember the soft tissues are not shown in the picture, but only the teeth and

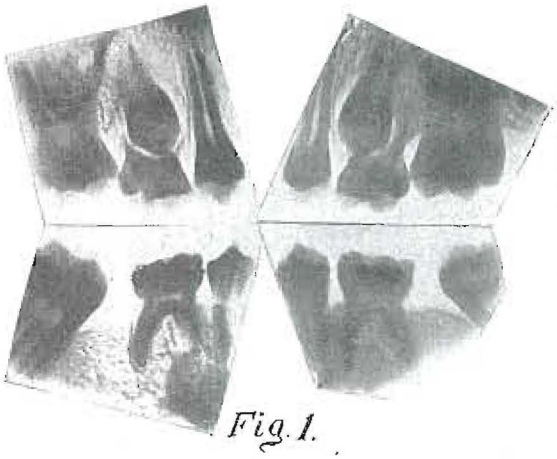


Fig. 1.

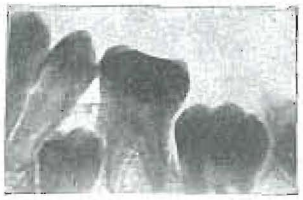
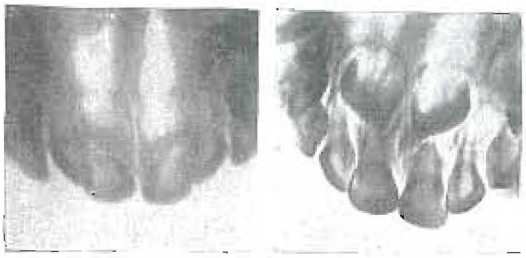


Fig. 3.

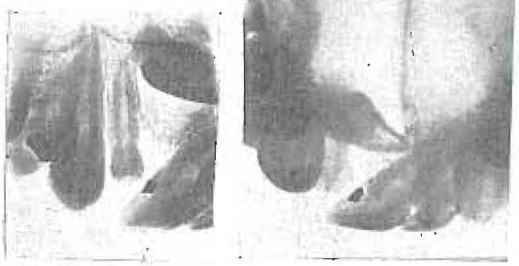


Fig. 4.



2.a. 2.b.

Fig. 2.



5.a 5.b.

Fig. 5.

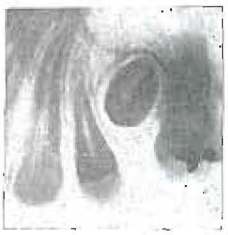


Fig. 6.

bone. Clinically the condition suggested that the missing bicuspid had not formed. You see it clearly inlocked between the first molar and the first bicuspid. You see also the developed crown of the second molar still without roots, and the developing crown of the third molar.

Sometimes teeth wander far out of their proper position. Fig. 4 shows a permanent cuspid in the floor of the nares and in the posterior part of the hard palate, with its cusp just in the median line. The patient is about twenty years of age. It also shows a small supernumerary just inside and between the central incisors.

Fig. 5 is even more remarkable, for it shows a fully developed permanent lateral root on which no crown has formed (a) and a fully developed central crown on which no root has developed (b). In this case the right permanent central and the left cuspid are nearly touching. The patient is a girl of fourteen years. The left central and lateral are missing, and there is to be seen between the right central and left cuspid what the mother remembers to be a temporary tooth. The skiagraph shows this supposed temporary tooth to be a crownless lateral with root perfectly formed, and also shows the rootless crown of the missing central with its incisive edge engaged against the root of the right central. This patient is of necessity quite disfigured, but the information suggests the proper course for the best correction of the error. This condition is the result of a bad fall when a baby.

Fig. 6 shows a second bicuspid erupting toward the hard palate.

Fig. 7 shows an impacted third molar. It is almost entirely covered with bone.

