DARWINIAN EXHIBITION IN MOSCOW

By SIR ARTHUR KEITH, F.R.S.

I HAVE had the privilege of reading a series of messages cabled by Mikhail Petrov to the president of the Linnean Society in which a description is given of an exhibition now displayed in the Zoological Museum, Moscow, to illustrate phases in the life and work of Charles Darwin. The exhibition, which has been organized by Prof. Turov, director of the Museum, and his staff, is on a scale beyond anything ever attempted in Great Britain or in any other country; in the words of M. Petrov, it "symbolizes the ever-growing cultural relations of two friendly nations who are united in a struggle against Nazi barbarism".

The exhibition begins with illustrations of Darwin's home life in Shrewsbury; passes on to his life and work on board the *Beagle*; then there follows what may be described as an objective account of the evolution of Darwin's masterpiece—"On the Origin of Species". The structure and distribution of coral reefs receives the fullest treatment. These are only a few of the sections of this exhibition, which is designed to meet the needs of the public rather than of the expert and is evidence of the intimate place given to Darwin and his works in the cultural life of Russia. Nor is this taste for Darwinism an affair of the moment; in these pages (NATURE, April 23, 1932, p. 606) was recorded the signal honour done to Darwin's memory by the Soviet Government on April 19, 1932—the fiftieth anniversary of his death. That day "was declared a public holiday in the U.S.S.R." Is it not a strange thing that our aggressive enemy should have domesticated Shakespeare in Germany while our Russian ally has taken to her heart Darwin—so often and so wrongly accused of being an instigator of war? Tolstoy has won wide homage in English-speaking countries; we in Great Britain must bestir ourselves if his great merits are to receive the recognition that those of Darwin have met with in the U.S.S.R.

There is another aspect of the Moscow exhibition which deserves attention. The reception which the "Origin" was accorded by the leading men of science in Russia during 1861–64 is illustrated by extracts from their writings, and the influence of its teaching on leaders of thought and action is brought home by extracts from speeches. Marx and Engels, as is well known, were influenced by their study of the "Origin"; Lenin regarded Darwin as the man who "placed biology, for the first time, on a sound scientific footing" M. Stalin's verdict on Darwin, given in 1938, is of particular interest: "In its development, science can name a good many men who found courage and means to break old, and to create new conceptions and laws, despite all obstacles—despite everything . . . such as Galileo, Darwin and many others". The description which the Prime Minister gave of M. Stalin in Parliament on his recent return from the U.S.S.R. helps us to understand his verdict on Darwin. "Premier Stalin," said Mr. Churchill, "has a deep cool wisdom and a complete absence of illusion of any kind." May not this description be applied to Darwin? He daily searched the face of living Nature in order that he might have no illusions about the manner in which she dealt with living things.

The year 1842 was one of the most eventful in Darwin's life; our colleagues in the U.S.S.R. do well in marking its centenary. In January of that year he finished the manuscript of "Coral Reefs" and sent it off to the printers; in May he corrected the last proofs. His home was then 12 Upper Gower Street, which he entered when he married his cousin, Emma Wedgwood, in January 1839; in 1842 he had entered his thirty-fourth year, was the happy father of two children and had taken into his service Joseph Parslow, who was to remain a member of the family for forty years. Darwin was then in a wretched state of health; his brain was continually overworking itself; he hated London; he called it "smokey", "dirty" and "odious"; he was "house-hunting", hoping to find a peaceful spot in the country within twenty miles of London. It was in the summer of 1842, while on a visit to Maer and to Shrewsbury, that "I allowed myself to speculate on the subject [the origin of species] and drew up some short notes". It is true he had been collecting facts which might throw light on the problem ever since he finished his "Journal" in July 1837; but this pencil sketch, drawn up in the summer of 1842, was his first attempt to apply the theory of natural selection to the explanation of his facts. We may, therefore, regard the year 1842 as marking the birth of the "Origin of Species".

