Lessons From Twenty-five Years of Orthodontic Practice*

FREDERICK B. NOYES, B.S., D.D.S., F.A.C.D.
Chicago

I began the practice of orthodontia with the E arch and the wire ligature. Since that time I have given up old technics and learned new ones with new mechanisms at least three times. With each change in technic there has been more or less development in fundamental concepts. It may be worth while to review these developmental changes in the light of the basic principles they reveal. For consideration in such a study I have selected the treatment of typical cases of Class II, Division I, malocclusion.

After making his classification of malocclusion, Dr. Angle was convinced that the fundamental principle governing treatment should be the establishment of normal cusp and contact relation of all of the teeth. In the evolution of all his appliances this was the objective. He was very conscious that the teeth were a part of the entire organism, the human body, and if in normal position they must be in correct relation to the head and cranium, and in harmony with the entire individual. He clearly visualized the denture as a mechanism through which the forces of function influenced growth. Teeth were moved to allow them to distribute forces in a normal manner, and so influence growth toward the individual type.

E arch treatment. In 1909 in the treatment of Class II, Division I, with the E arch and wire ligature, the objectives of treatment were accomplished by tipping the maxillary teeth distally, beginning with the first molar, and by tipping the mandibular teeth mesially, beginning with the incisors. It is important to examine in detail how this was accomplished. Clamp bands were adjusted in the upper arch to the first molars, aligning the buccal tubes so that the arch, when placed in them, would lie at the gingival margin of the incisors. Intermaxillary hooks were placed opposite the cuspids and the length of the arch adjusted by the nuts so as to keep the arch free from labial surfaces of the incisors. No ligatures were placed in this arch. In the lower arch clamp bands were adjusted to the first permanent molars, aligning buccal tubes so that the arch would lie at the gum margin of the lower incisors. The arch was then sprung occlusally and ligated to the six anterior teeth (Fig. 1, A, B, C and F).

Treatment was conducted in the following steps: intermaxillary rubbers were placed, delivering their entire force on the upper first molars, tipping them distally; as they moved the nut was advanced so as to keep the arch

*Read before the New York Society of Orthodontists December, 1935, and released for publication through the courtesy of that organization.

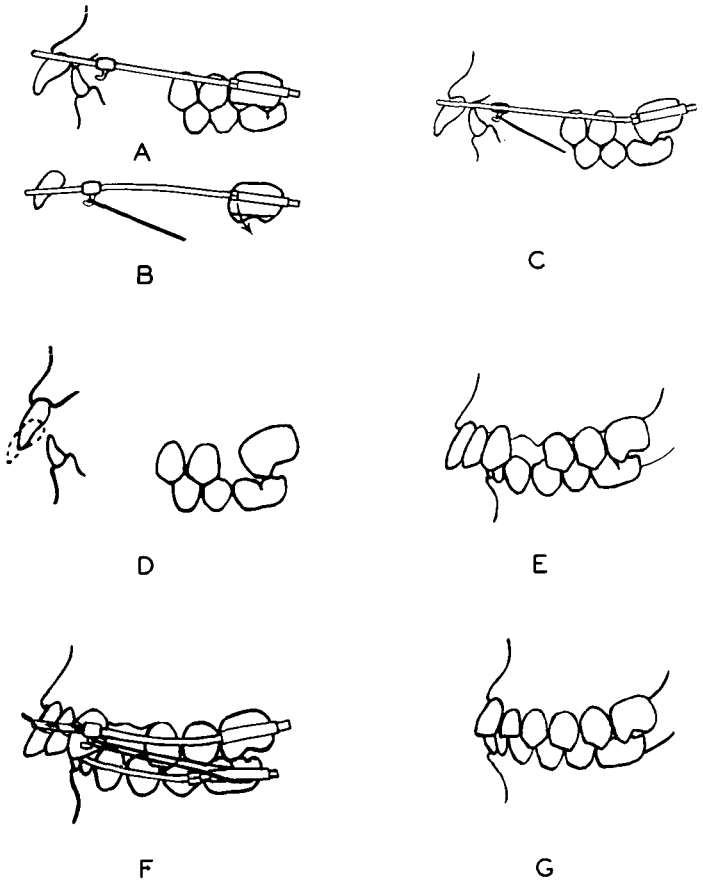

Fig. 1

Principles in E arch treatment.