Fig. 8 shows a remarkable condition. The patient had suffered from a dead pulp in the left central presumably caused by percussion in an argument about a year previous. After treatment the canal could not be closed without extreme discomfort and the tissue at the apex of the root seemed to be abnormally sensitive. The dentist in charge brought the patient for a skiagraph, which shows a fully developed cuspid tooth lying against the root of the central. It has caused a complete absorption of the upper third of the root of the lateral. The patient had a gold crown on the left cuspid, and he said he was sure it was on the permanent cuspid. The root of the deciduous cuspid, which proves to be the tooth crowned, is extensively absorbed on its mesial side. A piece of broach was placed in the canal of the central for skiagraphing.

Oases in Orthodontia.

Fig. 9 shows the cast (2) of a girl's inferior jaw at fourteen in which no teeth have erupted back of the first bicuspid since the extraction of the first permanent molar, which was done by force when the patient was only six years of age, and was attended with great strug-

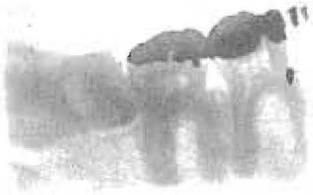


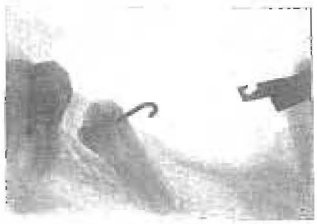
Fig. 7.



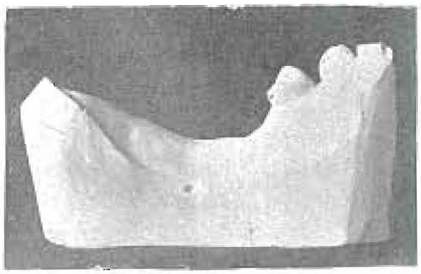
Fig. 8.



9. a.

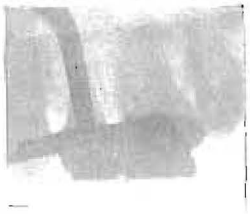


9. b.



9. c.

Fig. 9.



10 a



10. b.

Fig 10.

gling, so I am told. The next view (a) is a skiagraph of the condition, and shows the position of the second bicuspid and second molar. The second bicuspid is lying on its side in the bone, about one inch back of its proper position, and the second molar is in proper position back of it. The treatment for correction is quickly suggested, and accordingly I have placed a rigid anchorage appliance on the anterior teeth, and have, after anestheizing and incising the gum tissue, inserted a tapped screw-post into the displaced second bicuspid. The third view (b) shows these appliances in position.

Fig. 10 shows good work (a) in moving teeth bodily where the anterior teeth had to be extruded to correct an intruded bite. It also shows (b) that the structure of the new bone is identical with that elsewhere. This case also demonstrates beautifully by comparison the improvement in skiagraphing when the penetration of the rays is properly adapted to the condition.

Fig. 11 demonstrates the value of the rays for locating teeth that are supposed not to have formed. The missing permanent cuspid is clearly seen (a) inlocked in the process. The next view (b) shows this same permanent cuspid regulated to its proper position and retained with platinum wire. The bone has filled in perfectly about its root, and its pericemental membrane appears to be of perfectly normal thickness except at the apex. This patient is a young lady about eighteen, and on account of the permanent laterals never having formed, this correction is of very great value to her, for her features have been very greatly improved by her dentist since he secured this information.

Fig. 12 (a and b) shows how much nature had corrected the position of a locked bicuspid in sixty days after it had been released by separating the teeth that are locking it. Test skiagraphs had first been made three months apart to ascertain whether Nature would make any progress in correcing it unaided, and it was found that she would not. This case is of special value because the patient suffered from a badly intruded upper bite partly caused by this condition, only one bicuspid having formed.

A very large variety of cases from orthodontia could be shown if we had time, but we must be content with but one or two examples from each branch.

Diagnosis of Abscesses.

We will now study a few abscesses and their causes. Fig. 13 shows a typical appearance of one. Wherever there is a dead pulp in a tooth there is a break in the continuity of the pericemental membrane at the apex of the root, and more or less absorption of the bone at this point, and sometimes of the root also in cases of long standing



11.a.

