

certificate would be to-day worth *il.* because the nation will pay *il.* for it in five years' time. I fear that he stands alone in this valuation. H. LOUIS.

Man's Ancestry.

IN relation to your reviewer's interesting notice in *NATURE* for June 27 of Prof. Wood-Jones's booklet, "The Problem of Man's Ancestry," it is appropriate to remember that the "blood-reaction test" shows the relationship of man to the ape to stand exactly as that of the horse to the donkey; the latter have had a common ancestor. Taking man as equalling 100, the ape comes at 70; the numbers for the horse and the donkey are the same. But this test shows no blood relationship whatever between man and the lower animals, thus confirming Klaatsch's view that the human line became separated very far down at the basis of the vertebrate phylum.

W. WOODS SMYTH.

Maidstone, July 3.

THE similarity in the reaction of human and anthropoid blood is the most convincing evidence we have of man's close relationship to the gorilla, chimpanzee, and orang. The classical experiments on blood immunity and blood relationships carried out by Prof. Nuttall, of Cambridge, in the opening years of the present century assured him that those anatomists were right who brought man and anthropoid apes from a common stock. All the biological evidence collected since 1904 has supported Prof. Nuttall's conclusion. When attempts have been made to transmit diseases which are peculiar to man, such as syphilis and typhoid, it has always been found that the great anthropoid apes are more susceptible than any other primate, and much more than any other mammal. When physiologists wish to discover the action of any particular part of the human brain they invariably select an anthropoid ape as the subject most likely to yield the information which is being searched for. But I do not know of any anatomist who has claimed that the relationship between man and the gorilla or between man and the chimpanzee is as close as that which exists between the horse and ass. The structural difference between the gorilla and chimpanzee is greater than that which differentiates the horse from the ass; the structural difference between man and the gorilla is still greater.

It is for those who hold that man has arisen by an independent line from a primitive mammalian stock to explain why man's blood gives no reaction with the blood of lower animals. If it is true that man is a primitive form and retains primitive characters, then we should expect his blood to yield such reactions. The fact that it does not supports the usually accepted hypothesis that man has arisen from an anthropoid stock.

THE REVIEWER.

POSITION AND PROSPECTS OF THE HOME TIMBER SUPPLY.

THE utility of forests to a nation is one of the economic factors to its well-being which have been brought to an unforeseen prominence during the world-war; and perhaps to no other European nation has this unlooked-for development proved so startling, because so totally unsuspected, as to ourselves.

Our woods were not grown from the commercial aspect—sport, amenity, and shelter to crops and stock were their main *raison d'être*. We did not

consider it necessary to grow woods for purely commercial reasons—that is, for the sake of the timber and pit wood and paper pulp, etc., they would yield. We obtained our requirements in these commodities by importing them from abroad, and relied on the Navy being able to safeguard these imports. We have now discovered our mistake and are paying for it. The timber purchased in 1915 and 1916 cost 37,000,000*l.* more than it would have done in 1909–13.

On the Continent it was thought that the utility of the forest to a nation was thoroughly understood, but a study of Continental text-books discloses the fact that, so far as modern warfare is concerned, even there the value of the forest and its close connection with the operations of the contending armies were but dimly foreseen. It may be on record, perhaps, in the archives of the German War Office that an exceptionally large demand for timber might prove one of the essential factors to the successful waging of a great war. But it is doubtful whether the Germans even foresaw the magnitude of the demands; and, in any event, they would have calculated on obtaining their requirements in this respect from the countries they overran—as, in fact, has been the case in France, Belgium, Poland, and elsewhere. Nor was it anticipated that the destruction of forests would be so heavy in the fighting zones. In the western provinces of Russia, for instance, from which the Baltic ports were mainly supplied, some 16,000,000 acres of forest have been destroyed! This in itself will limit the amount we are likely to receive from the Baltic in the future. Destruction and heavy fellings are, then, taking place throughout Europe, and, with our timber imports reduced to a negligible amount, we have now been felling heavily for some time past in our own small area of 3,000,000 acres of woodlands, of which probably not much more than half will be commercially exploitable. It will be alike useful and of interest to consider briefly the present position and future prospects of this timber question.

Almost from the outbreak of war we have been living a hand-to-mouth existence so far as timber supplies are concerned. The first troubles arose with the pit-wood requirements of the collieries, and the matter has remained a difficult one throughout. Our position as the coal producer and coal merchant of the Allies has rendered it essential to keep the collieries working at full pressure. Previous to the war three-quarters of our pit-wood supplies came from Russia and France; this amount was cut off at a moment's notice with the closure of the Baltic ports and the calling to the colours of the French woodcutters. The price at once rose, and though the imports continued for some time, the increasing demands made upon tonnage for other purposes, coupled with the German submarine campaign, gradually reduced them to a very small figure. We had to fall back upon our home woods for this product. A demand also quickly arose for ash with which to fashion the handles of entrenching tools; but the use of

this wood for the purpose was afterwards altogether eclipsed by its introduction into the construction of aeroplanes. The country is now being ransacked for ash of high quality, and the price has greatly increased.

