THE FOREST DEPARTMENT OF INDIA.

THE Government of India has issued a pamphlet of sixty-five pages, entitled "The Work of the Forest Department of India," by Mr. R. S. Troup. This gives in popular form, and at the low price of 5*d*., an account of the forests of India, and of the methods by which they are protected and managed. The Forest Department controls one-fifth of the total area of India, viz. 249,867 square miles; but no fewer than 141,882 square miles of this are so-called "unclassed" forests, where control is nominal, being restricted to the collection of revenue. Of the "reserved" and "protected" forests, 107,985 square miles in area, about one-half, 55,629 square miles, are scientifically managed and subject to sanctioned working plans. The most important commercial forests are the teak forests of Burma, the sal forests of Northern, Central, and North-Eastern India, and the deodar and pine forests of the North-Western Himalaya. Forests yielding inferior kinds of timber are scarcely less important, as they provide wood, fuel, fodder, and other produce for the surrounding agricultural population. The *personnel* of the Forest Department includes 237 officers trained in England, 231 officers recruited in India and trained at Dehra Dun, and a subordinate service of 1610 rangers, 2000 foresters, and 10,500 forest guards. The Forest Research Institute of Dehra Dun, which was founded in 1906, prosecutes investigations in sylviculture, forest botany, economic products, zoology, and chemistry, and has already issued a considerable output of scientific literature. The pamphlet contains a valuable list, with short descriptions of the forty-four most important forest trees, and an excellent chapter on minor produce, which includes bamboos, grasses, fibres, oil seeds, tanning materials, essential oils, oleo-resins, gums, india-rubber, drugs and spices, and animal products like lac, silk, horns, hides, and ivory. An interesting account is also given of various forest industries which have been established by the Forest Department, such as the tapping of *Pinus longifolia* for resin and turpentine, which has now passed out of the experimental stage, the annual collection amounting to 2592 tons. The paper-pulp industry, the manufacture of matches, the antiseptic treatment of timber, and the dry distillation of wood are industries which appear to be capable of considerable development in India.

THE GREAT ERUPTION OF SAKURA-JIMA.

PROF. F. OMORI, the well-known director of the Seismological Institute of Tokyo, has recently issued a third valuable memoir on the great eruption of the Sakura-jima on January 12, 1914 (Bull. Imp. Earthq. Inv. Com., vol. viii., December, 1916, pp. 181–321). The first two memoirs have already been noticed in NATURE (vol. xciv., p. 289, 1914, and vol. xcviii., p. 57, 1916). The third memoir is principally concerned with details which, though of great value, are unsuitable for reproduction in a note. Two or three points, however, are of general interest. On and around the plateau of Hakamagoshi, which projects from the west side of the island, there are unmistakable signs of the generation of volcanic blasts. The school-house was entirely destroyed and carried away. On a farm near the top of the plateau a great number of large mandarin-orange trees were uprooted and carried some distance up a slope. The blasts were directed principally against the north-east corner of Hakamagoshi and the neighbouring village of Koike. The destruction here was general, and the tree-trunks were mostly overthrown or broken between two directions which, when produced backwards, passed through the highest and lowest of the western series of craterlets. On the east side of the island no distinct trace of the blast could be detected. Before the eruption the island was separated from the mainland on the east side by the Seto Strait, which, in its narrowest portion (400 metres in width), varied in depth from 29 to 40 fathoms. The lava entered the strait on the morning of January 13, blocked it up after sixteen days, and finally rose in height to about 54 metres above the sea. The movement of the lava stream on this side ceased with the close of 1914. About three months later there took place a second outflow of lava, not directly from the craterlets, but from the southern face of the south-eastern lava-field. The new outflows expanded into a form like that of a chrysanthemum leaf, the greatest elongation amounting to nearly 900 metres.

