A Discussion of the Angle Classification and Its Important Bearing on Treatment*

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For some time the writer has been dismayed at the superficial attitude that is assumed, even among the graduates of the Angle School and College, toward the process of classification of cases of malocclusion. This has not only led to considerable variation in conclusions but has also forced into the background the real purpose of this analytic procedure. I feel quite certain that the underlying thought in Dr. Angle's mind, when he sought to bring order out of chaos by grouping cases of malocclusion into a comparatively small number of classes, was to furnish convincing evidence of the possibility of preparing logical plans of treatment based upon the same factors that determined the segregation of the malformation into one of the various groups. And let me emphatically state there is no reason or excuse for case classification unless it has an important and specific bearing upon the method of treatment. In other words, the orthodontist should be so thorough in his study of a case for the purpose of classification that he will coincidentally acquire an intimate knowledge of the relationship of every dental unit to the line of occlusion and each component part of the organ of mastication to the plan of occlusion, so that corrective requirements are clearly visualized and a logically organized and comprehensive plan of treatment is made possible. This is the best assurance of a satisfactory end result.

In the more simple cases, I will grant that the importance of this correlation between classification and treatment may be a negligible factor, for the corrective procedures are routine and devoid of pitfalls. However, I believe that all orthodontists of experience will agree that a great many cases which have appeared to be very simple upon superficial observation, have proved to be extremely difficult to correct because of unseen complications. Hence it is never safe to omit the careful study of any case, even though at first glance it gives evidence of being without anything unusual or difficult.

But if classification is to assume such an important place in case analysis as to be a determining factor in the planning of treatment, then the operator certainly cannot be governed in his conclusions by inclined plane relationship alone. In fact, this association of occluding surfaces is really of minor,

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rather than of major importance. Yet I venture to state that to the majority of orthodontists the relationship of inclined planes is the answer to classification and, under such circumstances, classification cannot have any great bearing, or be of any great aid to the operator, in determining the various corrective steps or in suggesting the proper order of their application.

If we are to proceed further with any degree of harmony and with unity of thought, I must establish clearly in your minds just what I consider the classification of malocclusion to be.

I would define classification as a process of analyzing cases of malocclusion for the purpose of segregating them into a small number of groups, which groups are characterized by certain specific and fundamental variations from normal occlusion of the teeth; which variations become influential and deciding factors in providing the fundamental data for the preparation of a systematic and correlated plan of treatment.

It may seem to many that this is taking a rather broad view of classification, an enlarging of its scope to an unwarranted degree. I hope to demonstrate in my subsequent discussion that it is only by covering the complete field outlined in the definition that one is able to correctly classify the complicated cases. Conversely, when one has thus completed this study for the purpose of classification he is in a position to intelligently prognosticate and subsequently outline the necessary steps of treatment.

If classification is to assume such a keystone position in case analysis, it must be based upon principles that are admittedly sound as to their scientific background. When Dr. Angle introduced his classification, he thought he had such a foundation in the law of the constancy of the maxillary first molars. I believe that the factor of greatest influence in discrediting the importance of classification was the chaos that resulted from the discovery and presentation of undeniable proof that the maxillary molars were prone to wander over their basal bones.

Now the mere fact that the landmarks that were introduced primarily for this purpose were found unreliable, does not detract from the objective in view nor from the importance of the process. The need for the grouping of cases whose variations from normal are similar and which require definite corrective procedures incorporating the application of force in the same manner, must appear to the systematic mind as a necessity. Hence, when the fallacy of depending upon inclined plane relationship was evidenced, it was but natural that attention was directed toward the osseous structures as offering a stable basis for classification. And if the direction and localization of facial growth can be studied by noting the variations which occur from time to time in the facial bones, using certain points of the cranial

anatomy as the basis for measurement, it seems reasonable that cranial anatomy may also serve as a really scientific and stable base from which to classify malocclusion. Then the body of the mandible, which is the mobile bone of the denture and has the lower dental arch built upon it, can be taken as the variable factor. This is in harmony with Dr. Angle's original contention that the mandibular molars were the landmarks that varied their relationship to the maxillary dental units and determined the class in which to catalog the malocclusion.

If then the inclined plane relationship is ruled out as the fundamental factor in classification and if this is supplanted by the relationship of bony parts, are the teeth and their occlusion to be eliminated from the picture entirely? By no means. But their relationship to the equation changes considerably. Tooth inter-relationship now offers accumulative evidence for deducting the correct classification in complicated and doubtful cases and determines the logical plan of treatment. In other words, there are many cases that cannot be classified by simply glancing at the profile photographs and from these deciding upon the relationship of the body of the mandible to the cranial anatomy. These are borderline cases whose underlying osseous structures have been influenced by occlusal stresses. A study of the tooth interrelationship will aid in clarifying the problem and lead us to a rational conclusion. The role that the teeth themselves now play will be carefully expounded in the latter part of this presentation.

I am fully cognizant of the fact that the pendulum is swinging far over to the conclusion that occlusal forces have little or no effect upon modifying the form of the basal structures. Many orthodontists feel very strongly that the form of a bone is determined by the degree of activity present in the centers of growth. To substantiate this contention we all have corrected cases that show little or no improvement in facial lines after treatment, although the teeth are occluding correctly as to their inclined plane adjustment. But it seems to me that these are cases in which the growth forces were lost to such a marked degree that their influence was negative at a critical period. A certain portion of bone that was to be laid down at a particular age period was never constructed. The opportunity for its being built was lost forever, then and there. Certainly no occlusal stress can ever be expected to influence something that is not, nor to stimulate into renewed activity a growth center whose work is finished. But in any bone that is still actually growing clinical evidence does apparently indicate that there is some influence exerted by occlusal stress. A classical picture of this is exhibited by the massive jaws of the Eskimo. In practice we see it in the typical Class III case when compared with the Class III cases evolving

under the influence of Class I bio-mechanics or the Class I case with Class III bio-mechanics in action. So, I believe, we do have profiles modified from the type that we would expect to find in a certain Class, both by abnormal growth forces and perverted functional stresses. Consequently, we must include in our determination of a correct classification several important tooth relationships and denture inter-relationships.

With these fundamental facts in mind, definitions of the various Classes can be given as follows:

Class I. All cases of malocclusion in which the body of the mandible and its superimposed denture is in correct mesiodistal relationship with cranial anatomy. Of these two factors the position of the body of the mandible is the more important item.