During the first eighteen months of the war the hutting of the New Armies absorbed large amounts of soft timber, the material consisting mostly of imports. With the improvement in trench construction, dug-outs, lines of communication, and so forth, large orders for sleeper material, planks, etc., had to be fulfilled, and considerable areas of old forest and young pole forests were felled (the pole woods at a sacrifice). The latter were used for wire-entanglement posts, field telephones, corduroy roads, and gun-pits, of which numerous illustrations have appeared in the pictorial Press. Packing cases for stores also absorbed large amounts of wood. Later on a new demand arose: for the building of the network of light railways behind the front sleepers were required in enormous numbers, and by then we had been driven almost entirely to rely on our own home woods, inadequate and poorly grown as they were, and such areas of forest in France as our Ally made over to us. In Great Britain we have become acquainted with Canadian and Newfoundland lumbermen and their methods, with Portuguese, German prisoners, and others, companies of whom are at work throughout the length and breadth of the country.

Many ask, What is to be the end of it all? The answer is not difficult. We shall have to be prepared to sacrifice all the woods in this country which are commercially exploitable. This is the present position. If the war lasts long enough they will go into the war furnace and the material be lost to us so far as any future utility is obtainable from it. If the war comes to an end in the latter part of this year or early next year, still the balance will have to go in the course of a few years. For the demand for timber after the war will be as great for some years, so far as can be foreseen, as it is at present, and the supplies, owing to tonnage difficulties, short of the demand. Practically all our timber-using industries, where not employed on war work, are non-existent, of which house-building occupies a prominent position. We are all aware of the difficulties with which the paper trade, publishers, and the Press have to contend. These troubles have become chronic. It will be necessary to restart all these industries after the war. Timber prices will remain high, and fellings in our home woods will have to continue to help supplies. This is the present position so far as it can be foreseen.

Now as to future prospects. From what has been already said it is obvious that British woods will only be able to supplement the supplies which will be required during the period immediately following the peace. Even if we undertake, as it is to be hoped we shall, a large afforestation scheme in these islands when the war is over, the woods will not yield pit wood before twenty

to thirty years after formation, and timber in fifty to sixty years. We require, therefore, to make some arrangement to ensure adequate supplies during the next forty to fifty years. The old conditions in the North European timber markets, in which we reigned supreme at the outbreak of war, will not return. Some of our present Allies, previously nearly self-supporting, will be our competitors in these markets in the future. What arrangement is, then, necessary to ensure supplies for the above period at a reasonable figure? The problem requires to be faced and settled at an early date. It is one of the urgent problems in connection with reconstruction work. In the past, Russia, Norway, and Sweden sent us the bulk of our imports of soft woods, pine, spruce, and larch, Russia being the chief supplier. It is known that Norway and Sweden are nearly cut out. A few years will see their exports dwindle to a figure far below the pre-war one. We shall have to face competition in markets which will be shrinking. It is therefore imperative that new sources of supply should be tapped. So far as Great Britain is concerned the two countries where such new sources exist are Canada and Russia.

Canada.—Canada has long been looked upon by Great Britain as a timber El Dorado. We know for a fact that she has a gigantic reserve of untapped timber. All agree that the Douglas fir forests of British Columbia are magnificent. It may therefore be admitted at once that we can reasonably hope to obtain a certain portion of our requirements from Canada during the period under consideration. But there are certain factors in this matter which should not be overlooked. The chief are, first, the extent to which the forests accessible to us—*i.e.* accessible from the point of view of the price to be paid for the material—have been cut out; and, secondly, the manner in which the future great competition by America, who has mostly cut out her gigantic forests and is an enormous consumer of timber, will be likely to affect the Canadian market and its prices. Canada and Newfoundland together sent us only about one-tenth of our coniferous timber and pit wood before the war. In the future these imports may be increased, but any increase must inevitably be guided by the ordinary laws of supply and demand. Canada, we may infer, will sell her material, or the greater bulk of it, in the best market. This market, because the closest, will be the American. The timber imported from Canada in the past was practically all water-borne, cut on the banks of the rivers and floated out, this being the cheapest form of carriage. The freights on long railway and road carriage would kill Canadian timber exports to this country, since we could not afford to pay the price. Opinions differ a good deal as to the amount of Canadian timber which remains accessible to us—*i.e.* accessible at a price we can afford economically to pay.