Prof. Bundjiro Kotō has published (Journal of the College of Science, Tokyo, vol. xxxviii., art. 3, December 25, 1916) a comprehensive and handsomely illustrated account of the same eruption. The author reached the city of Kagoshima on January 15, 1914, and saw the great lava-sheets flowing from the volcanic island, a most unusual spectacle among the explosive volcanoes of Japan. The tremendous "Strombolian" outburst of January 12, when the fragmental matter rose as a great cloud-pillar to a height of more than 18,000 metres, is shown in the photographic frontispiece, which forms a most memorable addition to our historic pictures of volcanoes. The inhabitants of the island were rescued in boats by volunteers from the shore of Kyûshû, and traversed a pumice-laden sea. The ejected materials, which are described in petrographic detail, consist of femic augite-andesite. There is evidence in the scorched trees of a *nuée ardente*, like those of Martinique, which spread down the western slope on the early morning of January 13. Among the ejecta are many resembling porcelain, and composed of cordierite, plagioclase, and glass. This type has been described from Asama-yama, and Prof. Kotō now styles it ceramicite.

THE DISSEMINATION OF FUNGUS DISEASES.

VERY little has been heard of the International Phytopathological Convention of Rome since the outbreak of hostilities, but there is little doubt that the subject will be revived when terms of peace are settled or shortly afterwards. A careful consideration of its proposals is, therefore, all the more necessary at the present time, and the reasoned criticism published by Dr. E. T. Butler, the Imperial Mycologist, in vol. ix., No. 1, of the Memoirs of the Department of Agriculture in India, on the dissemination of parasitic fungi and international legislation is doubly welcome from both the scientific and the administrative points of view.

Dr. Butler discusses, in the first place, the various methods by which such fungi may be conveyed over great distances, and decides that little is to be feared from natural means, the chief agent being civilised man engaged in commerce. He then recounts some of the attempts that have been made to control the spread of plant diseases by legislation, and criticises the procedure proposed by the Rome Convention, chiefly, of course, with reference to the conditions under which India is situated.

The weak points in the Convention, especially those caused by the loose phraseology of the much-debated Article 5, are duly pointed out, but Dr. Butler concludes with the opinion that, subject to certain necessary amendments, and if certain clauses are broadly interpreted, there are obvious advantages in adhering to it, and that "after a few years' experience, and as soon

as other countries have established the organisation required if they wish to adhere, there seems to be a good prospect of a much more efficient control of the dissemination of the fungus diseases to distant countries than has ever been thought possible in the past."

The memoir contains an appendix giving a brief history of the spread of most of the important cryptogamic diseases of cultivated plants, the extension of which has attracted notice during the past seventy years.

PARIS ACADEMY OF SCIENCES.

BONAPARTE FUND.

THE committee has considered twenty applications for grants from the Bonaparte Fund. It is considered desirable to reserve the greater part of the annual income until after the conclusion of the war and to defer grants for the purchase of apparatus. The grants recommended and approved by the Academy are :—

(1) 2000 francs to Edmond Bordage, for the publication of his histological researches on the metamorphoses of insects.

(2) 2000 francs to E. Chauvenet, for the continuation of his researches on zirconium.

(3) 2000 francs to Gustave Dollfus, for the continuation of his studies on the Paris basin.

(4) 2000 francs to Henri Froidevaux, for the production of a catalogue of the periodicals, more than eight hundred in number, in the library of the Société de Géographie.

(5) 2000 francs to Emile Gadeceau, for his studies on the submerged forests of Belle-Ile-en-Mer.

(6) 2000 francs to F. Gagnepain, for assistance in the publication of an etymological dictionary of botanical genera, with illustrations.

(7) 2000 francs to L. Joubin, for pursuing at Messina the researches he has undertaken on the deep-sea Cephalopods.

(8) 2000 francs to W. Kilian, for the pursuit of his studies and his publications on the fossil fauna and the stratigraphy of the south-east of France.

Including the balance from 1916 (55,000 francs), the amount in hand is 105,000 francs, and the balance carried forward, after paying the above-named grants, is 89,000 francs.