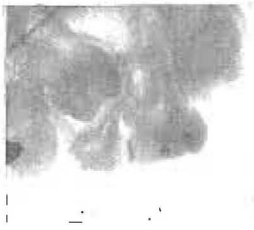


11.b

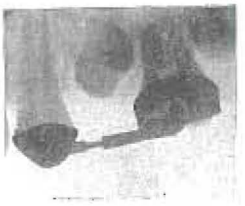
Fig. 11.



Fig. 13



12.a.



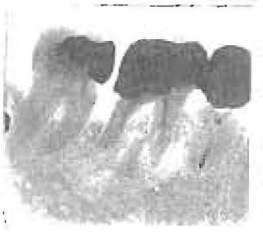
12.b.

Fig. 12.



Fig. 15.





14.a.

14.b.

Fig. 14

When a case presents with symptoms of a pericemental inflammation and the history is uncertain, as it usually is, the ideal procedure for both the patient and dentist is to first skiagraph the condition and find out the location and extent of the lesion and its cause. Then he can go directly to the trouble with a minimum of time and effort and treat the condition consistently and intelligently. He can take the skiagraph and develop the piece of bromide paper put in with the film all within one or two minutes. Fig. 14 shows two such cases. The first (a) shows the location of the lesion which is causing the neuralgia to be about the apex of the second bicuspid, and its cause is clearly evident, viz., that the root has only been filled about half way to the apex. This tooth did not respond abnormally to percussion. The second picture (b) shows a similar case, and the trouble is about the apex of the mesial root of the first molars which root is not properly filled to the apex, and the root is a little absorbed.

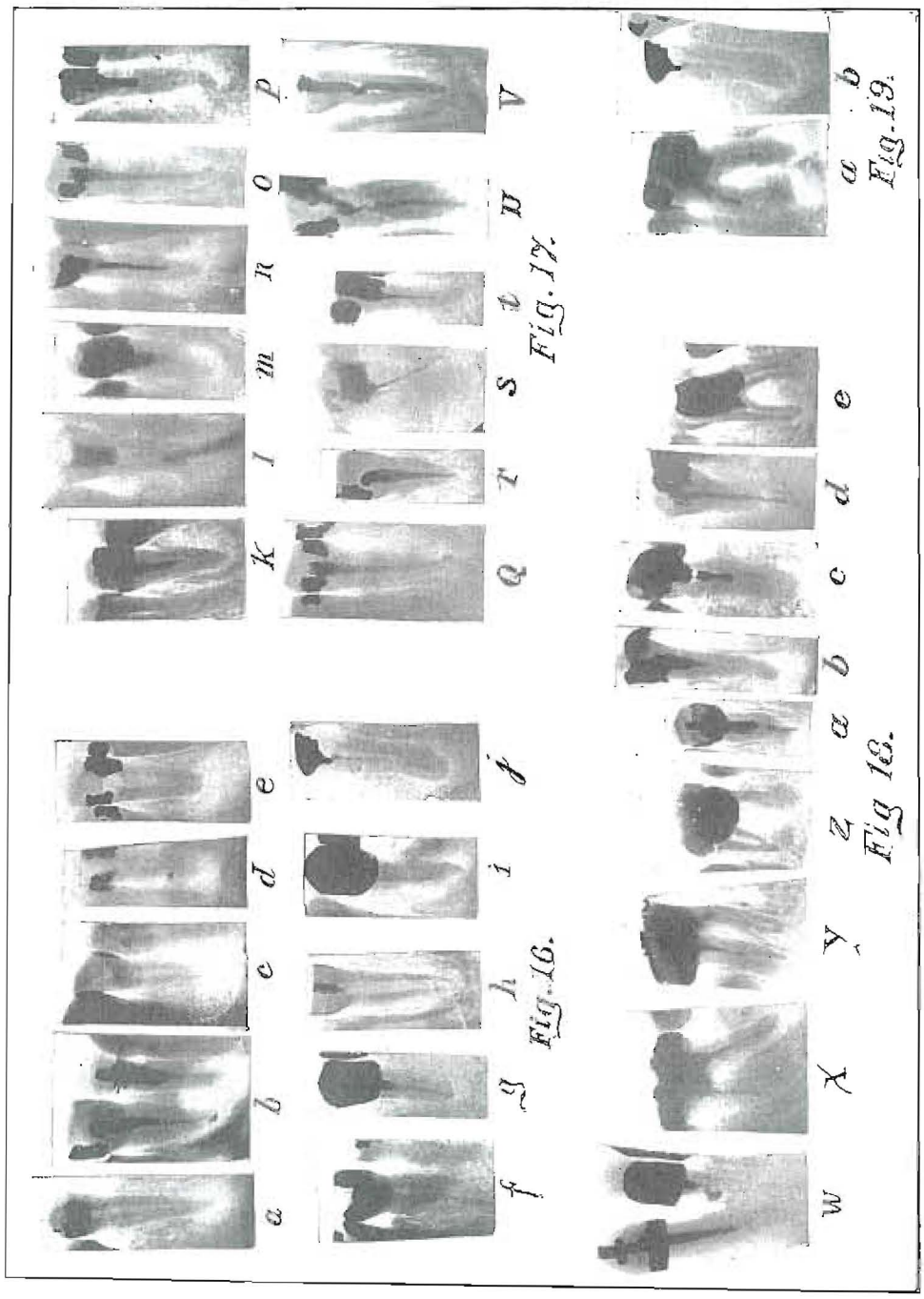
This condition of absorption of the apex obtains in almost all chronic abscesses whether blind or not, and, in my judgment, can usually be best treated by root amputation without extraction.

