

on simpler hydrocarbons, might readily have built up the larger molecules of petroleum. He would not at the present time, however, undertake to say whence came the simpler hydrocarbons, the raw materials in this geokinetic manufactory.

A lipid extract from tuberculosis bacilli was reported to act as a true antigen against the organisms that produced it, by Prof. R. J. Anderson, of Yale University. Prof. Anderson has also discovered a new fatty acid in the bacillus, which seems to be the active agent in the formation of the tubercles that are the name-symptom of the disease. The new compound has been named phitiotic acid.

A modification of the now classic Chamberlain-Moulton hypothesis of planetary formation was put forward by Prof. Kirtley Mather, of Harvard University. Prof. Mather accepts the idea that the nucleus of a planet is provided by the tidal extrusion of a 'bolt' of stellar stuff, caused by the near approach of two stars. He believes that this initial bolt contains the larger part of the mass of the new planet, possibly nine-tenths of it, including nearly all of the heavy metals, especially iron and nickel. Planetesimal accretions account for only the outer tenth of the total final spheroid.

Of the numerous symposia, perhaps the most popularly attractive was that on the future of man, conducted by the American Society of Naturalists on the afternoon of New Year's Day. This was participated in by Dr. A. V. Kidder, of the Carnegie Institution of Washington, who presented the subject from the archæologist's point of view; Prof. William F. Ogburn, of the University of Chicago, who considered it from the sociological angle; and Prof. E. M. East, of Harvard University, who spoke as a geneticist. Prof. Kidder opened the discussion in the rôle of a Cassandra, giving warning that if we are to build on the analogies furnished by past cultures, our own civilisation is in for a terrific crash unless by concerted action we head it off. But beneath the shadow of this Spenglerian doom, the succeeding two speakers indulged in a fine bout of Wellsian prophecy. They envisioned a world population of about three and one-half hundreds of millions of people, speaking one general language, composed of blendings of all the races, though nationalisms, and probably wars, will continue. Africa and the two Americas will be predominantly white; the native races will be largely extinguished, and their remnants absorbed into the dominating population. The Malayan peoples will about hold their own, but will not increase their territorial holdings; the Mongolian race will expand greatly. Birth-control knowledge will be universal; parenthood, restricted by social pressure and indirect rather than direct legislation, will be honoured, and babies at a premium. The stream of scientific discovery and invention will continue in ever-increasing tempo, changing the social order faster than the social order can adjust itself to the changes, thereby keeping social sanctions and moral codes in a constant state of flux. With oil all gone, coal supplies dwindling, and such natural sources as water and wind power in-

sufficient, the world will be hard put to it for sources of power, for the 'cracking of the atom' is a vain dream. Many factories will go to the land for both raw stuffs and labour, instead of sending to the land for materials to be worked up in town. Thus the entire population will be urbanised.

Among the scientific exhibits, the one that attracted most attention was that of Dr. George W. Crile, a surgeon of Cleveland, who with his associates has re-combined lipid, protein, and mineral salt fractions of animal tissue, obtaining microscopic bits of colloid stuff which he calls 'autosynthetic cells'. Although they are not alive, they display many of the physico-chemical phenomena of living cells, such as an electrical gradient from the centre outwards, absorption of food material (protein), increase in size, division into new units, absorption of oxygen and elimination of carbon dioxide, and deterioration and 'death' in the presence of toxins.

Of more immediate practical importance is the new X-ray technique employed by Dr. Thomas O. Menees, of the Blodgett Memorial Hospital, Grand Rapids, Michigan, to learn the sex of a fetus so much as three months before birth. The method consists in the injection into the fetal circulation of a small quantity of strontium iodide. This is non-toxic, and opaque to X-rays, thus permitting the photography of fleshy parts as well as bone. The effect fades after three hours and entirely disappears in a day. It is expected that the new technique will be of value in doubtful cases where a Cæsarian section seems to be indicated.

