REVIEWS

THE ADAPTIVE CHIN. By E. Lloyd DuBrul and Harry Sicher. (American Lecture Series No. 180.) 97 pp. Charles C Thomas, Springfield, Ill. 1954. $3.50.

A half century ago the tenor of evolutionary speculation was such that one could seriously state that a chin implied articulate speech and a higher evolutionary status for the being that was so blessed. Monkeys and apes and the lower forms of fossil men did not have such protuberances on the front of the base of the lower jaw. It was not many years, however, till comparative studies of primate mandibles showed differences in the shape and proportions of the mental region as well as differences in the angle and articulation; the relative position of the dental arch to the arch of the whole mandible was seen to change from form to form; phylogenetic reductions in tooth size were obvious too in such studies. Furthermore, human fetal mandibles were found to have separate mental ossicles and these called for explanation.

The harmonizing of all of these features posed a knotty problem of structural significance. Evolutionary transformation, however, served to explain the human chin; the different theories called for (1) shifts in the position of bone forming materials induced by fetalization, (2) formative influences arising from mechanical forces associated with tongue action and speech, (3) a reduction in the amount of supporting bone to harmonize with smaller teeth, and (4) the secondary mechanical influence of chewing-muscle forces upon phylogenetically altered patterns of bone structure. Little has been added to the picture during the past 20 years.

Now DuBrul and Sicher both review the historical developments in this field and present a critical evaluation of the data at hand. This is a handy package in itself. In addition they also carefully review a series of morphological changes that appear in the skulls and mandibles of a tree shrew, a lemur, two monkeys, a gibbon and a human. They maintain that, associated with the increasing tendency toward the erect posture in this series, there is (1) a forward migration of the foramen magnum on the cranial base and a shift in the plane of the foramen (relative to the normal body stance) from vertical to horizontal, (2) a movement forward of the posterior borders and angles of the jaw to avoid crowding of the neck viscera as the cranial

base shortens in harmony with the orthograde posture, and (3) an eversion of the whole lower border of the mandible from angle to angle, including the chin region. These changes are also associated with an anterior to posterior shift of cranial bulk, with a movement of the teeth from a more outward to a more lingual position relative to the bony arch of the mandible, and with slope changes in the axes of the cross sections of the bone as the mandible changes from a generally scoop-shaped to a plow-shaped structure. The lateral pterygoid muscles pull more transversely in the more advanced types of mandibles; the mental protuberance in the human, because of its anterior position, notably strengthens the bone relative to inward pulls of the lateral pterygoids.

The authors support their contention that the mandible adapts to the upright postural habit by further observations of a comparative sort. They compare the skull of an animal of normal quadrupedal habits with a semi-erect squatter-hopper type in each of two groups of mammals (Lagomorpha and the extinct South American Notoungulata). In each instance, as in the primate series, the mandibular base is more everted and the foramen magnum more horizontal in the semi-erect form than in the horizontal type.

The chin according to the view presented is an accessory adjustment in a wider phylogenetic adaptation to the upright posture involving both the mandible and the skull as a whole; brain enlargement, tooth reduction and changes in facial proportions have been concurrent trends which are to varying degrees correlated with the major postural adaptation. Like most concepts based upon the comparison of a handful of more or less selected type forms, these are not without an intrusive element of ingeniousness. The authors, nevertheless, do present a provocative idea which gets away from a myopic view of the chin as an entity in itself and treats of broader phylogenetic perspectives.

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GROWTH AT ADOLESCENCE. By J. M. Tanner. Pp. vii + 212. Blackwell Scientific Publications, Oxford. Published simultaneously by Charles C Thomas and the Ryerson Press. 1955.

Until recently there was a total lack of books on human growth, and it was necessary to refer students to the clinically-oriented summaries in the larger pediatric textbooks, or to the longer review articles (like Stuart's) published in the medical journals. Now we have two editions of Watson and Lowrey's *Growth and Development of Children*,