On returning to London, house-hunting was taken up in earnest, the choice finally falling on Down House, in the parish of Downe, Kent, "16 miles from St. Pauls". The purchase had two advantages —rurality and price. Down House, standing on eighteen acres of ground, cost £2,200—£1,000 less than any other place then available at this time. Darwin's income was well over £1,000 per annum, but he feared 'extravagance' above all things; he was a great naturalist, but when answering the queries put to him by his cousin, Francis Galton, in 1873, it was his business ability, not his aptitude for scientific inquiry, to which he gave prominence. Thus it came about that the Darwin household was moved from London to Kent, the flitting taking place on September 14, 1842—another reason for marking the present year as a Darwinian centenary. On entering his new and permanent home he set to work on Part 2 of the "Geological Report of the Voyage of the *Beagle* (Volcanic Islands)" and published a pioneer contribution to glacial action in Britain—"Effects produced by the Ancient Glaciers of Caernarvonshire". He was also busy with plans for improving Down House. Clearly, 1842 was a notable year in the life of Charles Darwin.

Early life at Down House was overcast by a tragedy in the Darwin family. Nine days after arrival Mrs. Darwin was delivered of her third child, which lived only three weeks. There is in the archives of Down House—which, thanks to the public spirit of Sir Buckston Browne, is now preserved as a national memorial—a letter written by Darwin soon after the birth of this child. The letter is addressed to Mrs. Horner, wife of Darwin's geological friend Leonard Horner. Its opening sentences are worthy of quotation because of the light thrown on the opening month in the parish of Downe.

"I am much obliged for your letter and most kind congratulations. . . . We are going on very well and Emma [Mrs. Darwin] is making a quicker recovery owing, I think, to country air, than she has ever done before. Our children are very well and Willy [eldest son, then nearly four years of age] approves

of 'country House' very much. I think the place will suit us very well. We have found moving so expensive that I have not ceased to be thankful that we bought a very cheap house. It is the quietest country I ever lived in."

In this and in other letters of this period, Darwin gives glimpses of his new surroundings—of nightingales, of larks, of fields pink with sainfoin, others white with spread chalk. It may interest our Russian colleagues to know that within these last ten years larks have moved away from the Down House fields, nightingales have almost forsaken its orchard and its sheltering trees, the pink and white fields have taken on other colours, and the sky, so peaceful a century ago, now resounds to the beat of propeller blades—sounds which we counted a nuisance in peace-time but which now, in these days, fall as a comforting music on our ears. But for the courage which makes this music, Down House might well have suffered the sad fate which, in spite of the splendid fighting of the Russians, has overtaken Tolstoy's old home.

To return for a moment to the Darwin exhibition in Moscow. We are glad to note the prominence which Prof. Turov has given to the spirit of humanitarianism which was so deeply ingrained in Darwin's nature—his hatred of cruelty and his horror of slavery. His indictment of slavery is illustrated by a quotation: "What an honour it is for England to be the first of European Nations to completely abolish slavery". This sentence is apparently taken from a letter which Darwin wrote from the Rio Plata and addressed to his elder sister Caroline on May 22, 1833 ("Life and Letters", vol. 1, p. 246). He tells his sister that "it is impossible to see a negro and not feel kindly towards him" and that he is "watching the results of the election", then taking place at home. "What a proud thing for England," he exclaims, "if she is the first European nation which utterly abolishes it [slavery]". Britain was the first, for in that same year Parliament abolished slavery in all British colonies and spent 20 millions of pounds in compensating the slave owners. His hot condemnation of Captain Fitzroy's defence of slavery very nearly brought his career of naturalist on board the *Beagle* to a premature end. Even Sir Charles Lyell, for whom he had an unbounded admiration and affection, was sharply and hotly reprimanded when in 1845 he wrote equivocally of an institution which Darwin felt to be criminal. Even in his books, particularly in the "Descent of Man" (the edition in front of me is Murray's reprint of the second edition, 1913), we see his humanitarianism influencing his scientific verdicts. For example, when discussing the preservation of the weak and unfit by civilized nations, he writes (p. 206): "Nor could we check our sympathy, even at the urging of hard reasoning, without deterioration in the noblest part of our nature". He believed that, in the struggle between our higher and lower impulses, "virtue will be triumphant" (p. 192). After describing the prolonged travail which has divided mankind into so many diverse races, he seems to welcome a movement which would undo Nature's evolutionary scheme. Here is an extract from the chapter which deals with the rise of "Man's Moral Sense" (p. 187):