A. Alignment of E arch placed in buccal sheath of molar clamp band crossing labially of the incisors at their gingival margin and nut in contact with the mesial extremity of the buccal sheath. Intermaxillary hooks soldered in place at the cuspid.
B. Effect of introducing intermaxillary elastic traction.
C. Showing the distal tipping of the first permiant molar through bend placed in the E arch mesial to the buccal sheath, advancing of the nut on the threaded arch end and the use of interxamillary elastics.
D. Showing the tooth movement accomplished in the first stage of treatment. The molar has been moved distally and the incisors depressed and tipped lingually.
E. Illustrating the tooth movement in the second stage of treatment when the bicuspids have been moved distally.
F. The appliance set up to accomplish the third stage of treatment. The nut has been removed from the upper arch ends, the cuspids and incisors ligated to the arch and intermaxillary traction utilized to carry the anterior segment posteriorly. The nuts on the lower arch have been turned mesially to maintain contacts in the teeth of the lower arch.
G. Tooth relationship after the third stage of treatment has been completed.

clear of the upper incisors as it moved incisally. This action was continued by bending the arch just mesial to the nut so as to keep the labial segment opposite the gingival third of the incisors. This was continued until the first molars were carried back somewhat beyond their normal mesio-distal relation to the corresponding lower teeth (Fig. 1, C). It is important to note that in the upper arch no other tooth was in movement; in the lower no readjustments were made but the action of the appliance was to depress the lower incisors, and the occlusal pressure of the arch at the mesial end of the buccal tube of the molars stimulated occlusal growth and counteracted the tendency of the inter-maxillary rubbers to tip the anchor teeth mesially. The lower appliance was therefore used partially to secure stationary anchorage for the movement of the upper teeth, and at the same time to depress the lower anterior teeth and tip them labially. The elongation, or movement, occlusally of the first molars increased the distance from the tip of the nose to the chin, correcting the under-development of the lower third of the face which is one of the prominent symptoms of this type of case.

The next step in treatment was the distal movement of the maxillary bicuspids. This was accomplished by passing a heavy wire ligature around the distal of the first molar gingivally of the buccal tube, carrying it on the lingual to the gingival of the screw post and around the mesial surface of the first bicuspid crossing the arch to the occlusal. On the buccal the ligature was carried across to the occlusal of the mesial end of the buccal tube, between the arch and the teeth and then to the buccal of the arch, crossing the arch at the gingival near the embrasure between the first and second bicuspids. Here the two ends of the ligature were twisted. By drawing up this ligature and twisting it the bicuspids were rapidly tipped distally. This was usually accomplished in three or four adjustments (Fig. 1, D and E). Occasionally it was necessary to band the first bicuspid in order to keep the ligature in place.

When the bicuspids were fully back in normal mesio-distal relation and contacts established, the clamp bands on the upper first molars were removed and their buccal tubes realigned so that the arch would lie across the gingival third of the upper incisors. The B arch was substituted for the E arch, or the nuts were removed from the E arch, the threads filed smooth and the bends which had previously been placed mesial to the nuts removed. The anterior portion of the arch was adjusted to lie closely in contact with the labial surfaces of the incisors and cuspids and ligated in place. By the continued use of intermaxillary rubbers, the anterior teeth were tipped lingually until they were in contact with the lower incisors and the distal of the cuspids with the mesial of the first bicuspid (Fig. 1, F and G). At this stage of treatment there was usually a diastema between the lower cuspid and

the first bicuspid; the ligatures were removed from the lower anterior teeth, and the lower molars and bicuspids tipped mesially by the intermaxillary force closing this diastema. Marked improvement was produced in the facial lines and normal lip function made possible. But both upper and lower incisors were left with too great labial inclination making the establishment and maintenance of normal lip functions difficult. The completion of the correction was therefore not accomplished until the pressure of the lip muscles and the occlusal growth of the denture corrected these axial inclinations. The necessity for changes during retention led to the development of the working retainer which was the beginning of the pin and tube appliance.