The United States Bureau of Standards exhibited specimens of rubber vulcanised by a new method, employing trinitrobenzene instead of sulphur. This rubber has the virtue of being non-corrosive to metals that cannot stand contact with sulphur-vulcanised rubber, making possible such things as rubber-plated steel and copper. Another exhibit of the Bureau of Standards was a set of 'fourth-dimensional' models constructed by Dr. Paul R. Heyl. These bear the same relation to figures in the fourth dimension that the two-dimensional pictures in books and on blackboards bear to figures in three dimensions.

Dr. Dmitry Borodin, who is working at the Boyce Thompson Institute, Yonkers, N.Y., presented a demonstration of his method for measuring the effects of mitogenetic radiation. He cultivates yeast in hanging drop colonies, and measures with the planimeter the comparative areas of colonies exposed to the radiations and of control colonies.

Though not shown in the exhibits, a new type of phonograph was mentioned in one of the discussions of the physics section. This uses, instead of records, motion-picture film with twelve sound tracks on it. The machine can use a five-hundred foot film, and can play a two-and-one-half-hour grand opera at one 'loading'. The quality of the sound reproduction is said to compare favourably with high-grade radio reception from a near-by station. Commercial production of the new film phonograph, however, is not planned for the near future. FRANK THONE.

### Botany in South Africa.

ON Nov. 10, Dr. Arthur W. Hill, who has since had the honour of K.C.M.G. conferred upon him, landed in Cape Town, on the invitation of the Government of the Union of South Africa, for the purpose of making personal contact with botanical affairs in the country. After spending some ten days in Cape Town, Sir Arthur Hill proceeded by the "Garden Route" to the forests of George and Knysna, proceeding from there to Port Elizabeth, Grahamstown,

and East London, and then travelling to Bloemfontein and Fauresmith. At the latter place Sir Arthur saw the work which is being carried out at the recently established Karroo Pasture Station. He described this station as the most remarkable which he had seen in the course of his travels throughout the world. Here the semi-desert shrubs which form the vegetation covering the great Karroo areas were being investigated as regards their palatability, carrying capacity,

and food value. From Fauresmith Sir Arthur Hill proceeded eastwards over the Drakensberg Range via Van Reenen's Pass and Ladysmith to Pietermaritzburg, from which place he travelled to Durban. From Durban he went to Pretoria and, after spending ten days there, travelled north to the Woodbush Mountains, and this completed his tour in the Union.

Before Sir Arthur left Pretoria, the Union Government gave a reception in his honour at the botanical laboratories attached to the Division of Plant Industry. At this reception Col. G. N. Williams, Secretary for Agriculture, welcomed him on behalf of the Union Government. In doing so, he spoke of the long and close association which Kew had had with the South African Departments of Agriculture, and also mentioned the many botanical expeditions with which Sir Arthur had been connected in different parts of the world.

Mr. C. E. Legat, Chief Conservator of Forests, welcomed Sir Arthur on behalf of the Forest Department. He mentioned the assistance which the Department of Forests had received from Kew, and stressed the fact that South Africa had to depend upon the introduction of exotic trees because the native timbers took between 150 and 200 years to mature.

Dr. I. B. Pole Evans, Chief of the Division of Plant Industry and Director of the Botanical Survey of South Africa, welcomed Sir Arthur on behalf of the botanists of South Africa. He described the great benefits which Kew had rendered to South Africa, and referred to the publication of the "Flora Capensis" and the assistance which the South African Governments had given in the matter. He referred to the close association between the Botanical Survey of South Africa and Kew, whereby the Survey had maintained at Kew for some years past a South African botanist to assist with critical determinations, etc. Dr. Pole Evans mentioned the botanical areas, institutions, and problems which Sir Arthur had seen, and expressed the hope that he would realise that botanical science had made considerable strides in the country during the past twenty-five years, and that South Africa must in the future endeavour to help herself much more than she had in the past.