"As man advances in civilization, and small tribes are united into larger communities, the simplest reason would tell each individual that he ought to extend his social instincts and sympathies to all members of the same nation . . . there is only an artificial barrier to prevent his sympathies extending to the men of all nations and races."

Those who, like Mr. H. G. Wells, advocate 'Universalism' as a remedy from the evils from which we now suffer—particularly the scourge of war—may, on the strength of this passage, claim the support of Charles Darwin. But then, on p. 219, we find this statement: "As man suffers from the same physical evils as the lower animals, he *has no right* to expect an immunity from the evils consequent on the struggle for existence. Had he not been subjected during primeval times to natural selection, assuredly he would never have attained to his present rank". From the context of this passage, one infers that Darwin expected that man's evolutionary struggle was to continue.

There is, I admit, a grave fault in Darwin's presentation of his facts in the "Descent of Man". In the last sentence just quoted we see the emphasis which Darwin places on the agency of natural selection in the evolution of man—an emphasis which has so misled many modern men of letters. Darwin gives prominence to competition, selection, survival, extermination, to all man's antagonistic qualities; but when we look into the contents of his longest three chapters—3, 4 and 5—we find they are devoted to the evolution of man's co-operative mentality—the evolution of those instinctive and emotional reactions which bind men into family groups, into independent tribes—which are but extended families, and sovereign nations—which are but overgrown tribes. In the evolution of man co-operation has played quite as important a part as antagonism. Darwin assumed that men—even in their prehuman state—lived in social groups, and all that has been learned in the last seventy years justifies this assumption; and that the instinctive and emotional reactions which bound them into isolated groups had been developed from those more primitive ties which unite members of a human family.

The main struggle in the evolution of man, therefore, was between tribe and tribe, and it was this competitive aspect of the problem which seized Darwin's attention. I could cite many passages to prove that he was equally alive to the co-operative machinery which was at work inside each evolving tribe. For example (p. 203), "a high standard of morality gives but a slight or no advantage to each individual man and his children over other men of the same tribe, yet an increase in the number of well-endowed men and an advancement in the standard of morality will certainly give an immense advantage to one tribe over another". Without morality there could be no co-operation of members of a tribe. In reply to a criticism which the late Lord Morley passed on the "Descent of Man" Darwin gave this answer: "I have endeavoured to show how the struggle for existence between tribe and tribe depends on an advance in the moral and intellectual qualities of the members and not merely on their capacity of obtaining food" ("More Letters", vol. 1, p. 326). In brief, if we could have looked inside the developing brain of an early tribesman we should have found a dual mechanism at work, one giving rise to mental qualities which induced co-operation in members of a tribal team and another which impelled these members to maintain their team intact at all costs.

Light is thrown on the difficult problem of combining co-operation with competition in a corporate

body (for a primitive tribe is a close corporation of interbreeding individuals) by what is taking place in the modern business world. We may take our illustration from our banking businesses. Ever since Darwin's day there has been taking place, just as happened in recent millennia in the human world, a tendency to the creation of an ever-increasing size of the evolutionary units; local banks have been amalgamated, and local amalgamations have been swallowed by central concerns, so that now only a limited number of great competing units survive, which units we may compare to the great nations of to-day. These large corporations, being managed by self-electing directorates, are run, as a recent writer points out (*The Times*, "Private Enterprise", September 18 and 19, 1942), for the benefit not of the whole British community but for a section of it. The problem is how the whole community can be benefited and yet be free from the evils, or risks, of monopoly.

