THE ORIGAMI CLEFT LIP

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" He who works with his hands is a labourer
He who works with his hands and his head is an artisan
He who works with his *hands* and his *head* and his *heart*
is an artist "

Attributed to Wang Wei (circa A.D. 699), famous poet, painter and physician—Tang Dynasty.

ORIGAMI, the art of paper folding, began as an Oriental art. Paper was invented in ancient China some 2,000 years ago and this art is just as old. It developed parallel to the ancient Buddhist custom of burning paper houses, furniture, vehicles and servants at funerals so that the deceased would be well provided and cared for in the next world. In the seventh century A.D. (Tang Dynasty), paper folding was brought to Japan and there it gradually developed into a highly creative art. In recent years, Origami has become the universal word for the art of paper folding.

We have tried, off and on during our spare time, to reduce the complex contours of the normal and abnormal lip-nose complex into lines and angles on paper. In doing so, we have been inspired by the beauty and originality of Limberg's paper models. Recently, we have come up with two Origami models—one for the normal lip-nose complex and the other for the congenital cleft lip deformity. It is our intention that this communication serve two purposes. The immediate one is that it provides us with an opportunity with paper, pencil and paste to reproduce accurately a deformity which we encounter often in our everyday practice. The printed paper patterns (Fig. 3)[2] have been distributed to the older cleft lip/palate patients in our service and many hours of enjoyment have been derived in folding them into models. In this way, our patients have come to know more of their deformity and appreciate what we workers—medical, dental and ancillary—are doing for them.

The other, and we consider this the more important one, is that it introduces a new tool to the study of the perennial cleft lip problem. All the energies of the plastic surgeon, the embryologist and those interested in the congenital cleft lip/palate deformity have hitherto been directed (and rightly so) towards converting the abnormal back to the normal. It will be worth our while to pause for a moment and work in the opposite direction, i.e. begin with the normal lip and go step-by-step systematically towards the abnormal cleft-lip deformity. This exercise can be achieved with the aid of the Origami models. The normal lip-nose complex is divided up into appropriately shaped and sized symmetrically placed co-planar units (Figs. 1 and 2). When the pattern is folded along the delineated lines, we will get a normal lip-nose model (Figs. 3A and 4). To get an abnormal cleft lip-nose model (Figs. 3B and 9) we have to alter the size and shape of the various units concerned although their position relative to one another remains unchanged. We believe that a study of these individual " abnormal " units and their relationship to that of the normal will be of value. We have now arrived at certain basic configurations for these units. Using these units, we can easily produce by folding, an Origami model of the cleft lip deformity. For the sake of clarity, the various steps of our thinking are shown in diagrams (Figs. 1-7). We are documenting these Origami models in the hope they will stimulate further study along similar lines by a wider group on this common congenital deformity.

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[2] Printed patterns are available on request.

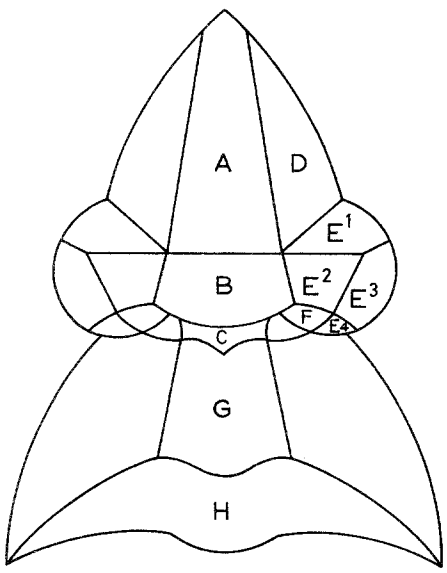

FIG. 1

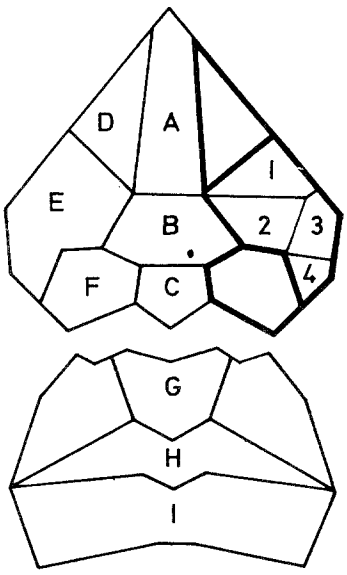

FIG. 2

Fig. 1.—Diagrammatic representation of the normal lip-nose complex. The whole anatomical area of the nose and the lip is divided up into smaller symmetrically placed units.

