The lengthening of the mandible seems to have reached its maximum degree in the Middle Miocene, after which it again became shortened by the reduction of the symphysis, while the fleshy and now mobile proboscis was left behind as the sole organ of prehension.

In the upper dentition the chief changes are the loss of incisors Nos. 1 and 3, and the great increase in size of incisor No. 2, which eventually forms the great tusk characteristic of the later Proboscidea. The canines are soon lost. In the earliest forms, some at least of the cheek-teeth (milk-molars) are replaced by premolars in the usual manner, and these teeth remain in wear simultaneously with the true molars; but in later forms no vertical succession takes place, and as the milk-molars are worn they are shed, being replaced from behind by the forward movement of the molars. Of these also the anterior may be shed, until at length in old individuals of the later types the last molar is alone functional. The gradual increase in the complexity of the proboscidean molars is one of their most striking characteristics. All stages can be traced between the simple, brachyodont, bilophodont (quadritubercular) molars of *Mæritherium* (Middle Eocene) to the extraordinarily complex type of tooth found in *Elephas*. Thus in *Palæomastodon* (Upper Eocene) the molars are trilophodont, and the same is true of the first and second molars of *Tetrabelodon* (Miocene), in which, however, the last molar is complicated by the addition of further transverse crests. In the Stegodonts of the Siwalik Hills (Pliocene) a further increase in the number and height of the crests takes place, and the whole crown of the tooth is more or less covered with a thick coat of cement. Still later, the transverse crests become highly compressed laminæ united by cement, and these are as many as twenty-seven in number in the Pleistocene *Elephas primigenius* and the recent *E. indicus*.

The evolution of the lower molars corresponds with that of the upper molars. Of the lower incisors the middle and outer pairs (Nos. 1 and 3) are soon lost, but the second pair remains functional for a long geological period. When the symphysis becomes shortened, these incisors are sometimes retained as vestiges (e.g. in *Mastodon americanus*), but in the genus *Elephas* they have completely disappeared.

REVIEWS.

I.—Chart of Fossil Shells found in connection with the Seams of Coal and Ironstone of North Staffordshire. By Wheelton Hind, M.D., F.R.C.S., F.G.S., and John Stobbs, F.G.S. (Published by the North Staffordshire Institute of Mining and Mechanical Engineers, 1903. Price 5*s*.)

IT is an acknowledged fact that, compared with many other commercially less important geological formations, very little is known about the distribution of the fossils among the Coal-measures. In this respect the North Staffordshire Coalfield has been more carefully searched than others, though outside the

district this typical Midland coalfield is not so well known as the excellence of the sequence and preservation of its organic contents warrant. The chart by Messrs. Hind and Stobbs should draw attention to this region, for besides being of use to the mining student it will be found to be of more than local value, and should be studied by all interested in the Coal-measures.

The chart gives the order of sequence, distance apart, and synonyms of the seams of Coal and Ironstone of the Pottery and Cheadle Coalfields, in two sections drawn on a scale of 200 feet to the inch. The fossil shells distinctive of or especially abundant on certain horizons are drawn opposite to the particular bed in which they occur. No attempt has been made to subdivide the Coal-measures beyond the use of merely local terms for the higher portion of the sequence. Marine organisms are represented as occurring on three horizons—at the base, near the middle, and towards the summit of the coal-bearing strata. A noticeable omission, evidently due to extreme caution, is the band, rich in marine organisms, found many years ago by Mr. John Ward above the Gin Mine at Longton. Thin limestones with *Spirorbis*, so long held to be distinctive of the higher Coal-measures, are represented at two horizons low in the sequence. The fossils are clearly drawn, while their selection by Dr. Wheelton Hind guarantees that the typical forms have been chosen.

The authors have evidently taken great care in planning and drawing up the chart: it is to be hoped the Mining Institutes in other coalfields will follow the example of that of North Staffordshire by publishing similar charts, and thus show that they recognize the close union of the two sciences of Mining and Geology.

WALCOT GIBSON.

II. — CAPE OF GOOD HOPE. ANNUAL REPORT OF THE GEOLOGICAL COMMISSION, 1900. 4to; pp. 93. (Richards & Sons, Cape Town, 1901.)

I. The results of the survey of parts of the Uitenhage and Port Elizabeth districts (pp. 1 to 18). The Sunday's River Marine Beds, the Wood-bed series, and the Enon Conglomerate series constitute the great *Uitenhage* series; and these were studied in the Zwartkop Valley, the Bezuidenhout Valley, and on the White River and the Sunday's River. The fossil fauna and flora are referable to both the Jurassic and the Cretaceous series; and are here provisionally regarded as Upper Jurassic. The occurrence of much more recent deposits near the coast are alluded to. The observations made by earlier geologists on the district are carefully noted.

II. (Pages 19–54.) A survey of parts of Clanwilliam, Van Rhyn's Dorp, and Calvinia divisions led to the definite recognition of a separate series of sedimentary rocks (shales, sandstones, vein-quartz, quartzite, limestone, and conglomerate) underlying the Table Mountain Sandstone, and resting on the Malmesbury series. The conglomerates are decidedly glaciated, and much resemble those of the Congo in Oudtshoorn in some respects. The sandstones,