Class II, Division 1. Cases of malocclusion in which the body of the mandible and its superimposed denture is in distal relationship to cranial anatomy and in which the maxillary incisors are in labial axial inclination.

Class II, Division 1, *Subdivision.* Cases of malocclusion in which the body of the mandible and its superimposed dental arch is in distal relationship to cranial anatomy on one side only and in which the maxillary incisors are in labial axial inclination.

Class II, Division 2. Cases of malocclusion in which the body of the mandible and its superimposed denture is in distal relationship to cranial anatomy and in which the maxillary central incisors are in vertical or lingual axial inclination.

Class II, Division 2, Subdivision. Cases of malocclusion in which the body of the mandible and its superimposed denture is in distal relationship to cranial anatomy on one side only and in which the maxillary central incisors are in vertical or lingual axial inclination.

Class III. Cases of malocclusion in which the body of the mandible and its superimposed dental arch is in mesial relationship to cranial anatomy.

Class III, Subdivision. Cases of malocclusion in which the body of the mandible and its superimposed dental arch is in mesial relationship to cranial anatomy on one side only.

As you will note, primary emphasis has been placed upon the body of the mandible as the determining factor in classification. I can readily understand that your first reaction to this may be one of rebellion, because you will say, "How can any reliable conclusion be drawn from a factor that so largely depends on the operator's opinion of whether or not the facial lines are distorted by a distally or a mesially displaced body of the lower jaw?" If this were the only symptom upon which to base our conclusion I, too, would agree. But the study of the facial lines is but one item to be considered and the conclusions do not depend upon this factor alone, but upon an

accumulation of evidence gathered as a result of carefully studying five other important sources. The deductions derived from a study of *all* these various factors not only determine the true classification of each case, but also furnish the data from which a comprehensive plan of treatment can be outlined.

These six processes of case study for the purpose of classification will now be tabulated in the sequence in which they should be followed and not one of them should be omitted from the study of any case, if errors in classification and treatment are to be avoided. They are enumerated as follows:

1. A study of the inclined plane relationship.
2. A study of the axial inclination of each dental unit.
3. An analysis of the relationship of the interproximal line of the central incisors in the two arches and a comparison of the relationship of these lines to the mid-sagittal plane of the head.
4. The noting of rotated buccal teeth, especially the maxillary molars.
5. A study of the intra-oral and profile roentgenograms.
6. A study of the facial photographs, both the front view and each profile picture.

Let us now elaborate somewhat on the importance of each of these steps.

1. The inclined plane adjustment of the teeth is a very good index of the relationship of the body of the mandible to cranial anatomy, provided the individual tooth units are, in turn, in correct relationship with their bony bases. Consequently it may be used as a factor of influence in doubtful cases, but such cases must always be checked carefully to determine whether or not each tooth is in its correct mesiodistal location on the bone upon which the dental arch is built. The most important clinical method that the operator can apply for the purpose of determining tooth shifting on the basal bones is through the study of the axial inclination of the teeth. This then brings us to the second of the processes through which we must pass in our study.

2. The study of the axial inclination of the individual teeth is, in my mind, the most important of all the steps that are here enumerated. It determines, quite conclusively, whether there has been a forward movement of buccal segments in the denture and hence is not only of importance in arriving at a correct classification but also points out the proper manner of treatment. Any method of case analysis that omits the study of the axial inclination of the teeth is indeed a faulty one, for it fails to take advantage of the most reliable symptoms of the shifting of teeth over their bony bases. Furthermore, if in treatment such misplaced dental units are not brought back to their intended location on their basal bones and coincidentally placed in harmony with the cranial anatomy, normal occlusion has not been re-established. The corrected denture will be too far forward in relation to the

cranium and then stability of structures is jeopardized and esthetic conditions are marred. For the purpose of classification, teeth that have shifted from their correct location on their basal bones must be mentally replaced and deductions made secondarily to establishing this mental conception of the normal.

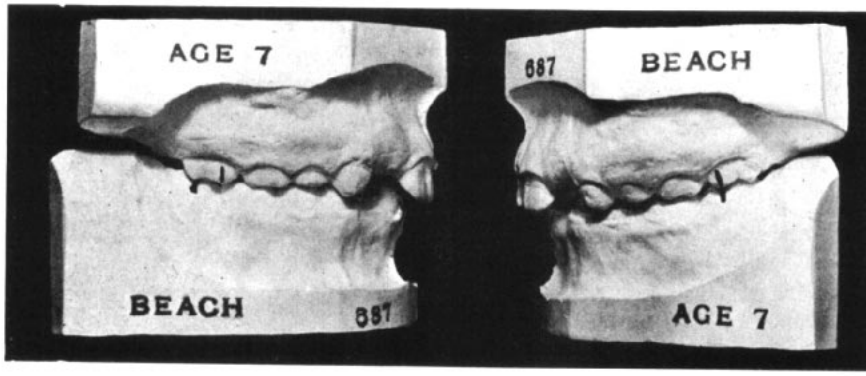

Fig. 1
False position of inclined planes, on left side of model, due to a forward shifting of mandibular condyle on this side.

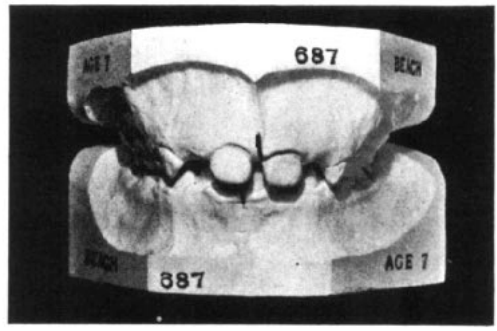

Fig. 2
The effect on the median line harmony induced by a forward shifting of the condyle on the left side.

3. Median line harmony and disharmony are exceedingly important factors to study. In the maxillary arch, disharmony of the mid-central

line with the mid-sagittal plane of the head indicates a tooth shifting over the basal structures, unless it is simply limited to a tooth-crown variation. This latter condition is differentiated by an abnormal axial inclination.