Fig. 2.—In the Origami model, these same units are bounded by straight instead of curved lines and they are now all co-planar. For the sake of simplicity, the lip segment is detached from the nose. Since the units are co-planar, we can see clearly the inner (hair-bearing) skin of the nostril (F) lying on each side of the columella (C). The mucous membrane lining of the lip is also represented (I).

Key

A: Dorsum of the nose
B: Nasal tip
C: Columella
D: Lateral surface of nose
E: Ala. This is sub-divided into 4 smaller areas
F: Inner wall of the nostril
G: Lip
H: Vermilion
I: Mucous surface of lip

SUMMARY

Studying Origami paper patterns of the cleft-lip nose complex, we would like to make the following observations:

1. There is very little difference between the perimeter of the nostril of the cleft and the non-cleft side. By pulling on the cleft side, thus widening the cleft, we notice that the slack is taken up by the acuteness of the columella side.

2. There is an apparent triangular defect in the lower portion of the columella border of the cleft. This is in concurrence with the observation made by Blair and Brown and later by Brown and McDowell. There is also an "excess" triangular-shaped area

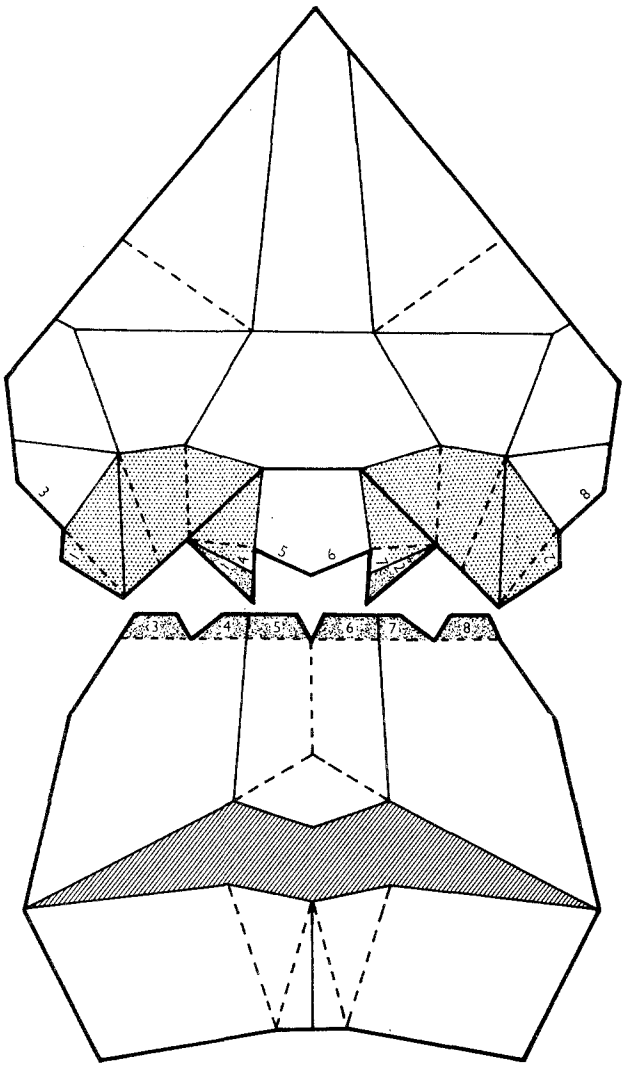

FIG. 3A

bordering the cleft side of the lip. This area is rightly utilised in the triangular flap repair (Tennison, Tennison-Randall operation).

3. The ala, together with its hair-bearing skin on the cleft side, appears to be stretched but we notice that this spontaneously corrects itself after the lip repair.