Fig. 15 shows a typical case indicating this treatment.

Fig. 16 shows a collection of abscesses demonstrating a variety of conditions. The first, marked a, is a typical blind abscess; b is a chronic abscess involving two teeth with some absorption of the roots; c shows much absorption of the apex, and the canal is very large, indicating that the tooth died before the apex was completely formed; d is an abscess just commencing; e shows a great deal of absorption of the apex, as does also f, in which the absorption is mostly on one side; g shows the break in the continuity of the pericementum over the apex where the root is even well filled, h shows the undeveloped or rather incompleted condition of the apex of a central in which the pulp is dead caused by fracture of the crown, i shows an abscess about a bicuspid root on which there is a gold crown. The root is seen not to be filled. j shows the extended thickening of the pericemental membrane.

Root Canal Fillings.

We will now turn our attention to the dentists' graveyard, root canal fillings, where so many cover up defective, careless work, trusting it will never come to light, and often reminding the patient that when this tooth gives trouble again it will have to be extracted. Humanity should thank God for a new light that will go into these dark places and show up what is often criminally careless or wilfully bad work in filling roots. True, it is often impossible to properly fill roots, but if all were as well filled as possible, those imperfectly filled would be only those with so small a canal or so little of it unfilled that


a b c d e
f g h i j
Fig. 16.
K I m n o
Q T S t V
Fig. 17.
W X Y Z a b c d e
Fig 18.
a b
Fig. 19.

the woes of humanity from this source would be infinitely less than they are.

Figs. 17 and 18 show collections of good and bad, mostly the latter, however. In Fig. 17, k, m, n, p and t are filled only part way to the end of the canal, and all except t are abscessed. In t the canal is probably too small. l shows the root filling pushed through into the tissue. s shows a root filling through the side of a root, and u and v show changes in the shape of the root filling from the evaporation of chlorapercha. I know what these two are filled with, for I did them myself. r is as nearly perfectly filled as we can hope to accomplish. In Fig. 18, w shows the metal of a porcelain crown, and in the next tooth the wall of the root has been perforated and cement is forced through into the tissue, and has apparently caused absorption of the bone around it. In x we see another case of root filling through the side of a mesial root of an inferior molar. y shows another mesial root in which the filling only goes to the bend in the root, and the canal is open beyond that point. The root is abscessed. z shows open root canals and the floor of the pulp chamber decayed through and filled through to the bification and the septem of bone between the roots is entirely absorbed. Probably the abscess at the end of each root has its drainage through this space. a shows a crooked root, which is well crowned, but the root filling goes straight through the apex, not following the curve. b is only filled part way, and, as usual, is abscessed. c is only filled part way and abscessed, but you will see it contains a broken twist drill, which has been there thirteen years, and the tooth giving trouble. d has a broken broach perforating its apex, which has caused the root to be absorbed. e shows unfilled root canals under amalgam.