In the mandibular denture however, we may be confronted by three possibilities. First, a shifting of the teeth over their bony base; second, a shifting of the mandible with its superimposed denture produced by the forward slide of one condyle onto the articular eminence; third, a combination of the two conditions. The mandibular shift (Figs. 1 and 2) is differ-

Fig. 3
Facial inharmony resulting from the forward shifting of the left mandibular condyle.

entiated by a disharmony in the facial lines, the mental protuberance (Fig. 3) being carried out of alignment with the mid-sagittal plane. When the condyle is thrown forward on one side to establish more serviceable occlusion, the inclined planes on the side of shifting will be thrown forward a corresponding amount. This frequently can be detected in the profile photograph (Fig. 4). In such a complication, the teeth so affected must be mentally carried back until they can be visualized in their correct relationship with the cranium before deciding upon the classification. On the opposite side the inclined plane relationship remains undisturbed in its mesiodistal relationship with the cranial structures.

It is well to emphasize the fact that harmony of the two mid-central lines does not always indicate that they are in alignment with the mid-sagittal plane of the head. The orthodontist may find himself very much in error in classification and subsequent treatment plans if he takes this for granted.

In the case illustrated in Figs. 15, 16 and 17, there is perfect alignment

between the mid-central lines of the maxillary and mandibular dentures. Study of the facial lines, however, shows very clearly that the mandibular protuberance is out of harmony with the mid-sagittal plane of the head. Here we are dealing with a mandibular shift in the mandibular denture and a tooth shifting in the maxillary denture which accounts for the harmony of the mid-central lines, but which, if overlooked, would lead to a wrong classification and a sad error in treatment. We will discuss this case again, for it is exceedingly interesting and a splendid illustration of the intimate interrelationship between classification and treatment.

Fig. 4
The profile picture of the right side shows the true relationship of the body of the mandible to the cranium. The true relationship of the body of the mandible to the cranium is rendered obscure in the left profile photograph by the forward displacement of the left condyle.

4. The presence of rotated teeth in the buccal segments must be recognized as a disturbing factor to correct inclined plane adjustment, because of the added space that is required to accommodate a rotated tooth, especially in the case of the molars.

5. A study of the intra-oral roentgenograms will, of course, detect missing or supernumerary teeth and, if taken skillfully, confirm faulty axial positions and rotated teeth. The density of the alveolar structure is another important detail to register, especially when considering the prognosis.

Profile roentgenograms, standardized in the manner that Dr. Broadbent advocates, can be almost positive in determining the relationship of the body of the mandible to the cranial anatomy and would be extremely valuable evidence in doubtful cases. Unfortunately, there are few orthodontists who have the necessary equipment to make them. However, even the routine profile head plate will be found of aid in differentiating lack of growth in the

body of the mandible, especially in cases of hypertrophied mentalis muscles. I must admit that I have not taken advantage of this factor in the past to the degree that is warranted. A mandibular shift can also be confirmed by clear temporo-mandibular joint roentgenograms.

6. Finally, we consult the profile photographs and, in doubtful cases, study the patient to confirm the mass of evidence that has been accumulated in carefully checking the five previous steps. Then, and then only, is the classification decided upon and the treatment logically outlined.

Let us now proceed to make practical application of this process of

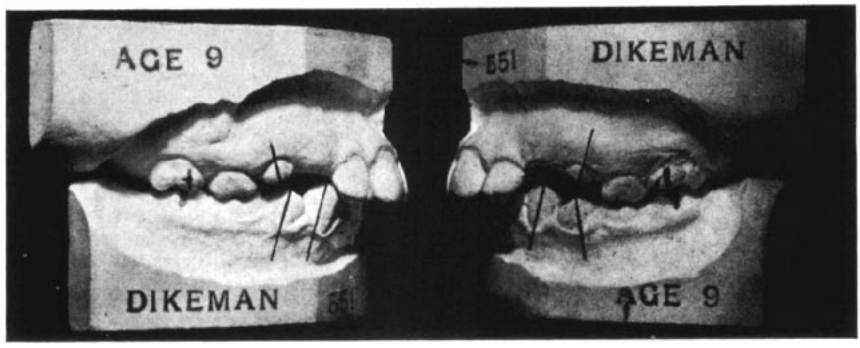

Fig. 5
The inclined plane relationship would indicate a Class I case. Faulty axial relationship of the mandibular buccal teeth shows a forward shifting and hence a Class II case.

case analysis for classification and treatment purposes. I shall not waste your time by discussing typical cases, over which there is little chance for disagreement, but will confine my analysis to cases that require careful study before definite conclusions can be reached.

Case I. On the right side of this case (Fig. 5), the inclined plane relationship of the first permanent and second deciduous molars and first premolar teeth is correct. If we limited our conclusions as to classification upon this factor alone there would be no question but that this case should be placed in Class I so far as the right side is concerned.

Turning to the left side, we find that a similar condition of permanent molars prevails, while the deciduous molars and first premolars are in end-to-end relationship. Again our inclined plane adjustment indicates a Class I case.

We pass now to the second of our processes of analysis, i.e., the axial position of individual teeth. On the right side the maxillary incisors are in a slightly exaggerated, labial axial position. The maxillary first pre-

molar shows a decided mesial axial perversion. The maxillary molars are in correct vertical axial inclination. From the lack of sufficient room for the maxillary canine and from the mesial axial inclination of the first premolar, it can be deduced that the maxillary buccal teeth on this side have moved slightly forward from their correct relationship to their bony base. This would explain the lack of correct relationship in the adjustment of the maxillary and mandibular first premolars and place this case more perfectly in Class I, for the molar relationship would still be within the normal range of inclined plane relationship.

In the mandibular denture however, we note a distinct mesial axial inclination of the right canine and first premolar. The canine is overlapping the lateral incisor, as shown by the front and occlusal views (Figs. 6 and 7). The incisors are not lingually displaced on their base, as they show no lingual axial inclination exclusive of the mandibular right lateral. Therefore, we must transpose this mandibular buccal segment, which unquestionably has shifted forward, to a position that is in normal relationship to its bony base. The transposition required is so extensive as to throw the mandibular teeth into distal relationship with the maxillary teeth and a Class II adjustment of inclined planes is now effected.