Mistakes of treatment. The commonest mistakes in the execution of this treatment were, first, the inclination of the operator to ligate the upper arch to the upper incisors before the normal mesio-distal relation of molars and bicuspids had been established; and, second, the failure to relate the strength of the intermaxillary rubbers to the reaction of the tissues in the case. This I shall refer to again in connection with ribbon arch treatment. Third, a common mistake was the attempt to compensate for insufficient distal movements of the upper molars and bicuspids by increasing first bicuspid and cuspid width.

In 1911 Albin Oppenheim of Vienna presented at New London, Connecticut, his classic contribution on the tissue changes in tooth movement. He showed what occurred in the bone upon the application of simple tipping forces within the orthodontic range. He had been induced to undertake this work by his friend, Joseph Grünberg, and the author had some slight part in it through his friendship with Grünberg. This work has so profoundly influenced the development of orthodontic theory and technic that it is necessary to consider it at this point.

Clinically we had known for some time that simple tipping forces applied to the crowns of teeth, either by ligature or springs, tipped the crown but did not affect the apex of the root. At New London in 1911 Oppenheim showed what occurred in the tissues; that the bone is not sprung, nor is the tooth moved through the bone, simply by absorption on one side and building on the other, but that the normal functional arrangement of the bone is transformed into an arrangement characteristic of rapid growth; that this rearrangement begins in the connective tissue of the periodontal membrane. Reorganization of the bone begins at the occlusal margin and proceeds apically, and there is little change in the apical region. No one can understand or correctly manipulate modern orthodontic appliances without mastering the significance of Oppenheim's research, and it is exceedingly unfortunate that in recent years his findings have been seriously confused.

In 1911 I spent many hours with Dr. Oppenheim in the study of his material, and I am convinced that it stands today fundamentally correct. Oppenheim's findings have been confused by investigators who have used forces far beyond the orthodontic range. It is important to remember that Oppenheim was dealing with simple tipping forces. All of the work on growth and development, whether by madder feeding, histologic examination, or by cephalometric measurement, has shown that the occlusal border of the alveolar process is an area of rapid bone growth. It is therefore necessary to remember that in nearly all orthodontic treatment the teeth are moving occlusally, and that movements occur in three dimensions of space.

Pin and tube appliance. I shall not discuss treatment with the pin and tube appliance. It was used for too short a time for many cases to be completed by it, and the principles involved differ little from those of the ribbon arch.

Ribbon arch treatment. The introduction of the ribbon arch mechanism inaugurated radical changes in the concepts of anchorage. Up to that time the first molars had often been referred to as the anchor teeth. In ribbon arch treatment of Class II, Division I, the anchorage concept included consideration of relative resistance, for in treatment the six anterior teeth in the upper arch were also used for anchorage. This is the most fundamental change from E arch treatment. The program followed was the same, insofar as it consisted in shifting the maxillary teeth distally beginning with the molar, following with the bicuspids, and ending with the anterior teeth; but the means employed were quite different. The lower teeth were more efficiently used as anchorage and because of the axial control the unnecessary and undesirable labial movement and inclination of the lower incisors were minimized.

This appliance also marks the beginning of a fundamental change in orthodontic concept. Instead of thinking of an orthodontic appliance as a supplementary assistant to nature in the development of the denture, the appliance began to be thought of as a means of placing the teeth so that function and growth would bring about normal development. This is the only justification for the otherwise illogical procedure of moving maxillary teeth distally in the correction of Class II, Division I, cases. The anatomical and anthropological study of Class II, Division I, skulls made by Oppenheim, Hellman and others has proved that in this class of malocclusion the deformity essentially consists of an under-development of the mandible and that the maxillary teeth, while apparently prominent, are really not so, and that there is frequently an under-development of the maxilla as well as the mandible. The theory of treatment, therefore, becomes a problem of moving the maxillary teeth distally to establish occlusion with the under-