When skiagraphing comes to be used generally even a little in dentistry there will be a great improvement in the work of filling root-canals.

Two cases of excementosis are shown in Fig. 19, a and b.

Antrum Cases.

The range of usefulness in antrum examinations is very extensive. Foreign bodies as roots are clearly shown and the relations of the teeth to the antrum or abscess about them. The shape and position of the floor of the antrum is also clearly shown.

Fig. 20 is a case of chronic empyema of the antrum of an old lady. The case baffled skilful treatment, and finally the dentist in charge brought the case for skiagraphing. A root was found perforating the antrum, and was deeply buried in the tissue. It was evidently the cause of the trouble, for after its removal and securing drainage from the lowest point, the condition healed very promptly.

Fig. 21 is a case requiring drainage for empyema. The first picture (a) shows the most dependent point to be between the second bicuspid and the first molar. The second view (b) shows a platinum drainage tube in place properly. It enters from the buccal side of the alveolar ridge, and is attached to the second bicuspid. Fig. 22 shows another case where the most dependent point is between the first and second molars. This antrum is unusually level, and would drain freely at almost any point in the floor by tipping the head. It is very rare that the floor is level as in this case.

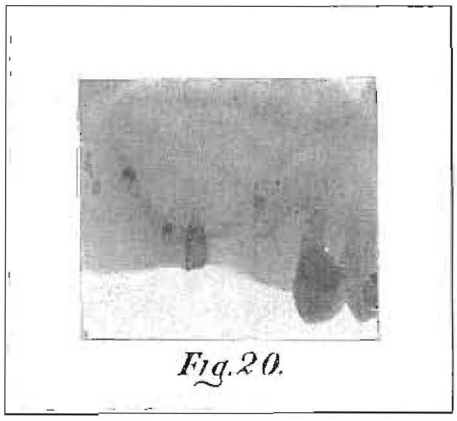


Fig. 20.

Other Uses of Skiagraphy.

Fig. 23 (a and b) shows two cases of pulp nodules. There are two large ones in the pulp of the molar. This lateral is perfectly sound, and it is very probable that it was extracted on account of this condition, which of course, was not recognized.

Fig. 24 shows a couple of cases of pyorrhoea so called. In the first (a) the entire mesial root is denuded except at its apex. This was treated by root amputation and with good success. The next (b) shows a pocket between the roots involving the septum of process. It was treated by thoroughly cleaning and scraping the bone with a hur and filling with gutta percha, as seen in the next (c). This treatment gives excellent results in this particular condition.

Fig. 25 gives an example of the use of the rays in opening through a filling or root-filling to an unfilled or partially filled root canal. The first view (a) shows this case as presented with a blind abcess at the apex and a gold filling. The root filling was done twenty years ago.



21a

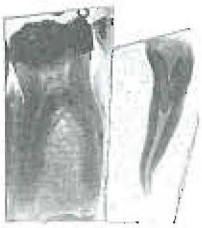


21.b

Fig.21.

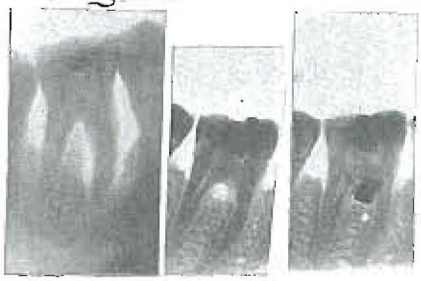


Fig 22.



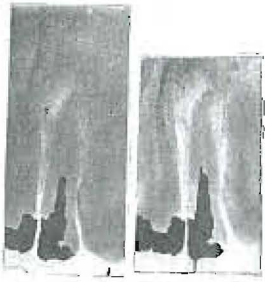
23a 23b

Fig.23.