On the left side we find almost duplicate modifications of axial positions in the maxillary arch, indicating a slight forward movement of the buccal segment which is now mentally compensated for. In the mandibular denture the left canine is not in mesial axial inclination, but in distal axial perversion. Careful study of this faulty axial position shows very conclusively that here is one of the rather unusual cases in which we have a bodily forward movement of the canine. It may be explained in this case very well. If you will note the location of the mesial marginal ridge of the mesially inclined first premolar, you can observe that it is acting as a perfect fulcrum for a force exerted against the canine crown, to effect a forward movement of the root. The lip, in this case, furnished the power for putting such a lever in action, and we have as a result, a distal and somewhat lingual axial inclination in a canine that is too far forward on its basal bone. The first premolar leaves no doubt that the left mandibular buccal segments have moved forward. So mentally replacing these into correct relationship with the body of the bone, we observe that they assume a distally occluding adjustment with the maxillary buccal teeth. Now our classification has changed to Class II, Division 1. But we are not yet through with our problem. We have not sufficient evidence to confirm either one or the other deduction.

The mid-central lines must now be taken into consideration (Fig. 6).

There is a slight lack of harmony here, but this is readily accounted for by the breaking of the contact points of the right canine and lateral. This has permitted a minor shift of the mandibular incisors to the right. Therefore in the case we are now studying, the inharmony of the two median lines is of such a minor degree that we may pass it by as having no influence upon classification. It must be considered under treatment, however.

Now let us study the occlusal view of the buccal teeth. A rotation of these teeth, especially the first molars, might be of sufficient degree to cause a forward displacement of the teeth anterior to them and thus modify the

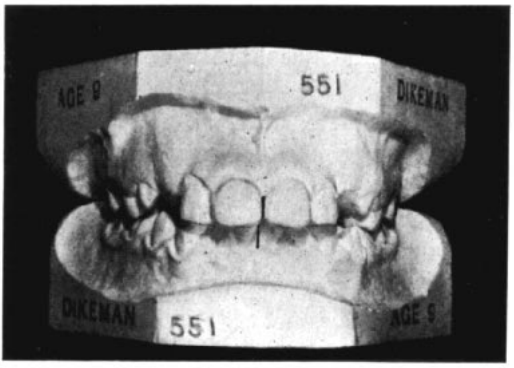

Fig. 6
Slight median line disharmony due to a shifting of the mandibular incisors to the right.

inclined plane adjustment (Fig. 7). Here we do not find sufficient rotation to cause any marked effect on proximal teeth. In the mandibular occlusal view we have evidence of the forward position of the buccal segments.

Our next analytic step takes us to the roentgenograms. Nothing abnormal appears in this case in the way of missing or supernumerary teeth. The x-ray pictures of the premolar areas confirm the perverted axial inclination of these teeth.

Our court of last resort is now reached. We study the photographs, especially the profiles, to determine the relationship of the body of the mandible to cranial anatomy. So far, we have come to two very different conclusions concerning the classification of this case. Our inclined plane analysis shows this to be a Class I case, while our analysis of axial position places the case in Class II, Division 1. Now, do you not see how closely treatment is associated with classification? If this is a Class I case, we must move the mandibular incisors and canine teeth forward and bucally to effect harmony in the two arches. If it is a Class II, Division 1, case, we

will move the mandibular buccal teeth distally and then take all the maxillary teeth distally as a secondary procedure. All of this knowledge concerning the proper method of treatment of this case has been gained during our systematic study of tooth malposition for the purpose of reaching a correct classification.

Now let us study the profile photographs (Fig. 8). My deduction from these pictures is that the body of the mandible is in distal relationship to the cranial anatomy. It is not an exaggerated defect for two very good reasons. First, the characteristic facial expression of lack of forward

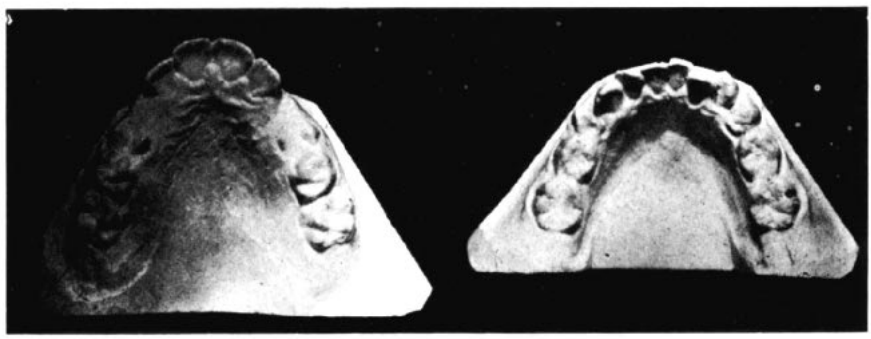

Fig. 7
The occlusal views demonstrate an absence of tooth rotations in the buccal areas, but show a forward shifting of the mandibular buccal teeth.

growth in the body of the mandible is covered up, to quite an extent, by the enlarged mentalis muscles. Second, a factor has been at work here, and I wish to place considerable emphasis upon its influence for we shall hear more of it later, that has given considerable aid to this mandible in its effort to obtain sufficient forward growth. This has resulted in evolving a much more perfectly formed bone than we would expect to find in a typical Class II lower jaw. Here we have a Class II case with Class I biomechanics in action, so far as occlusal stress is concerned. It was that adjustment of buccal tooth surfaces that dictated a Class I decision, when we considered classification from only the standpoint of inclined plane relationship. This normal interlocking of the inclined planes (Fig. 5) does not tend to throw the occlusal stress force in a distal direction because the mandibular molars are not forced into mesial axial perversion, with the maxillary molars assuming a distal axial inclination. The occlusal stress force has been delivered along correct vertical lines and hence the bony base responded to the best of its ability and built a bone whose architec-

tural form more nearly approached perfection than in the typical Class II case. I feel very positively that occlusal stress action must be taken into consideration in analyzing the relationship of basal bones to cranial anatomy, for their architectural form is certainly moulded and modified under the influence of functional stress. There is plenty of clinical evidence to support this claim, even though scientific evidence may not be at hand to back up these deductions.

Fig. 8
These profile pictures point to a distal relationship of the body of the mandible to cranial anatomy, indicating a Class II case.

As the result of the complete analysis of this case for the purpose of classification, we now have some very important and valuable data upon which to base our treatment. We find that we have a Class II, Division 1, case complicated by a slight forward movement of the buccal segments of the maxillary denture and a marked forward movement of the buccal segments of the mandibular denture. The logical plan of correction is quite clear. The primary movement will be the distal shifting of the buccal segments in the mandibular denture until these are placed in their normal relationship with their basal bone. In performing such a corrective movement, we reduce our case to a simple Class II, Division 1, malocclusion. From that point on, we proceed with the routine Class II treatment, which is, of course, the distal movement of the entire maxillary denture until correct occlusal inclined plane relationship is established.

