from some infectious conditions within the lung, and I have come to the conclusion that these so-called pleural affections which are localized are generally secondary. I believe that the cases described are almost invariably the result of some pulmonary infection; in my opinion, these infections occur first in the lungs. Occasionally an abscess forms at the periphery of the lung and there is formed a localized accumulation of pus. When certain cases of empyema appear they are not primary cases of empyema, but the result of abscesses occurring at the periphery which have burst into the pleural space because it was not walled off.

This class of cases is the most difficult that the surgeon has to deal with, because of the pulmonary involvement. When the surgeon operates, he does so on the empyema cavity and not on the lung cavity which is so deeply situated. We know the results that have followed operations on empyemas, secondary and subdiaphragmatic abscesses which have followed cases of appendicitis, duodenal ulcer and other abdominal conditions. I think that the first infection in these cases is a pulmonary infection, for the reason that the lung tissue becomes adherent to the diaphragm and because of the expectoration of so much pus. It appears that a pulmonary abscess has burst into a bronchus.

DR. ARTHUR A. GILLETTE, Rome, N. Y.: I should like to make a report, from the general practitioner's standpoint, of a distinctive case that occurred in a young woman. There was difficulty in making an early diagnosis, but the abdominal symptoms were marked. They seemed to be referred well up and to the left side of the pelvis especially, and were without any apparent cause. The patient gave a history of an acute infection which took place during the grippal season and which pointed to some serious abdominal disease. Subsequently there was discharged by mouth large quantities of foul-smelling pus which was loaded with streptococci. With a hypodermic syringe there was withdrawn from the chest some very offensive pus which was loaded with streptococci. I am convinced that this was one of the cases with which we are now dealing. The patient recovered without surgical aid; the young woman is now in apparently perfect health and is very active. My difficulty lay in determining the point where the infective process was likely to become localized. In attempting to locate this point, the general practitioner must be constantly on the watch and must use every facility available and examine every organ. In cases in which operation for appendicitis has been advised, I have seen the development three or four days later of a distinct pleural or pulmonary process. In my experience I have often found that the symptoms referable to one side result from diseased conditions on the same side especially when associated with abdominal symptoms. In the instance I have just reported the local process was on the left side of the chest and back, and the abdominal symptoms were distinctly in the region of the left ovary.

DR. ELSWORTH SMITH, St. Louis: The case cited by Dr. Janeway is one of great interest. Dr. Robinson holds that all pleural vomicae are due primarily to a focus in the lung, as he believes that it would be impossible for an empyema to perforate the greatly thickened visceral layer of the pleura. While he may be right in many cases, still in a large proportion the pus does actually perforate from the pleural cavity into the lung; and after all it should not be any more impossible for this to occur than for what happens in empyema necessitatis, for instance, in which it is of course conceded that the pus within the pleural sac does perforate the parietal layer of the pleura, even though greatly thickened. From the point of view of this paper, moreover, the recognition of the presence of pus within the pleural sac communicating with a bronchus and being expectorated is, of course, far more important than the question whether the primary source of this pus be pleural or pulmonary. Therefore, from this point of view it might be well to modify the definition of pleural vomicae to be a collection of pus within the pleura communicating through a bronchus and being expectorated; with this definition the primary source of pus might be pulmonary, pleural or in the abdominal cavity.

PROGNATHISM, WITH OPERATIVE TREATMENT *

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In the consideration of this subject I wish to distinguish between racial prognathism and pathologic types as illustrated by the case reported. Evolution is presumed to have been from the prognathous or forward-jawed type to the orthognathous or straight face, Mongolian or Caucasian type. The contraction from the prognathous jaws to the orthognathous has been a factor in the production of the irregularities of dentition so common in the higher races. Figure 1, shown through the courtesy of Professor Starr, represents a Taruscan Indian girl (Mexico) illustrating a racial type. With the occurrence of the recession of both jaws the teeth are crowded together.

Fig. 1.—Taruscan Indian girl, showing (racial) prognathism. (Copyright by Frederick Starr.)

In the case of prognathism which is the subject of this report, only the lower jaw projects and therefore the occlusion of the teeth is very imperfect (Figs. 2 and 3). The incisal edges of the upper central incisors were five-eighths of an inch posterior to the incisal edge of the lower central incisors on one side and three-quarters of an inch on the other. There was also an overdevelopment of the mental portion of the mandible, and almost complete absence of the angle between the body and the ramus of the jaw. All the lower teeth were inclined sharply toward the tongue. Dental and labial sounds were inhibited. There was a marked thickening of the lower lip, and a depression of the upper, with depressed alar nasi.