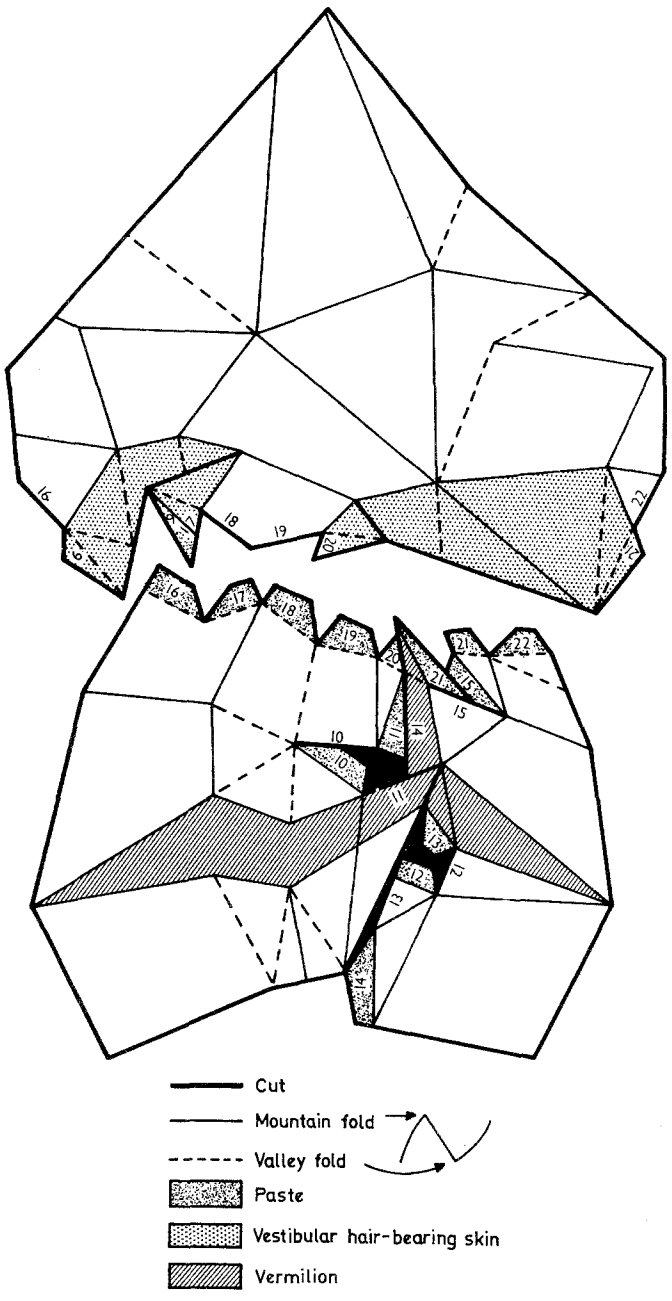

FIG. 3B

Fig. 3.—These patterns when cut, folded and pasted will give us the (A) normal lip-nose model and (B) the cleft lip model. Fins are added to facilitate pasting. Fold lines and cut lines are also included.

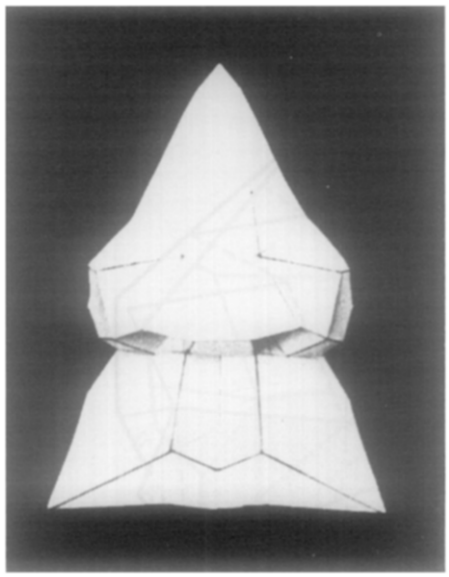

FIG. 4

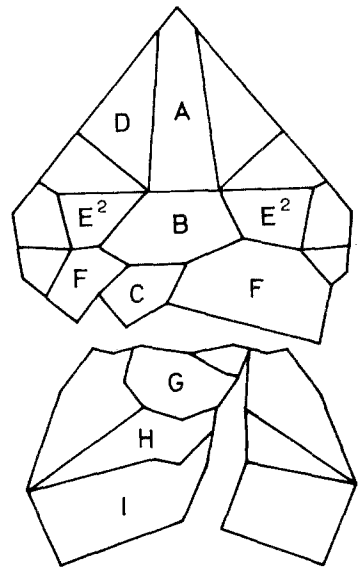

FIG. 5

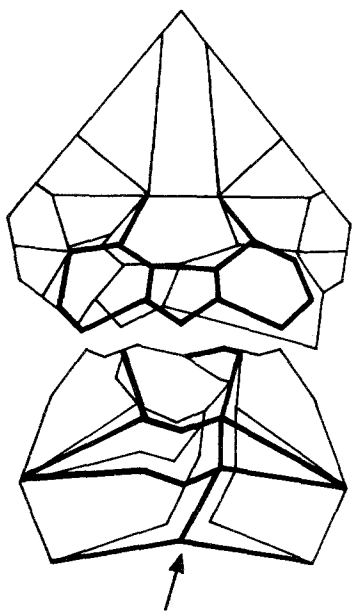

FIG. 6

Fig. 4.—Photograph of the actual model of the normal lip-nose complex.