The other point, the competition with America, is a more difficult and delicate one. In the early years of this century America endeavoured to negotiate with Canada a preferential tariff on

wood pulp. This question may be expected to crop up again. America must in the future be a very large importer of Canadian timber; and although we may hope to obtain a certain proportion of our requirements from Canada during the next forty years, it would not be a good policy, or even economically sound if another way out can be found, to stand in Canada's way by asking her to forgo a certain part of a large and profitable market at her door in order to bolster up a more distant one at a financial loss to herself. On the other hand, our timber industries could not afford to pay the same price as American ones *plus* the additional transit charges to this country. The question of tonnage does not affect the matter save in so far as the shorter the distance the material has to be carried, the simpler the tonnage arrangements.

Russia.—I have given some study to the Russian forests for the past decade and more, and had an opportunity last year of discussing the problem of their exploitation with several members of the Russian Provisional Government and assistant Ministers. Russia has an enormous area of undeveloped forests. Those of interest to us are situated in the Archangel, Vologda, and Olenets Governments, Archangel and Alexandrovsk being the ports of shipment, the chief species being pine, spruce, and larch. Before the war our chief imports from Russia came from the Baltic ports. I have already given the reasons for regarding the revival of these imports after the war as improbable. What remains of those forests, I was credibly informed, Russia will require to keep for herself. I have long held the opinion that, with the inevitable decrease of the exports from some of the countries supplying Great Britain, which were all felling primeval forest, we should have to go to Russia for an increasing amount of our requirements. The war has brought about this condition and rendered our position more difficult owing to the fact that we shall now have to face competition to a degree previously non-existent. It has become an economic necessity for us to obtain a proportion, the larger proportion, of our requirements in soft woods from the Russian forests during the next forty to fifty years. The only point for consideration is, Are we going to make arrangements to obtain them direct, or are we going to obtain them from middlemen and pay the middlemen's profits?

In March, 1916, I put forward the suggestion that we should come to an arrangement with the Russian Government whereby areas of a sufficient size to furnish us with a definite proportion of our requirements should be leased to us. With this end in view I went to Russia last year. I visited portions of the forests in the Archangel and Vologda Governments, and discussed the matter thoroughly with members of the Government. This Government had decided upon an arrangement under which it was prepared to favour the Allies as against the Central Powers with reference to granting facilities to capital for the development of the valuable unexploited

resources of Russia, of which her forests will prove the easiest to commence with. The Government was proposing to grant concessions in the big forests of the north-east in blocks of 500,000 acres, each concession to be for a period of thirty to thirty-five years. The working of these blocks would be granted to foreigners who were prepared to provide the necessary capital and would undertake to fashion the material in Russia before export—*i.e.* convert it into sawn material, wood pulp, etc. I was informed that the Provisional Government was prepared to come to an agreement with the British Government on these lines, that, in fact, we could acquire an area or areas of Russian forest which would enable us to assure a proportion of our future requirements, our necessities, in the soft woods which are of such great importance to our industries.

This was the position when the Provisional Government was swept away and the Bolsheviks came into power. The present phase in Russian politics may be regarded as a transition stage. When a stable Government supervenes we should be ready to take advantage of this opportunity to remove all anxiety on the score of the future timber supplies of this country. If we do not seize the opportunity we may be certain that others will do so, in which case, since the material is essential to our wood-using industries, and, therefore, must be obtained, we shall have to pay middlemen's profits to the foreigner, the Swede, Norwegian, and so forth, who, having exploited their own forests, would wish to maintain their exports to Great Britain by felling in the Russian forests.

E. P. STEBBING.

INDIGO IN BIHAR.

THE present position and future prospects of the natural indigo industry in India have of late been the subject of renewed and intensive study. Two interesting articles, in which the actual situation is partly summarised, have recently appeared.¹ These papers supply a concise review of the growth of the synthetic indigo industry and of the displacement since 1897 of natural indigo by the synthetic product. By 1910 the cultivation of indigo in Java had almost become extinct, the crop there being largely replaced by sugar. By 1914 the manufacture of indigo had practically ceased in all the provinces of India except Bihar, where alone the industry was in European hands and was conducted in well-equipped establishments. The area under indigo, which in 1895 was nearly 1,700,000 acres, had shrunk to less than 150,000 acres. The price per lb., which in 1897 was still from 7s. to 8s., had fallen, in the early part of 1914, to 3s.

With the cessation of the supplies of German synthetic indigo which accompanied the outbreak of hostilities, the prices of Indian indigo were nearly quadrupled, and this high figure was main-

¹ "The Present Position and Future Prospects of the Natural Indigo Industry." By W. A. Davis, Indigo Research Chemist to the Government of India. *Agricultural Journal of India*, vol. xiii., parts i. (January) and ii. (April), 1918.