Nature had, and has, to face the same problem in the evolution of mankind. The directorate she instituted for her purpose is that combination of qualities we call 'human nature', in which co-operative and competitive inborn or instinctive tendencies work for the good of the community or tribe as a whole. To quote Darwin once more (p. 190), "The social instincts . . . no doubt were acquired by man, as by the lower animals for the good of the community".

THE EXPLOITATION OF MINERALS IN RELATION TO NATIONAL AND WORLD PLANNING*

By DR. L. DUDLEY STAMP

ALL minerals are won by what used to be called 'robber economy'. Man has no control over the location of minerals: his efforts are directed towards the discovery and subsequent winning of deposits the position of which is dependent upon the geological structure of the earth, or towards the utilization of deposits not previously regarded as 'economic'. Once any given deposit is exhausted it is not replenished.

Thus the social and economic consequences of the extractive industries are entirely different from those which result from industries connected with either the animal or vegetable kingdoms. In those cases, provided adequate care is taken, Nature replenishes the stores year by year and the dependent industries are afforded a marked degree of permanence. By the limited nature of the resources on which they depend, mineral industries, whether merely extraction or processing, or secondary industries based thereon, are essentially impermanent.

It is of considerable importance to distinguish between two groups of economic minerals. In the first place, there are those which occur in limited supply and where the object of mining is to remove *all*, or as much as is economically feasible, of the mineral. Into this category come oil, coal, iron ore (at least above a certain metal content). and most metalliferous ores. In the second place, there are those minerals which occur in such abundance that only parts of the available deposits are ever likely to be worked. Into this category come limestone (including chalk) for lime and cement, clay for bricks and tiles, slate, building-stones, road metal, sand and gravel.

In the international planning of mineral exploitation it is the first group which is concerned: the rocks and minerals of the second group are of the greatest importance, but nationally rather than internationally. In the minerals of the first group there is little choice in the siting of the works; in the minerals of the second group it is possible to plan the actual areas of working to a considerable extent—they are usually dictated primarily on economic grounds, especially in relation to transport costs, but where necessary may be planned in accordance with requirements of the national planning or the location of industry, the conservation of agricultural land, the preservation of amenities and other relevant factors.

Restricting attention to the minerals of the first group, those of which the object is to remove the whole or as much as possible, a definite cycle is associated with the working. This is, briefly, exploration, exploitation and exhaustion. With *exploration* and the early stages of exploitation comes a very rapid development, an influx of population, a spate of building and often of extravagant expenditure—indeed all the conditions associated with a 'mining boom' whether it be a gold rush, an oil boom, or simply the development of a new coalfield. The period of relatively steady *exploitation* may be short (as in the case of alluvial gold or tin) or it may be long—even running into a century or more (as in the case of a coalfield). If it is long, then social and economic conditions become stabilized, substantial towns are built and the whole community may go so far as to forget that its existence is primarily dependent on the exploitation of a mineral deposit. This is the position reached in many of the older coalfields of Britain. The period of *exhaustion* or approaching exhaustion is one of serious and inevitable maladjustments often resulting in much human suffering and misery, and which calls for careful thought and action—it cannot be left to right itself.

Thus the recognition of the right of the nations of the world to share the world's mineral resources carries with it the obligation of those nations to accept responsibility and to share the burden of whatever social and economic readjustments may be needed. There is, in other words, an obligation to safeguard the interests of human beings both during and after the exploitation of the minerals.

Most of the problems which arise, and some of the readjustments, can be illustrated, though on a small scale, in the British Isles.

(*a*) Tin has been won in Cornwall and the south-west since pre-Roman times. Exploitation reached its peak some seventy years ago and resulted in a large number of mines with their conspicuous pithead gear widely scattered over the wilder parts of the county. At least two not inconsiderable towns, Camborne and Redruth, grew up dependent primarily on mining. To-day most of the deposits are sufficiently near exhaustion that in pre-war years their exploitation had become uneconomic. As a mine approaches the later stage of its career, there is little money left after running costs have been met and, when the mine fails, none at all to remove the old gear and buildings, which thus become unsightly ruins marring

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