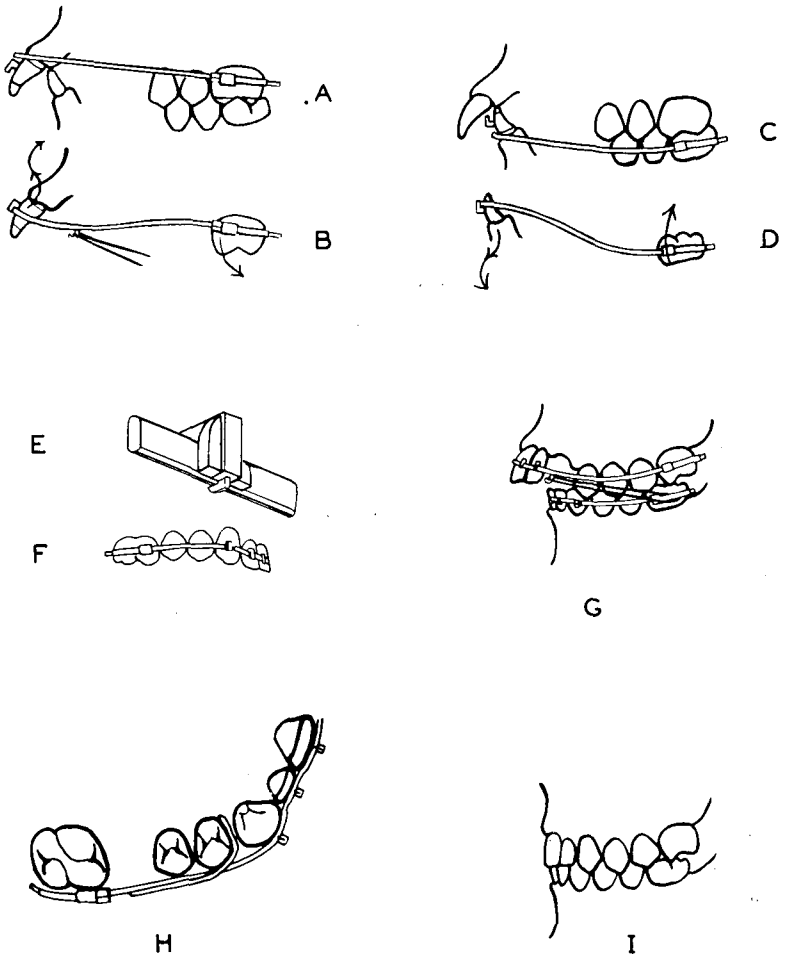

Fig. 2

Principles in Ribbon Arch Treatment.

A. Molar buccal tube aligned to place the arch at the gingival level of the incisor brackets.
B. Arch placed in the brackets showing action of arch with elastic traction.
C. Lower arch placed in buccal tubes and lying to the gingival of the brackets.
D. Arch placed in brackets showing action.
E. The cleat as placed to engage the cuspid bracket.
F. Upper arch in the incisor bracket.
G. The action of the appliance when the upper buccal teeth have been moved distally.
H. The spring soldered to the arch as used to tip bicuspids distally.
I. The result of treatment.

developed mandible so that the use of the teeth in the proper line of force brings about the normal development of both maxilla and mandible. It is necessary, therefore, to examine in detail the manner of obtaining this objective by the use of the ribbon arch mechanism.

The arrangement of the mechanism. In the maxillary arch bracket bands were adjusted to the six anterior teeth; clamp bands to the first permanent molars with the curvalinear buccal tubes soldered so that the arch, when placed in them, lay at the gingival margin of the incisors (Fig. 2, A). Without having the ends of the arch in the buccal tubes the arch was adjusted to the brackets of the anterior teeth so that when in place it exerted no pressure on any of them. Cleats were placed on the arch to embrace the cuspid brackets or lugs which were soldered to the arch at the distal side of the brackets (Fig. 2, E and F). Intermaxillary hooks were placed at the mesial surface of the cuspid brackets. The adjustment of the arch was tested by placing it in the brackets, and if correct it crossed the buccal tube on the molars at about the middle of the tube, the mesial end of the tube being to the gingival and the distal end to the occlusal of the arch. The arch was then removed from the brackets and inserted in the buccal tubes, and the anterior portion torqued so that the long diameter of the arch would be parallel with the opening in the bracket. It was then placed in the molar buccal tubes and in the incisor brackets, and pinned in position.