THE AMERICAN PHILOSOPHICAL SOCIETY.

THE American Philosophical Society held a very successful meeting in Philadelphia on April 12–14. The address of welcome was delivered by the president, Dr. W. W. Keen, who, with Vice Presidents W. B. Scott and G. E. Hale, and with Dr. A. A. Michelson, presided. More than forty papers were presented. The national crisis also received some attention, Dr. M. T. Bogert, of Columbia University, outlining the work chemists may do to aid the National Research Council in the solution of certain war problems. Suitable badges to identify "members of the industrial army" so that they may not be called slackers was urged. Attention was directed to England's mistake in permitting general enlistment for "the front" when in many cases men with special ability could have been of much more value using their brains in the laboratory. A well-trained industrial army is just as important as the army of fighters.

A brief outline of the effect of different lighting conditions on the eye and the factors which cause the eye to lose in efficiency and to experience discomfort was given by Dr. C. E. Ferree, of Bryn Mawr College. More than forty different lighting conditions have been investigated, and many experiments conducted pertaining to the hygienic use of the eye. The loss of efficiency sustained by the eye in an unfavourable lighting situation seems to be muscular, not retinal. The retina has been found to lose little, if any, more in functional activity under one than under another of the lighting systems employed. The observation of motion pictures for two or more hours causes the eye to lose heavily in efficiency. The loss decreases rather regularly with increase of distance from the projection screen. It seems little, if any, greater, however, than the loss caused by an equal period of steady reading under much of the artificial lighting in actual use. In all the lighting situations tested a close correlation was found to obtain between the loss in power to sustain clear seeing and the tendency to produce ocular discomfort.

A spectroscopic method of deriving the absolute magnitudes of stars, and a new formula connecting parallax and proper motion for studying the relationship between the motion of stars and their true or absolute magnitudes, were described by Dr. W. S. Adams, of Mount Wilson Observatory. About one thousand stars have been used in the investigation, and the results establish almost certainly a definite increase in velocity with decrease in brightness.

The skeleton of a gigantic extinct bird found last summer in the Bighorn basin of Wyoming by an expedition from the American Museum of Natural History was described by Dr. W. D. Matthew, one of the curators. It is of the Lower Eocene age, a contemporary of the little four-toed horse, the fossil remains of which are found in the same region. The bird was about as large as the extinct moas of New Zealand, much bulkier than any living bird, although not so tall as an ostrich. It stood nearly 7 ft. high. The head was enormous, 18 in. long with huge compressed beak like the extinct Phororhachos of Patagonia, but unlike any living bird. The neck, too, was very massive and rather short, and it was quite unable to fly, the wings being about as large as in the cassowary. Although it resembled the modern ostrich group in some ways, it was not related to them, and only remotely related to any other known birds, the nearest perhaps being the seriema of South America. A few fragments of this gigantic bird were found by the late Prof. Cope more than forty years ago, and named Diatryma, but it remained practically unknown until the discovery of this nearly complete skeleton. A description of this specimen by W. D. Matthew and Walter Granger, with photographs and a reconstruction, will appear in the Bulletin of the American Museum.

In a paper by E. S. Botch, of Philadelphia, the present status of our knowledge about early man in America was summed up as follows. Man lived during at least a part of the Pleistocene period for tens of thousands of years south of the Glacial moraines. He probably went through an Eolithic period, and certainly through a Chelleen period in some places, and therefore was truly a Palæolithic man. He may have shown rudimentary fine art. Palæolithic American man was the ancestor of the Neolithic historic Indian, and although less advanced in culture, much like his descendant in anthropological characteristics. Whether he was an autochthon in America or whether he came from some other place, and, if so, when, we do not as yet know positively, although his affiliations seem to be to the west. And it is to four men above all others that we owe our knowledge: Abbott, the discoverer of Palæolithic implements and horizons; Volk, the corroborator; Lund, the first finder of probably Palæolithic bones; and Winchell, the investigator of patination.