Sir Arthur, in returning thanks to the Government for its invitation, referred to the great importance and educational value of botanic gardens. He stated that he would like to see three great botanical gardens flourishing in the Union. There were the Kirstenbosch Gardens, but in addition he would like to see one in Natal and one in Pretoria. He spoke of the excellent work which was being done at Fauresmith and at Pretoria on the pasture plants of the country, and also stressed the importance of the work that was being done by the Botanical Survey. Regarding forestry matters, Sir Arthur expressed high appreciation of the work for the preservation of native forests in the Knysna area. In concluding, he hoped that means would be found for subsidising post-graduate research work in botany, since he thought South Africa would derive considerable benefit from work of this nature.

General Smuts moved a vote of thanks to Sir Arthur Hill, the British Government, and the Union Government, and pointed out that Sir Arthur was the first of Kew's great directors to undertake a tour of the Dominions—and in this connexion General Smuts paid a great tribute to the foresight of the Empire Marketing Board in making this possible. He referred to the valuable gift which Sir Arthur had made, through Kew, to the National Herbarium at Pretoria by donating type specimens of many of the older collections, and pointed out that the National Herbarium at Pretoria would now be able to do a very large part of the work which Kew originally did. He expressed the view that the time would probably come when South Africa might well become one of the great pasture countries of the world, and for this reason every effort should be made to develop the country's natural resources. This might in time become a question for the whole of Africa, and they would see not only one institution, not only one country such as the Union, but all the African Governments collaborating and trying to solve common problems. Science would have to be applied more and more to the economic situation. General Smuts referred to the great spaces in South Africa and the difficulties which isolated workers had to contend with, and he felt that Sir Arthur's visit would be a great inspiration to these people.

After the speeches of welcome, Dr. A. C. Leemann spoke on "Plant Immunity and the Aims of Modern Plant Pathology". He gave his audience the benefit of his researches in his own entirely new line of work in the realm of plant immunity, in which, by reinforcing soil conditions, he has found it possible to effect a marked change in the immunity of plants to certain fungus diseases. Dr. Leemann supplemented his remarks by giving a demonstration of plants which had been inoculated under these conditions.

Guests were then given the opportunity of inspecting a very interesting and instructive series of exhibits illustrating the work of the Division of Plant Industry. These included amongst others:—(1) Photographs of much of the vegetation of those parts of the country which Sir Arthur Hill had not been able to visit. (2) A collection of old type specimens presented to the National Herbarium by Kew and Berlin. (3) A collection of living pasture grasses recently collected on a tour from Pretoria to Lake Tanganyika. (4) A trap specially designed by Mr. H. Harris, as a result of his work in Zululand, for catching tsetse flies. The success already achieved by the use of this trap opens up considerable possibilities with regard to tsetse fly control (*NATURE*, Nov. 22, p. 817).

This visit of Sir Arthur Hill to the Union of South Africa is of outstanding significance, and much of botanical interest should accrue from it, for there is probably no part of the British Empire which has contributed more towards the pure and economic branches of botanical science, and it is scarcely possible to encounter a flora which could excel that of South Africa in beauty and scientific interest.

### Scotland's Testimony to the March of Evolution.

THIS subject formed the main part of Prof. James Ritchie's inaugural address (reprinted in part in the *Scottish Naturalist*, Nov.-Dec, 1930) on his induction to the Regius chair of natural history in the University of Aberdeen.

Prof. Ritchie reminded his audience that bears were once common in the Caledonian forest, and that he, with his collaborators, had found in caves near Inch-nadamph, in Sutherland, bones of bears, remains of wolves, lynxes, Arctic foxes, and lemmings, and more

than nine hundred antlers of reindeer. All these animals, and more besides, have disappeared from Scotland; they have been swamped in the struggle for existence. Red deer, once common throughout Scotland, are now restricted to the Highlands; wild cats, pine martens, and polecats are dying out; and the white-tailed eagle, the kite, and the osprey have disappeared. On the other hand, many species of wild ducks are now nesting where they never bred before; and the fulmar petrel, for centuries confined