In the mandibular arch bracket bands were adjusted to the six anterior teeth, and the molar bands formed with buccal tubes aligned so as to have the arch opposite the gingival of the incisor. The arch was adjusted in the brackets without expansion and the anterior segment torqued so that when placed in the buccal tubes the incisor region had its long axis parallel with the slot of the brackets. Lugs were soldered to the arch at the distal of the cuspid brackets. The arch was then placed in the buccal tubes, seated in the brackets and pinned in place, after which the nuts were turned mesially so as to free them from the anterior end of the buccal tubes (Fig. 2, C and D).

The program of treatment:

1. The nuts on the upper arch were advanced at regular intervals one full turn bowing the arch slightly between the buccal tube of the molar and the bracket on the cuspid.

2. Intermaxillary rubbers were placed to stabilize the anterior anchorage.

3. The strength of these intermaxillary rubbers was very important and had to be adjusted in each individual case. First, the rubber was intended to balance or counteract the mesial pressure of the arch on the in-

cisors; second, the strength of the rubber had to be related to the muscular tone of the muscles of the temporal region. If the rubbers were too strong the balance of these muscles gave way, the mandible was protruded and the condyle allowed to ride out on the articular eminence. In this way a false appearance of progress in the treatment of the case resulted.

4. As the upper molars were tipped distally it was usually necessary to bend the arch mesial to the nut. By this process and without readjustment of the lower the upper molars were carried a little beyond their normal mesio-distal relation. The upper bicuspids were then carried distally by ligature as in E arch treatment, or by springs soldered to the arch. No expansion was placed in either arch in the cuspid and first bicuspid region up to this period (Fig. 2, H).

5. When the bicuspids were fully back to their normal mesio-distal relation the molar bands were removed and the buccal tubes realigned so that the arch would lie in the brackets on the incisors; the nuts were removed from the arch, the threads filed smooth and the distal ends of the arch curved so as to assist the sliding of the arch distally through the buccal tube. The unrestricted action of the intermaxillary rubbers moved the anterior teeth lingually until the upper incisors were in contact with the lower and the cuspid with the first bicuspid.

6. The increase in the cuspid and first bicuspid width was accomplished during this period by changing the form of the anterior portion of the arch and by ligating the bicuspids to it. This was attained in both the upper and the lower arches simultaneously.

Mistakes in treatment. The commonest error in execution of this treatment was failure to carry the maxillary molars and bicuspids far enough to the distal. Often in an effort to compensate for this error excessive labial root torque was put into the arch in the incisal region, consequently the ends of these roots were forced against the dense cortical plate of the bone causing absorption of a root. I have recognized this condition a number of times. It was facilitated by what was probably the greatest disadvantage of this treatment. The most fundamental requirement in applying orthodontic force is constancy of direction. It will be seen that by this program every time the nuts on the upper arch were advanced pressure in the labial direction was produced on the anterior teeth. This could not possibly be perfectly balanced by the pull of the intermaxillary rubber. Consequently, after each adjustment the force in the labial direction was increased, but this diminished as the molars moved distally, and as this occurred the force of the intermaxillary rubbers remained the same, contributing increasing lingual pressure on these teeth. This variation in the direction and amount of force taxed tissue tolerance to the limit.

The second, and quite as common cause of mistaken treatment, was the placing of expansion in the arch before the full distal movement of molars and bicuspids had been accomplished. In this instance, an attempt was made to provide for the retrusion of the incisors by the increase in buccal width. Bicuspid width is an expression of, and is determined by, masticatory function. When these over-expanded arches returned to their normal width under function, protrusion of the upper incisors was inevitable. In most cases the mesio-distal relation of buccal teeth held, but the case was converted from a Class II, Division I, to a Class I malocclusion.

A third error was the failure to properly rotate the upper first molars during or after their distal movement. This made it impossible to establish normal mesio-distal relation to the bicuspids and cuspids. A condition in which the molar seemed to be perfect, the position of the second bicuspid a little to the mesial, that of the first bicuspid a little more so, and the relation of the cuspid quite imperfect was often due to this defect. The lingual rotation of the upper first molar caused it to occupy more room in the arch than it should. Consequently, the bicuspids and cuspids were forced to the mesial.