Here is a Class II case in which we shall and did resort to Class III elastics in the primary stage of treatment and temporarily produced a

greater disharmony in the facial lines than appeared in the original condition. In so doing, however, we avoided the very serious mistake of carrying the lower denture too far forward in relation to its basal bone and to the cranium and of finishing treatment with both dentures in mesial relationship to their basal bones, which would have hideously deformed the patient for life. This condition would have resulted from superficiality in classification, such as basing this decision upon the results of a quick glance at the inclined plane adjustment. The prognosis in this case cannot be

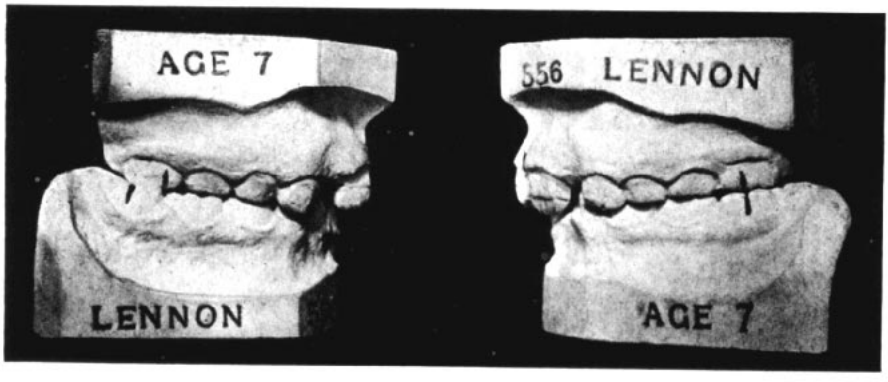

Fig. 9
The inclined plane relationship would dictate a subdivision case in Class II. The axial position of the teeth is normal, also.

considered in quite as favorable a light as it would have been without complications, while the treatment is quite unusual, but can now be clearly and definitely outlined in terms of the tooth movement that is required.

Case II. And now let us consider another atypical case of malocclusion. The left side of the models illustrated in Fig. 9 show an inclined plane adjustment that is correct and a Class I conclusion is justifiable if this evidence alone is considered. On the right side a Class II adjustment of inclined planes is found. Therefore, from the standpoint of the occlusion of the inclined planes, we are dealing with a subdivision of Class II.

Turning to a study of axial inclination, there is no perversion of axial inclination in the buccal segments, either maxillary or mandibular. In the incisor region, there is a lingual axial inclination of the left central and a mesial axial inclination of both centrals. If this is a subdivision of Class II, then it probably would be placed in Division 2 rather than Division 1.

The mandibular incisors are interesting in that the left one is in mesial axial inclination and the right one in distal axial perversion, which would

point strongly to a shifting of the incisors to the right, thus blocking out the right lateral incisor, the space for which is completely closed (Fig. 11).

There are no rotations of the buccal teeth.

Median line disharmony, however, is marked (Fig. 10). The man-

Fig. 10
Marked inharmony of the mid-central lines pointing to a tooth or a mandibular shift.

Fig. 11
No rotations of the molars are in evidence. The mandibular right lateral incisor is completely blocked out.

dibular intercentral proximal space is displaced to the right of the mid-sagittal plane, with which the maxillary intercentral proximal space is in harmony.

We have already noted that the perverted axial conditions of the mandibular centrals indicated that these teeth have shifted over their bony base and are displaced to the right. But we cannot permit ourselves to be satisfied that all of this displacement is due to tooth shifting, for we know that it might be a combination of tooth shifting and mandibular displace-

ment. The lingual occlusion of the right maxillary molar should make us suspicious of a mandibular shifting. We therefore examine the front view photograph of our patient and if this does not tell us anything we go to the patient.

But in this case the photograph is sufficient, for this exhibits a mental protuberance that is out of harmony with the mid-sagittal plane. Therefore, we are dealing with a combined cause of median line disharmony, i.e., a tooth shifting and a mandibular displacement. The left condyle is occluding on the articular eminence. Hence we must mentally replace that

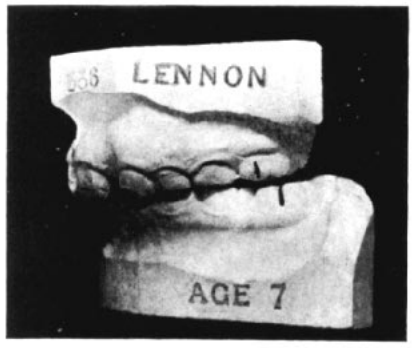

Fig. 12
The inclined plane relationship resulting from replacing the left condyle in the mandibular fossa as required for correct analysis of the classification and for proper treatment.

condyle in its correct position in the temporo-mandibular articulation. When we do this (Fig. 12) we have changed the picture for classification and for treatment. We also know how much to shift the mandibular incisors to the left and how much to move the right canine to gain space for the right lateral incisor.

The classification now resolves itself either into a Class I case with the maxillary teeth too far forward, or a full Class II, Division 1 or Division 2, case. Now let us proceed with our analysis.

Study of the roentgenograms shows that the maxillary lateral incisor teeth are present.

Finally, we must consult the profile photographs to aid us in making the differentiation (Fig. 14). The right profile photograph clearly indicates that the body of the mandible is in distal relationship to the cranial anatomy. The profile of the left side of the face is more confusing, but let us remember that the left condyle is not in the mandibular fossa but anterior to it. Hence the chin is further forward than the actual amount of for-

Fig. 13
Inharmony of the facial lines indicating a forward displacement of the left mandibular condyle.

