

compelled in the struggle for existence to sacrifice important parts of their organisation, while a more favoured collateral branch, in quiet progressive evolution, developed into a human race.

By a new kind of diagram Klaatsch endeavours to elucidate the distribution of the human races and the anthropoid apes. The femur of *Pithecanthropus* fixes its position in the neighbourhood of the eastern group. The chimpanzee is in many respects further removed from the gorilla than from the Neanderthal man. The African races exhibit some affinities with the Neanderthal type. As to the eastern people, the similarities between the skulls of young orangs and the skulls of Javanese, which impressed certain authors, require further investigation.

With the help of his new theory, Klaatsch promises us a new interpretation of single pieces of the diluvial find of Krapina, some of these apparently belonging to the Aurignac type and others the Neanderthal type.

Of all earlier finds, the skeletal remains from Galley Hill, Kent, have the greatest affinity with the Aurignac man. Less certain are the affinities of the skull from Engis. A new comparison of the other diluvial and early prehistoric finds from the point of view of the new theory appears to be highly desirable.

RICHARD N. WEGNER.

MINERAL PRODUCTION OF INDIA.¹

THIS quinquennial review of the mineral output of India is probably the last official publication of Sir Thomas Holland in his capacity as Director of the Geological Survey of India, and it is especially appropriate that this should be so, seeing not only that he originated this most useful form of publishing the records of Indian mineral production, but that he has been the first of all the directors of the Survey to recognise that the chief duty of this survey is to assist and encourage the development of the mineral resources of the country. It is an undoubted fact, to which the present report bears eloquent witness, that the mineral production of India increased during Sir Thomas Holland's directorship at a rate with which no previous similar period of Indian history can show any comparison.

A glance at the records before us shows that the last five years have continued the energetic development of the mineral resources of the peninsula; as pointed out by the authors, it is practically impossible to set up any unexceptional standard of valuation, so that accurate comparisons cannot well be looked for; yet, even allowing for this fact, an increase in the estimated value of the output from 3,455,565*l.* in 1898 to 5,047,201*l.* in 1903, and from this figure, again, to 7,880,832*l.* in 1908, is a clear proof of a steady rise in the exploitation of these important resources of our Indian Empire. Of the total value thus assigned to the production, about two-thirds are made up of two items, gold and coal, the latter being now by far the more important; in 1903 the value of the gold was nearly twice that assigned to the coal, whereas in 1908 the latter figure was about 50 per cent. greater than the former. The gold output has, in fact, remained just about stationary during the period under review, the great bulk of it coming, as hitherto, from the Mysore mines.

The important increase in the coal production is perhaps one of the most satisfactory features indicated in this report; from 1½ million tons in 1884, the output rose steadily to 8½ millions in 1905, and then more rapidly to nearly 13 millions in 1908. About 90 per cent. of the entire output comes from Bengal, and about 50 per cent. from a single coalfield, namely, Jherria, which is now the leading coalfield, having gone ahead of Ranigunj since 1906. A very interesting statement is here published concerning the geological age of these Bengal coalfields; they occur in the Damuda series of the Gondwana system, which has always been looked upon as of Mesozoic age, the Lower Gondwanas being classed as probably of

Triassic and the Upper Gondwanas as probably of Jurassic age, thus making the coal-bearing formations much younger than those of Europe. On palæontological evidence, it is now possible to assert that the Lower Gondwanas are Palæozoic, and "certainly not younger than the Upper Carboniferous. Thus the Indian Coal-measures are not much younger than, and may even be of the same age as, those of Europe."

The only other point of especial importance is, in contradistinction to the first one, a purely economic one, namely, the fact that within the period under review the first battery of bye-product coke ovens has been erected on an Indian coalfield, namely, at Giridih.

During the five years to which this report refers the number of persons engaged in coal-mining has increased from 92,740 to 129,173, the numbers of those at work underground being respectively 64,969 and 83,164. The output has thus risen more rapidly than the number of persons employed, showing an increase in efficiency in the workers. The output per person employed has risen from 88.6 tons in 1904 to 98.8 tons in 1908, and per worker underground from 126.4 tons in 1904 to 153.5 tons in 1908. The efficiency of the Indian worker is thus approximately one-third of that of the worker in the United Kingdom; as is correctly pointed out in the report, this figure does not properly represent the ratio of labour efficiency, because in India a great deal of work is done by hand which in the United Kingdom is done by machinery, simply on account of the cheapness and abundance of labour in the peninsula. The death-rate from accidents has shown a marked tendency to increase during the last five years, but it is not possible to say whether this fact is due to the increasing depth of the mines or to accidental circumstances; its average over the five years 1904-8 is 0.98 per 1000 persons employed, or 10.2 per 1,000,000 tons of coal raised; the corresponding figures for the United Kingdom in 1906 were 1.29 and 4.37 respectively.

Another mineral that now bulks largely in the mineral production of India is manganese ore, the output of which shows a very marked increase, namely, from 150,190 tons in 1904 to 674,315 tons in 1908. The output in this latter year was about 228,000 tons less than that of the previous year, the falling off being due to market conditions, and in no wise indicating that the productive capacity has reached its zenith and is commencing to decline; on the contrary, it may be confidently anticipated that the general expansion above indicated will continue. The interesting economic question is raised whether it would not be preferable to smelt a considerable proportion of this ore on the spot, and thus export ferro-manganese instead of manganese ore; seeing that about one-fourth of the selling price of the ore represents the cost of freight, it is obvious that the possibility exists of effecting a very considerable saving, and the question should well merit investigation at the hands of the producers of manganese ore.

India is of great importance as a producer of mica, the Indian output being well over one-half of the world's total production. Here again a great increase is to be noted, namely, from 22,164 cwt. in 1904 to 53,543 cwt. in 1908.

The production of petroleum, still almost entirely from Burma, has also shown an increase, namely, from 118,491,382 gallons in 1904 to 176,646,320 gallons in 1908; even this latter figure is insufficient to supply the needs of the country, which imported about 70 million gallons in 1908.

It may be fairly said that the above comprise the mineral products of most importance; there are, of course, numerous others, and in most cases these show a marked increase in output. It is gratifying to find that the exertions of a scientific institution like the Geological Survey are having such a beneficial effect upon the economic development of the peninsula; and whilst congratulating Sir Thomas Holland upon the success in this direction that has attended his tenure of the directorship of the Geological Survey, we may express the hope that this expansion of the material interests of the country will continue to be the first care of his successors, with the same gratifying results.

H. LOUIS.

¹ "Quinquennial Review of the Mineral Production of India during the Years 1904 to 1908." By Sir Thomas H. Holland, K.C.I.E., F.R.S., and Dr. L. Leigh Fermor. Records of the Geological Survey of India, vol. xxxix. Pp. 280+8 plates. (Calcutta: Geological Survey; London: Kegan Paul and Co., Ltd., 1910.) Price 2 rupees.