Fig. 5.—This figure shows the changes that occur to the pattern as a whole and to the various units in particular when there is a complete cleft of the lip on the left side. The columella (C) is shifted to the non-cleft side with resultant constriction of the hair-bearing inner surface of the nose (F) on the same side and stretching of (F) on the contra-lateral side. Similar changes also occur in E^2 of the ala. The lower part of the nasal tip (B) follows after C and shifts to the non-cleft side. In the lip, there is rotation upwards together with a complete dehiscence of the lip into two parts. Note the thinning of the vermilion (H). The changes in the shape of these units become more evident if this is superimposed on the normal lip-nose pattern. This pattern when folded, somehow or other, does not give a true cleft lip model. Further changes must be made.

Fig. 6.—This shows Figure 2, in bold lines, superimposed on Figure 5.

The line of the cleft along the lip, indicated by the arrow, cuts right through the peak of the Cupid bow.

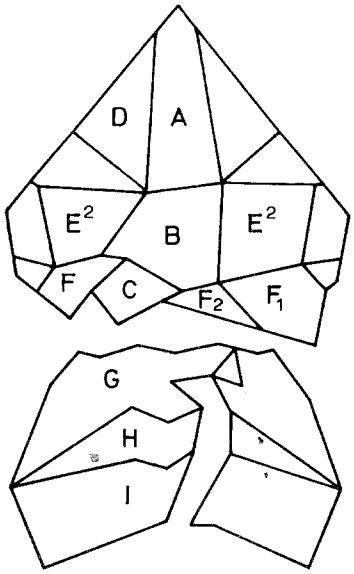

FIG. 7

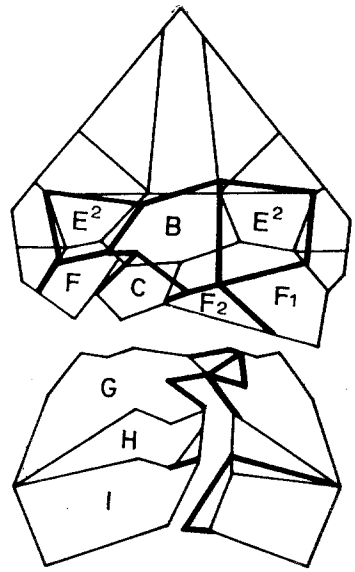

FIG. 8

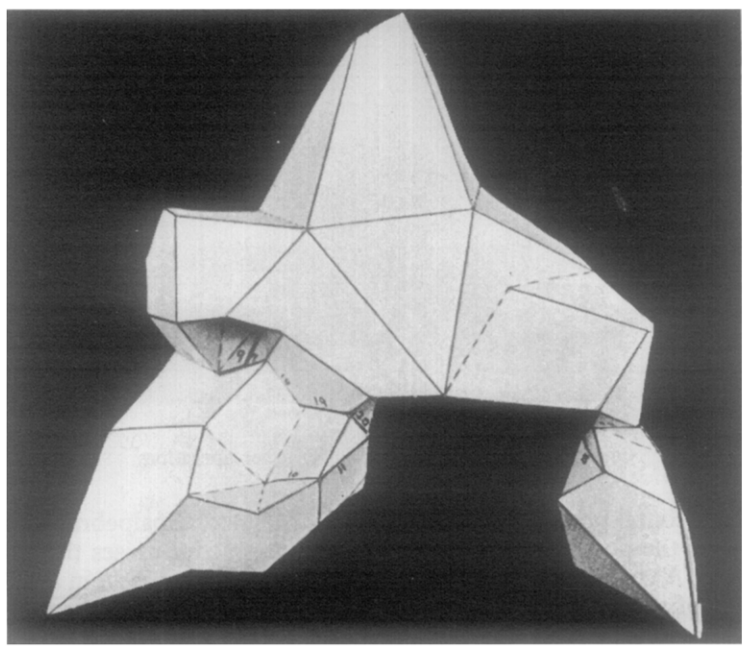

FIG. 9

Fig. 7.—This shows the final size and shape of the basic units and when we fold along the lines, we will get a paper model of a left complete cleft lip. We have obtained this pattern through trial and error. Note that units B and E^2 (especially that on the cleft side) have changed their shape and have increased in size when compared to Figure 5. In doing so, they have encroached principally upon the upper part of the hair-bearing area (F). The significance of this has not been fully elucidated. We now subdivide unit F on the cleft side into two smaller areas (F^1 and F^2). Changes also occur in the other units of both sides. In the lip, note the triangular defect in its lower border and a similar triangular extension on the cleft half of the lip. Changes in the vermilion and the mucous area are also shown.

Fig. 8.—This composite diagram shows Figure 7, in bold lines, superimposed on Figure 5.

Fig. 9.—A photograph of the Origami model of a complete left cleft lip made from pattern 3B.