A fourth mistake was failure to properly torque the arch in the incisal region. In the upper this resulted in a labial pressure at the occlusal border of the alveolar process which rapidly destroyed the anterior anchorage. Consequently, the result of treatment was the labial movement of the anterior teeth more than the distal movement of the molars and bicuspids. In the lower arch failure to make this adjustment caused severe labial pressure on the occlusal border of the alveolar process where the bone is very delicate. This sometimes resulted in the loss of bone and the recession of the gum margin.

The torque in the labial arch had still more important uses. If properly adjusted the resulting force on the lower incisors was that of depression in the line of their axis, but to accomplish this, it was necessary that the arch not only be torqued in this region, but the nut be turned mesially on the arch, freeing it from the buccal tube so that as the teeth were depressed the arch could slip distally through the buccal tube. Failure to do this resulted in a common defect—the production of the diastema between the cuspid and the first bicuspid as in E arch treatment. Too great a labial crown torque in the incisal region also left both the upper and lower incisors with excessive labial inclination, repeating the defect of E arch treatment.

A seventh mistake, closely related to the last error, was the tendency to leave the incisors and cuspids in too deep an over-bite.

The eighth, and commonest error, resulted in an imperfect cuspid rela-

tion because of insufficient tipping of the upper cuspid distally and insufficient depression of the lower cuspid.

Relapses. All of these defects and mistakes in treatment invited relapse. Probably the commonest one was due to overexpansion of the cuspid and bicuspid region combined with insufficient distal movement of cuspids and bicuspids. Another frequent relapse was caused by the disturbance of the contact of lower cuspid and bicuspid. As a result of this the lower incisors and cuspids slipped lingually and elongatedly during retention. The developmental pressure at the distal of the arch pushed the bicuspids mesially and the mesial marginal ridge of the first bicuspid was caught below the contact point of the cuspid. This usually happened because the axis of the first bicuspid had never been properly corrected so that a diastema was created between the bicuspid and the cuspid. But, in most cases the mesio-distal relation of the buccal teeth held and the disturbance occurred in the anterior part of the arch; in other words, the Class II case became a Class I case. When the mesio-distal relation of molars and bicuspids slipped in retention it was most often due to improper adjustment of the strength of intermaxillary rubber.

The edgewise arch mechanism. The change in theory and technic from the ribbon arch mechanism to the edgewise arch mechanism was much greater than that from E arch to ribbon arch. The ribbon arch was originally adjusted to the teeth in their positions of malocclusion. The edgewise arch is given the ideal form from the beginning. With the edgewise arch all teeth to be moved are banded; this has two very great advantages: first, greater force control, and, second, greater protection against caries. A well-fitted and well-cemented band protects susceptible areas of the tooth, and with reasonable mouth hygiene the danger of caries is much less than with the E arch and wire ligature. With the new mechanism band, which is narrower and has no reinforced area, much more perfect adaptation is secured. The technic of the new band-forming pliers greatly facilitates this operation. Several articles by different writers have appeared describing the technic of this mechanism, and I shall consider it only as it is related to principles and to show the changes in treatment.

The set-up of the appliance. All teeth in both the maxillary and mandibular arch are banded. As in the case of the ribbon arch, the band is placed with reference to the anatomical form of the tooth, but much greater care is necessary in securing the correct position of each band. When all the bands are in place, the arches are given the ideal form. This, in the writer's judgment, is the most difficult and important step in the use of this mechanism. It is comparatively easy to follow a formula, but the

shaping of an arch that is correct for a given individual requires much experience, knowledge, judgment and skill. If all of an operator's cases look alike when completed it means that his arch form is produced too much by formula and too little by the architectural plan of the individual.