Fig. 14
The profile of the right side clearly shows a distal relationship of the body of the mandible to the cranium. The profile of the left side is improved by the false location of the left condyle.

ward growth in this mandible would actually demonstrate. When this condyle is mentally replaced in its fossa, the profile defect would be as great on this side as on the other. Consequently, our final conclusion would

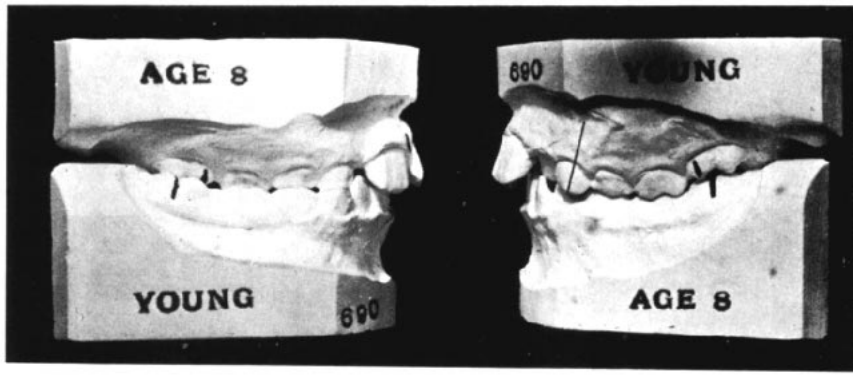

Fig. 15
The inclined plane relationship of the right side indicates a Class II case. Note the lingual occlusion of the maxillary buccal teeth, indicative of a forward shift of the opposite condyle. On the left side a Class I case would be decided upon if judged from inclined plane relationship only. The axial relationship of the left maxillary canine points to a forward displacement of the crown of this tooth.

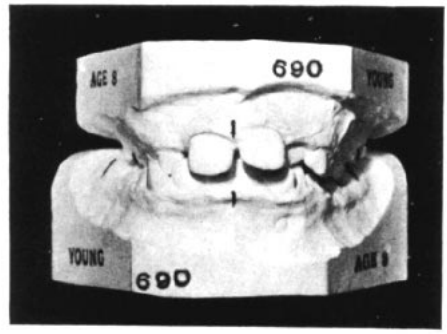

Fig. 16
Mid-central line harmony in a mandibular shift case due to a coincidental movement of the maxillary central incisor to the right.

place this case in Class II with a chance for argument as to whether it is Division 1 or Division 2, because of the maxillary incisor inclinations. The right one says Division 1 and the left one indicates Division 2. It is further complicated by a forward shifting of the condyle of the mandible on the left side.

Here again is a case which would be treated quite differently if it were analyzed as a subdivision case with the median line disharmony wholly due to a shifting of the mandibular incisors. When treated as a complete Class II case, that portion of the median line disharmony that was due to a shifting of the condyle automatically corrected itself when the condyle assumed its proper position in the mandibular fossa, which it did,

Fig. 17
Facial line inharmony proving the presence of a forward displacement of the left condyle.

as distal movement of the left segment of the maxillary denture took place and proper width in this arch was established.

Case III. Here is the case that was thrown on the screen when discussing the importance of the median line in analyzing for classification.

On the left side (Fig. 15) we note that the inclined plane adjustment is correct and this would point to a Class I selection.

On the right side we find either a slight distal relationship of the mandibular denture, because of the cusp-to-cusp relationship, or a minor degree of mesial shifting of the maxillary dental units. Hence we may say that the right side points to a transitional Class II conclusion or a Class I with the maxillary teeth forward. We also discern a lingual occlusion of the maxillary buccal units, which makes us suspicious of a mandibular shift.

A study of the axial position of the teeth on the left side shows a maxillary molar that is in distal axial inclination and a deciduous maxillary canine that is mesio-axially inclined.

In the mandibular denture, on the left side, there is an exaggerated curve of Spee with the first permanent molar slightly mesio-axially inclined. The position of the second deciduous molar makes us suspicious that we

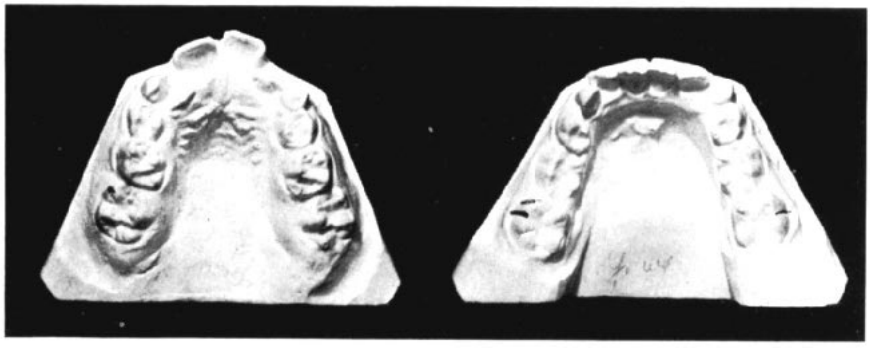

Fig. 18
Marked rotation of the maxillary first permanent molars.

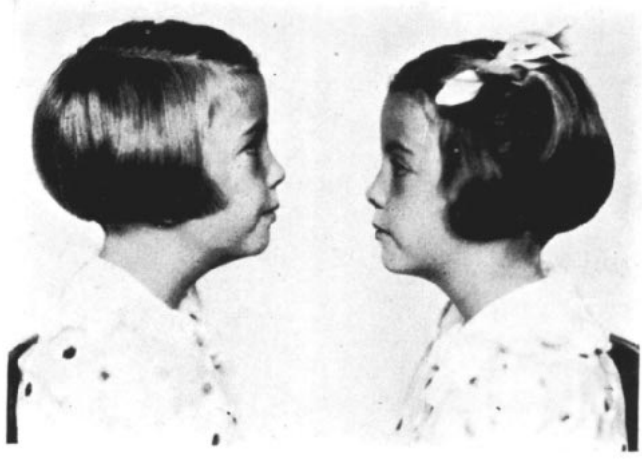

Fig. 19
The profile photographs show that the body of the mandible is in normal relationship to the cranium and the case is a Class I malocclusion.

may be dealing with a submerged tooth which is ankylosed to the bone (Fig. 20). The left deciduous mandibular canine is slightly inclined lingually. Axial inclination only aids us here by showing a slight tipping forward of the crown of the first permanent mandibular molar to which the maxillary molar has adjusted its axial relationship. There is also a forward

movement of the buccal segment of the maxillary denture, indicated by the mesio-axial inclination of the left deciduous canine and the encroachment upon the left lateral incisor area.