This pathologic prognathism stands in sharp contrast to the racial type because of the malocclusion, faults of

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alignment and overdevelopment of the mental process. The occlusion and alignment of teeth in the types of race prognathism are normal, even better than the average in the higher races (Fig. 4).

ETIOLOGY AND EMBRYOLOGY

Nothing valid can be suggested as to the method of production of this deformity, except error or defect in development. The mandible develops from the first branchial arch, which has previously divided into a lower mandibular and an upper maxillary process. In

The diagnosis will require only the exclusion of an old forward dislocation of the lower jaw, with restored motion. This differentiation can be done by physical examination and verified by x-ray.

Indications for operation are:

1. Inability to secure through orthodontic measures a sufficient occlusion of the teeth.
2. Marked deformity because of overdevelopment of the mental portion of the mandible with malocclusion.
3. Development of the mandible in a straight course, and consequent absence of a proper angle of the body of the jaw with the ramus, preventing proper occlusion.

Fig. 2.—Case of pathologic prognathism; protrusion of lower jaw.

Fig. 4.—Occlusion and alignment of the teeth in racial type.

Fig. 3.—Pathologic type, showing faulty alignment and malocclusion.

Fig. 5.—Space after removal of a section to permit proper articulation.

this mandibular process appears what is known as Meckel's cartilage, which is straight and rod-like, extending from the periotic capsule, or site of the internal ear, to the distal part of the mandibular process.

The absence of a proper angle in the case which I report suggests this defective development. The absence of the third molars which never erupted is further evidence that it is not a reversion of type, as in racial types the full number of teeth is found, and Bertillon and Fontan have even observed an extra (fourth) molar in one of the New Caledonian races.

TREATMENT

Much can be done to prevent the deformity by orthodontic measures during the early years in the way of correcting the occlusion and alignment. After maturity the same means may aid in restoring alignment of the teeth and correcting the arches preliminary to operation.

The first surgical treatment of which I find record is that of Hullihen of Wheeling, W. Va., in 1848.¹ Dr. E. P. Blair of St. Louis, on the recommendation of

1. Babcock: Items of Interest, xxxii, 442.

Dr. Angle of that city did resection between the second bicuspids and first molar in 1897. Infection delayed healing. Later operations of this kind were done with the reported loss of the jaw in one case. W. W. Babcock of Philadelphia has in later years done several operations, resecting a portion of the ramus of the jaw with successful results. Dr. Max Ballin of Detroit, in 1907, did a double resection between the cuspids and molars with good results, secured by extra-oral operation.

The operation here reported was done with a view to secure occlusion, to correct the angle and to effect the

Fig. 6.—Fragments wired.

best cosmetic result. Because of the length of the mandible and the absence of the last molars, there was room at the site of the angle for resection. This site for the operation seems best adapted for restoration of the proper angle which in most of these cases is lacking. Estimation of the size and shape of the fragment was made from the *x*-ray plate, and models kindly made for me by Dr. Joseph Eisenstaedt.

REPORT OF OPERATION

Operation.—Five-eighths inch on one side and three-fourths inch on the other were resected through a 2-inch incision along the lower border of the jaw on each side (Fig. 5). This was easily done with bone-cutting forceps. When the inferior dental nerve was reached, it was held out of the way by a ligature, while the upper portion was cut away. The fragment was rhomboid in shape with the base above. The ends of bone were fastened together, each with two wires (Fig. 6). Slight mobility was permitted so that the ends might be moved upward or downward, as required, to adjust the upper and lower teeth, which were wired together by Dr. Eisenstaedt by the method of Dr. T. L. Gilmer. The wound healed by primary union. Before bony union had taken place, the patient was called home because of serious illness in his family and further supervision was impossible. The slight immobility planned for advantage proved to be a disadvantage when the patient was out of reach. The wire splints were removed before union was complete, with the result that the distal fragments were displaced upward, and it was necessary to have two molars extracted.

Result.—In a communication the patient says he can now talk and masticate well and that his appearance is greatly improved (Fig. 7). He admits that a better result could have been secured if he had remained under treatment a sufficient time.