The buccal tubes on the lower molars are aligned so that the arch, when placed in them, lies at the gingival of the incisors. It is seated in the brackets of the centrals, then in the laterals, then in the cuspids, and finally in the bicuspids. In this process it is gently carried distally through the buccal tubes of the molars. When it is placed, there is a depressing force on the incisors without tendency to produce labial inclination. There is occlusal force on the bicuspids and a slight elevation to the mesial cusp of the molars. This adjustment needs little change except for the correction of rotations. In the upper, the ideal arch placed in the buccal tube of the molars lies parallel to the occlusal surface of this tooth. At the first adjustment, it is seated in the bracket of the centrals and ligated, and then ligated alternately to each succeeding distal tooth. The arch may not be fully seated in the brackets at the first adjustment, and it is important to remember in the use of this mechanism that little force should be used in seating the arch in the brackets. One or two adjustments are all that are usually necessary to gain complete control. After the arch has been seated in all of the brackets for at least a week, the adjustments are made which are to carry all of the maxillary teeth distally.

Before describing this adjustment it is necessary to discuss the principles involved. If a bicuspid tooth is banded and a lever soldered to the middle of its buccal surface, and force applied occlusally at the mesial end of the lever and gingivally at the distal end of the lever, the two forces being balanced and the lever free to move, tissue reactions begin at the occlusal margin of the alveolar bone and proceed apically so that the apex will be the last region of tissue reaction. The tooth will thereupon tip distally, the apex remaining unchanged. If, however, the same adjustment is made and the lever is prevented from moving, the reactions will begin both at the occlusal margin and in the apical region, and the root will be tipped mesially with a little distal movement of the crown. This is the basic principle involved in the distal movement of maxillary teeth with the edgewise arch. This force is reciprocated from tooth to tooth, each one acting as anchorage and as a tooth being moved. The classic example of the picket fence illustrates this principle in reverse; if the pickets are united by two barallel bars fastened to each picket by a single bolt, and a groove cut in each picket at right angles to its axis, a perfectly elastic wire is bent and seated in each of these grooves and the base of the picket held in place, the pickets will resume the