On the right side the axial adjustment of all the buccal teeth except the canine is about normal. This axial perversion of the canine and the encroachment of the right buccal segment onto the lateral incisor region

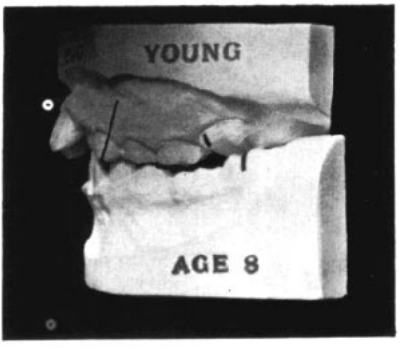

Fig. 20
The inclined plane relationship resulting from replacing the condyle in its mandibular fossa. This also indicates that the maxillary buccal teeth must be moved distally in treatment.

(Fig. 18), point very strongly to a forward movement of the maxillary right buccal segment. Mentally replacing these forwardly displaced teeth re-establishes a correct mesio-distal adjustment of the inclined planes of the right side and indicates a Class I case.

Turning now to the front view of this model (Fig. 16), we note that the mid-central incisor lines of the two dentures are harmonious, but there are two factors that should lead us to a more careful consideration of this median line. First, there is the lingual occlusion of the maxillary buccal segment on the right side and the great loss of space for the right maxillary lateral. We have already ascertained that the right maxillary buccal teeth have moved abnormally forward to a considerable degree, overlapping the incisor area, but not sufficiently to account for such a complete closure of this right lateral incisor space. Therefore, the greater proportion of space closure must be due to a shifting of the maxillary centrals to the right and a lingual movement of the right maxillary canine.

But if we move the maxillary incisors to the left to make partial space for the right lateral, we will encroach on the left lateral incisor area and upset the mid-central line harmony. This movement can only be justified

by finding a lack of harmony between the maxillary mid-central line and the mid-sagittal plane of the head. Examination of the patient showed that there was such a lack of harmony, for the central incisors were displaced about one-half of their width to the right. This being so, we must in turn conclude that the left maxillary buccal segment has shifted forward and is overlapping the left incisor area. Mentally reconstructing our case we now have a Class III relationship on the left side and a disharmony of the mid-central lines, but we have acquired a balance between the maxillary mid-central incisor space and the mid-sagittal plane of the head.

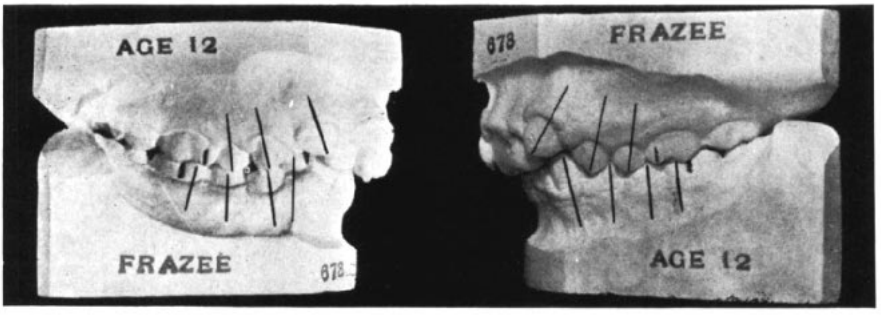

Fig. 21
The inclined plane relationship in this case would signify a simple Class II, Division 2, malocclusion. An analysis of the axial position of both maxillary and mandibular teeth demonstrates a very complicated case.

This Class III relationship, combined with the lingual occlusion of the right maxillary buccal segment, makes us even more certain that there is a mandibular shift caused by a forward slide of the left condyle. If this is so, the front view photograph should indicate it. Turning to this (Fig. 17), there can be no doubt of its presence. So once more we mentally reconstruct the true relationship of the bony structures with the cranial base (Fig. 20) and the medial line disharmony disappears, while the inclined plane adjustment comes back into Class I when we mentally replace the left maxillary buccal segment in correct relationship to its base.

The maxillary molars are quite badly rotated (Fig. 18) which accounts for some of the forward displacement of the buccal teeth.

The x-rays confirm the ankylosis of the left mandibular second deciduous molar, while the profile photographs (Fig. 19) indicate a normal relationship of the body of the mandible to the cranial anatomy.

The classification is Class I, complicated by a slight forward shifting of the maxillary buccal segment on the right side, a marked forward shifting

of the maxillary buccal segment on the left side, a movement of the maxillary central and left lateral incisors to the right and a forward shifting of the left condyle of the mandible onto its eminence.

Think of the errors possible in the treatment of this case if a careful analysis for classification had not been made.

Case IV. In analyzing the inclined plane relationship of this case, which will be the last one that we will study, we find two possibilities on the left side (Fig. 21). Either there is a distal relationship of the mandibular denture with the maxillary, or a mesial shifting of the maxillary buccal teeth. The inclined plane adjustment from superficial observation dictates

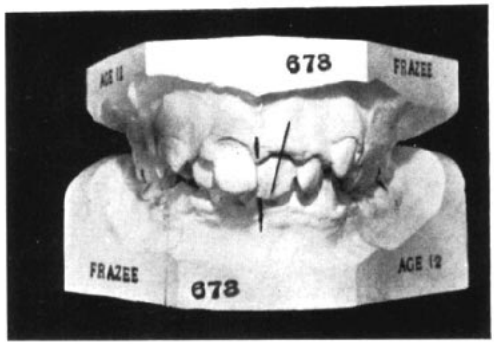

Fig. 22
A slight inharmony of the mid-central lines due to faulty mesial axial inclination of the maxillary left central incisor.

a Class II case. On the right side we find a similar occlusion of inclined planes. So far, then, our classification is Class II, Division 2.

Passing on to the study of the axial inclination of the various teeth, we see at once that we are dealing with a complication, for the maxillary canine on the left side is in marked mesio-axial inclination. Consequently, we must mentally readjust this buccal segment to a correct relationship with its basal bone. This throws the maxillary buccal teeth back into a Class I occlusion.

Turning to the mandibular denture, we find a similar mesio-axial inclination of the mandibular left canine. Then this buccal segment must also be mentally reconstructed into a correct positioning with its base. Again we have reduced our case into a Class II relationship.

On the right side, the maxillary canine is in mesio-axial inclination and overlapping the incisor area. Throwing this segment back to a correct position on the maxilla of this side, we establish a Class I adjustment of inclined planes.

On the right side of the mandibular denture (Fig. 23), we note that the first molar is in mesio-axial inclination; the second premolar is in a correct axial position; the first premolar is in disto-axial inclination and the canine is in perverted linguo-axial inclination. What conclusions are we to draw from this unusual combination of axial upsets?