ADVANTAGES

The advantage of extra-oral operation is obvious. The selection of the site posterior to the molars is the best for correction of the angle which is desirable in almost all cases, while at this point submucous resection is easier than either anterior or posterior resection. In case there is lack of room back of the teeth, the last molar can be extracted and time allowed for healing over before operation, so as to make submucous resection possible.

I wish to acknowledge my obligation to Dr. Joseph Eisenstaedt for his valuable aid in the case along dental lines.

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ABSTRACT OF DISCUSSION

DR. E. S. TALBOT, Chicago: I should say that this condition was an atavism of the lower jaw which returned to the original type because of an unstable nervous system of the father and mother. These conditions are not uncommon when one side of the jaw is longer than the other. The appearance of this picture leads me to believe that this was a very unstable individual, as far as the nervous system was concerned. I can say very little about the operation because I have never performed it in this way. Dr. Harsha has performed it successfully to all appearances, and perhaps a little differently from the technic which Dr. Babcock presented to our Section a year or two ago. This will go down no doubt in history as one of the first cases in which the operation was performed in this location.

Fig. 7.—Profile of patient after recovery.

DR. W. WAYNE BABCOCK, Philadelphia: One of the great handicaps in operations of this type is the fact that the upper jaw is badly developed. If one could develop the upper jaw properly, the need for extensive resection of the lower jaw would not be so great. The tendency in many cases is to injure the patient's appearance by operation. Some operations take from the individual the firmness of character of the rather large lower jaw. There are difficulties in enlarging the upper jaw, but, of course, a great deal could be done for the patients if they went to a capable orthodontist early in life. It remains, however, after a certain degree of fixation has occurred, for the surgeon or dentist to get, not a perfect result, but something that will improve the appearance and the powers of mastication and speech. The portion of the body of the jaw, used by Dr. Harsha, has in this particular

case worked very well. The difficulty, of course, in attacking the body of the jaw, is that we interfere with the teeth, and if the teeth are extracted and the jaw at once resected, the compound fracture into the mouth adds much to the danger of later sepsis. A suggested improvement is to remove one or two teeth and then, after healing occurs to do a submucous resection of the jaw from the under side. One need not fear to resect or to destroy the inferior dental nerve. The nerve rapidly regenerates, the teeth maintain their function and nutrition and the tissues their vascularity, unless infection spreads through the jaw, when necrosis is followed by menace to the teeth, as well as to the entire bony structure.

After the report of a somewhat similar case before this Section some years ago I had occasion to use a steel splint instead of wiring, and I was impressed by its value. I have applied Lane plates after resection or division of the jaw, and in one instance I screwed an angular ramus made of steel to the body of the jaw below the angle so as to form a false ramus and joint. This worked very well, but a rough projection at the angle finally worked through the overlying skin. The steel was not expelled and the patient wore this artificial ramus of steel with a point protruding for about four months without any inconvenience except a slight discharge from the perforation. Of course, during the healing process it is wise to have an additional support.

DR. THOMAS L. GILMER, Chicago: There is certainly little known about the etiology of prognathism of the mandible, but it is known that inheritance has much to do with it; I know many children with prognathism of the lower jaw which can be traced to heredity. The operation is worth while for cosmetic purposes, if for no other, and, as Dr. Babcock has said, it is not impossible that the results cosmetically may be worse than the deformity, but it does not seem to me that this should often be the case.

The pictures exhibited by Dr. Harsha do not show that the mandible is much too long, but rather that the maxilla is too short. It may have lengthened somewhat on account of the occlusion of the teeth.

I do not think that it makes very much difference whether the nerve in the mandible is severed. I have done many operations for removal of the inferior dental nerve, also of the second branch, in cases of tic douloureux, and I have never seen a dead pulp in a tooth as a result. I hope that sometime it will be known what changes if any occur in the pulps of teeth after resection of the nerve. Dr. Babcock spoke of the advisability of cutting the bone at the angle. If the operation is done in this locality there is less danger of entering the oral cavity, since the thickness of soft tissues overlying the bone in the mouth is greater here than further forward.

I have used the Lane plates in fractures of the mandible, but if we can get along without drilling into the bone we lessen the possibility of bone and other infection. By wiring the lower to the upper teeth, we use the upper teeth as a splint which holds the parts rigidly. The only objection to this method is the fixed closure of the jaw. Any technic is good which in the experience of the operator succeeds.