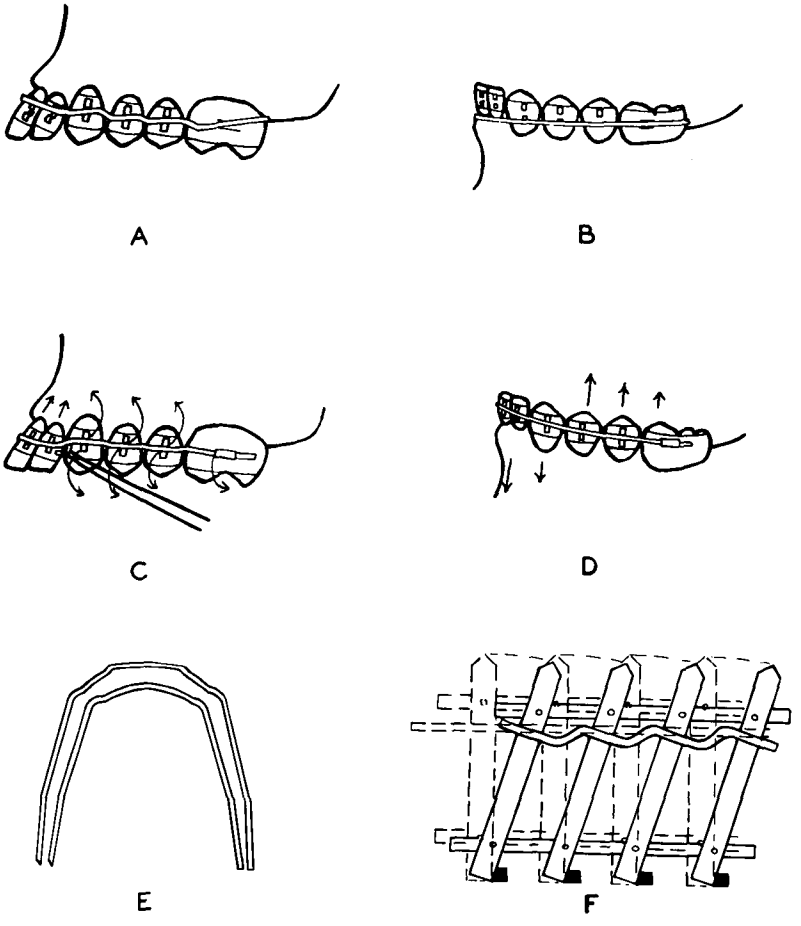

Fig. 3

Principles in Edgewise Arch Treatment

A. The second order bends in the arch ready to be placed.
B. The lower arch placed in the buccal tubes of the molars and lying to the gingival of the incisor bracket.
C. The upper arch placed showing action of arch and elastics.
D. Lower arch in place showing action.
E. Ideal arch form.
F. The action of an elastic arch on a picket fence. The rod is sprung to be placed in the groove in the pickets and the spring of the rod swings the pickets to vertical position. (This makes an interesting model.)

vertical position as the bar returns to a straight line. If the upper end of the picket is held, the basal ends of the picket will move until the vertical form is reached (Fig. 3, F).

To return to the appliance, at the next sitting, before the arch is removed, a mark is made on the arch at the mesial of the buccal tube on the molar, at the mesial and distal of each bicuspid and cuspid bracket. The arch is then removed and the end of the arch bent gingivally about a sixteenth of an inch mesial to the molar mark. The next bend is to the occlusal, a little distal of the second bicuspid mark, then gingivally to the mesial of the second bicuspid mark, and in the same manner for the first bicuspid and cuspid. It is then tried on the brackets and should cross from occlusal to gingival at the mesial of the buccal tube on the molar and lie slightly to the occlusal of the slots in the brackets at the mesial of the bicuspids and cuspids and slightly to the gingival of the slot at the distal of the same bracket. It will lie to the gingival of the slots of the incisor bracket (Fig. 3, A).

The arch is now sprung occlusally, seated in the incisor brackets, and ligated. It is then seated and ligated in the bracket of each succeeding distal tooth. In this process it is straightened, and the forces applied will be occlusal on the mesial of the molar, gingival at the distal, and occlusal on the mesial of the bicuspids and cuspids, and directly depressing on the incisors. All of the teeth are free to move distally, but the distal force does not carry around the cuspid angle except through the shortening of the arch as it returns to its bent position. The only lingual force exerted upon the incisors, therefore, is the force of the intermaxillary rubbers which reacts against the lower mandibular teeth which supply stationary anchorage. The importance of the intermaxillary elastic in this mechanism, therefore, is much greater than in any previous mechanism, for if the incisors do not move lingually as rapidly as the crowns of the buccal teeth are carried distally, the result in the buccal teeth will be a mesial movement of their root apices, destruction of the anchorage and defeat of the object of treatment. It is also important to notice that a single conflicting force, such as the incorrect placement of a single staple for rotation, will fix the position of the crowns, prevent their distal movement and instead cause a shifting of the apices (Fig. 3, C).

As compared with previous appliances, instead of first tipping the molars distally, next the bicuspids, then the cuspids, and finally the incisors, all of the teeth are moving distally at the same time and at the same rate, and the result is obtained in approximately one-fourth of the time. At the same time the difficulties encountered with previous mechanisms are largely eliminated. There is perfect control of the bicuspids; the incisors are not left with too great labial inclination or an excessive overbite. As in all

treatment, the movement should be carried somewhat beyond the normal point. The correction of such details as rotations, especially the rotation of molars, is accomplished during treatment and the teeth are all left in normal axial relation.

The results obtained by the correct use of this mechanism are more perfect than we have ever been able to obtain with any other. The period of retention is shortened and sometimes entirely eliminated.

The most important lesson that I have learned in twenty-five years of orthodontic experience is that teeth will remain in position only when all of the forces to which they are subjected are in balance. The ultimate problem in the treatment of every orthodontic case then is the establishment of an approximately normal balance of functional forces. Every slight imperfection in the relation of the teeth offers an opportunity for relapse or new malocclusion after the completion of treatment. Orthodontic practice furnishes a challenge to all of the operator's ability and successful treatment requires esthetic appreciation, professional knowledge, and technical skill in order that a denture may be developed that will make it possible for the patient's face to become a true mirror of his personality. More than this, the clinician should remember that his intimate contact with individuals during the most impressionable period of their lives will leave some stamp upon their characters for either better or worse.

30 North Michigan Avenue