We see that there has been a decrease in the tooth area from lateral incisor to molar, causing the canine, which apparently erupted unusually late, to be blocked out and forced lingually. This could be caused either by a lingual movement of the incisors or by a forward movement of the molars and premolars. If the incisors had been forced lingually, we would expect

Fig. 23
Various positions of faulty axial inclination of the mandibular right buccal teeth requiring careful analysis to determine the cause.

to see a linguo-axial inclination of these teeth, but they are upright. If anything, they are slightly labially located on their base.

In the buccal segment, we note that the first molar crown is tipping forward and the first premolar is in a disto-axial inclination. A muscular force must have been at work pushing the molars forward and, coincidentally, holding the crown of the first premolar from moving forward. This has resulted in a tipping forward of the first premolar root. Then the canine began to erupt and was forced lingually by the root of the first premolar and the lack of space in the arch to accommodate its crown width.

Thus we conclude that this mandibular buccal segment is also forward on its base and must be mentally replaced to its correct location. This again places our case in Class II.

Study of the median line harmony (Fig. 22) tells us that is correct, but that the crown of the left maxillary central has been carried to the right. The root apex of this tooth has not been disturbed. Note the marked mesio-axial inclination and the abnormal linguo-axial positioning of this left central.

The maxillary premolars on the right side (Fig. 24) show some rota-

tions which are causing these teeth to usurp more mesio-distal space than belongs to them, but not enough to account for the great amount of forward displacement of the right maxillary canine.

The roentgenograms confirm the faulty axial positioning of the teeth.

The photographs of the profiles (Fig. 26) give but little proof to our deductions that we have here a mandible whose body is in distal relationship to the cranial anatomy. I believe that the muscular perversions have prevented a greater deformity of the body of the mandible than is here found. The front view of the face (Fig. 25) does not give any indication

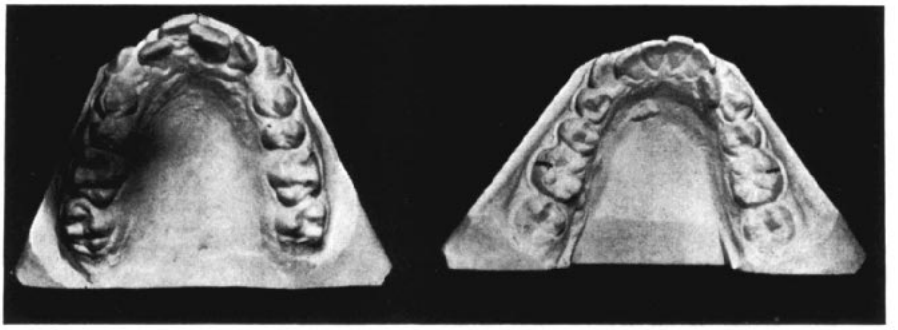

Fig. 24
Rotations of the maxillary left premolars and further evidence of a forward movement of the buccal teeth overlapping the incisor areas in both dentures.

that there is a forward displacement of either condyle, but it does tell us that in spite of the closed bite there is no lack of vertical growth below the nose. Hence we have no infraocclusion of the molars and premolars in the production of the overbite, but a supraocclusion of the incisors which must be corrected in treatment.

The classification of this case is Class II, Division 2, complicated by a forward shifting of all four buccal segments and an overbite due to supraocclusion of the incisors. The correct plan for treatment is clearly indicated as a result of our study of the case for classification purposes. These marked complications would never have been suspected if the case had been classified from a quick glance at the inclined plane adjustment, although, in this particular problem, the classification by inclined plane judgment would have been correct.

While I have chosen four cases which illustrate quite clearly certain factors that I wished to particularly emphasize, these cases are not at all unusual and can be duplicated in the practice of each one of you. Consequently, because these complications are so universally distributed, I be-

Fig. 25
No evidence of a mandibular condyle displacement. This picture also shows excellent vertical growth, showing that the overbite is due to the supraocclusion of the incisors and not infraocclusion of the molars and premolars.

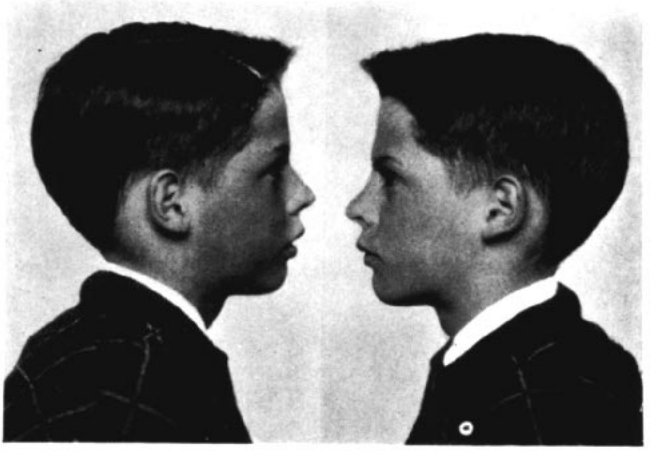

Fig. 26
These profiles give further evidence of a distal relationship of the body of the mandible to cranial anatomy. Enlarged mentalis muscle covers up the magnitude of the deformity, however.

lieve that the subject under discussion is worthy of the most careful consideration. I feel that the methods of approach to this process of case analysis should be uniform throughout the specialty so that the conclusions that are evolved from such a study will convey the same meaning to each and every one of us.

I hope that I have demonstrated that classification by inclined plane relationship alone is a superficial and erroneous procedure, because it frequently fails to visualize the true relationship of the mandibular unit to cranial anatomy and the abnormal location of individual teeth on their basal bones. Neither does it carry with it sufficient data to be of aid in the preparation of a logical plan of treatment. On the other hand, a classification that is based upon the relationship of the body of the mandible to cranial anatomy and which, coincidentally, reveals and describes all attending complications of tooth shiftings over their bony bases or of mandibular shifting, gives a clear picture of the malocclusion from a fundamental point of view and accurately and positively points out the problems associated with corrective procedures. Such a method of classification, when universally taught and comprehended, would evolve the same mental conception of the malocclusion for every orthodontist who had an intelligent grasp of the ideal which we have as our standard of achievement. It is simply the Angle Classification placed upon a sound, scientific basis and broadened to a degree that establishes it as a most important factor in determining the logical and consecutive steps applicable for the reduction of the deformity.

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