DR. G. V. I. BROWN, Milwaukee, Wis.: This Section has had the opportunity to consider two methods which represent the newest and best surgical procedures for resection of the mandible for the purpose of improving tooth occlusion and facial conditions. Some of us at least have felt rather strongly about the unfortunate publicity that has been given the earlier attempts to perform the operation to which Dr. Harsha referred, in the course of which at least several important surgical principles were needlessly violated. Dr. Babcock's method as he explained it to us, and as since published, judged from a surgical standpoint, appears to be perfect for resection at the particular point he selected; this also may be said of Dr. Harsha's method. The point which Dr. Babcock raised, which was emphasized by Dr. Gilmer, is really the vital question. In some conditions such an operation may be called for, but they seldom occur. Most of the patients whose jaws present the picture exhibited by Dr. Harsha are persons who are being deprived of some very vital necessities, and it is vastly more important that these people be given general

relief through better respiration, by spreading the upper arch in addition to facial improvement, than that we improve their appearance alone by the reduction of the lower jaw. If one examines the palates in such cases it will be found that most of those with upper arches shaped like that of this patient, and with palatal vaults similarly formed, are persons in whom there has been a distinct loss through arrested development of the upper maxilla. This condition usually affects very vitally both nasal form and structure, and less directly, but almost certainly, general nervous conditions also. Such persons are commonly highly nervous, and many times have nervous habits of one kind or another that are closely akin to chorea or similar affections. I think these corrective possibilities should be considered first and surgical procedures afterward, but if it finally be decided that resection is necessary, I am satisfied that we can do no better than to follow either Dr. Babcock's or Dr. Harsha's method.

DR. A. J. FLANAGAN, Springfield, Mass.: I would like to find out the length of time that such cases as these have been under observation. For instance, some have spoken of the inferior dental nerve not being affected in these operations; is there any instance of some years' standing in which the inferior dental nerve has been removed and a record kept of the conditions which follow? Has there been a case of which a record has been kept for more than fifteen years, in which there has been no paralysis, no nephritis and no symptom of conditions such as Dr. Brown spoke of? Is there any record of positive results of never having any trouble because of the removal of the inferior dental nerve?

DR. T. L. GILMER, Chicago: I have one case that I know positively is of fifteen years' standing, in which I removed the second branch of the fifth nerve, going underneath the eye to do so, and the pulps of all the teeth are still alive.

DR. J. LOWE YOUNG, New York: Study of Dr. Harsha's models shows that it is impossible to put these plaster teeth in occlusion. The best that can be hoped for from this operation, if these models are accurate, is the cosmetic effect. It is impossible, I think, for any man to get a good chewing apparatus with these teeth by any surgical operation, such as has been done here. There are cases in which it is advisable to perform surgical operations; I have had a few cases in my practice, but they were in adult life. I am not in favor of treating adults orthodontically, because the orthodontic trouble really goes back to bone development. Bone development is very slow at any time, and particularly so in adult life, and I do not want to attempt the treatment of a case without the possibility of seeing the finish. I would like to suggest, however, to the surgeons to whom these cases come, to be exceedingly careful of the conditions. Accurate impressions should be taken and plaster models should be made to determine if proper occlusion can be obtained in the place that the incision is to be made. In Dr. Harsha's case the wiring of the teeth together does not help very materially to hold the front portion of the mandible in place, because the incision is back of the last molar tooth. This also applies to Dr. Babcock's operation; that is why I think he had to use the steel plates in one of the cases to which he referred. If it were deemed practical to make the incision further forward, then I think it would be very much easier to get fixation of the part, which, of course, would facilitate the final union of the bone.

DR. W. M. HARSHA, Chicago: The contraction of the upper arch was from side to side; the upper incisors did not recede but were nearly normal in direction. The palate was high. It is known that afferent nerves regenerate much more readily (from the peripheral side) than the efferent. I have frequently resected the inferior dental nerve with apparently too early regeneration, and with no appreciable injury to the teeth. Resection at the point which Dr. Babcock selects does not, in my opinion, restore the proper angle, as is possible at the point where I did it. In my case the line of the mandible was almost straight. The Lane plates could be used on the jaw, but in compound fracture, for instance, they would generally have to be removed, while in simple fractures union is so prompt, that for the short time required apposition can be maintained by more simple means.