24.a. 24.b. 24.c

Fig 24.



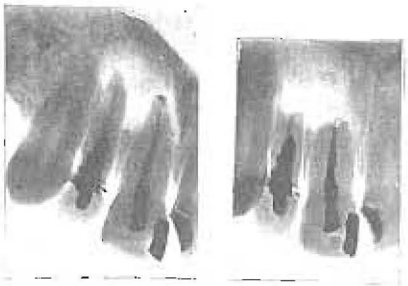
25a. 25.b

Fig.25.



25,c,

Fig.25.



26a. 26.b



26.c.

Fig. 26.



27.a



27.b.



27.c

Fig. 27.



Fig. 28.



29.a.



29.b.



29.c.



29.d.



29.e.



29.f.



29.g.

Fig. 29.

You all know it is like trying to thread a needle at arm's length in the dark to drill straight through a hard substance to an open canal in the root.

Having the skiagraph before me I could tell by measurement when I had gone far enough, but could not tell the exact direction. To ascertain the relation of my drill to the canal two skiagraphs were taken at different angles with the drill in place, and were developed at once. As you see (b and c) my drill was only out of line about the width of the drill mesially, as seen by the center view, but twice that distance lingually. It only took a few moments to get this information, and, after getting it, I was able to go as directly and quickly to the unfilled pulp canal as if I could see it.

Fig. 26 shows the use of the rays in a branch of dental surgery, viz., root amputation. The first view (a) shows the condition before operating. There was a large abscess involving both roots. This had been skilfully treated, but could not be cured by ordinary means, because of the diseased condition of the roots of both teeth, which were accordingly amputated without extraction.

The second view (b) shows them after amputation, and the third view (c) shows the extent to which Nature has filled in this abscess cavity with new bone in thirty days.

Fig. 27 (a, b and c) shows the use of the rays in reaching an abcess through the root where the canal is too small to find. I drilled in the right direction as far as I knew I was safe, and put in a piece of broach and skiagraphed in two directions, as in Fig. 25. In this way I was able to drill the whole length of the tooth in safety, and, as you see by the final test, went straight through the apex and not through the side, as I would have been most certain to do without the help of the rays.

Fig. 28 shows a case of root implantation less than three years after the operation. The root had been crowned with a logan. By comparing the density of this root with the others you will observe that the lime salts have been almost entirely absorbed from it, which accounts for its lack of rigidity. Nature evidently considers it as an irritant and is trying to absorb it.

Fig. 29 (a, b, d, e, f and g) shows the results of bad or careless finishings of fillings under the gingivae at the cervical margins. In every case you see there is decay and absorption of the alveolar process between the teeth.

I must speak, though briefly, of a new method of localizing and of seeing in correct relation in skiagraphs, first suggested by Dr. Mackenzie Davidson, of London. It consists in taking two skiagraphs, just

as two are taken by a sterescopic camera for viewing with the stereoscope. After the first exposure is made a second plate is used, and all conditions kept the same except that the tube is moved a distance of two and a half inches, or the distance between the eyes, and kept the same distance from the plate. When these pictures are mounted in this relation, and viewed in a stereoscope, we see the objects in their true perspective. For example, two views of Fig. 6 taken in this way show this condition in true perspective instead of flat, as you see it in this single picture.

This large subject of practical progress implies a discussion of many phases of this work of which we have not time to speak. The time of exposure has been reduced so that all conditions about the teeth can be skiagraphed in from one to six seconds. The registration on the film of the angles of incidence is a great advance. The classification of all conditions in terms of a standard of density and also a standard for the tube at the same time will help all workers in this field. For this see my communication before the Third International Dental Congress, Paris, 1900, which appears in the Transactions of that body. Very great improvement has been secured in the quality of film for our work, and also in the methods of development. Whether there has been improvement in the results or not I can leave you to judge from the pictures you see. In answer to the many inquiries I have to say that I very much regret the delay in the appearance of my book, which covers this subject in detail, but the many demands for papers and demonstrations on this subject have, with much time used for research, taken so much of my time that it could not be prevented. It will be published very soon.