

Research Items.

THE SWISS NATIONAL PARK AND ITS MOLLUSCA.—First mooted in 1906, a National Park for Switzerland was finally established in January 1919. It is situated in the Lower Engadine, almost on the extreme eastern border of Switzerland, and abutting on the Italian frontier. It comprises an area of about 151.5 sq. km., and has been put in the charge of a Commission, which has wisely decided on a complete investigation of its fauna, flora, etc., a task which the Schweizerische Naturforschende Gesellschaft has undertaken to carry out. For the purposes of this survey, however, it has been resolved to include the territory to the north of the Park down to the banks of the Inn, as well as some to the east, so as to furnish a more satisfactory physical area to deal with as a whole. The first portion of this undertaking, the "Molluscan Fauna," by Ernst Bütikofer, has just been published by the Schweizerische Naturforschende Gesellschaft in Bd. lv. of their Denkschriften. If this be a fair sample the complete work will be well worthy of its authors. Following a general account of the characters of the eleven districts into which, for purposes of description, the district has been divided, come the molluscan fauna of each, a systematic description of the various species and varieties, with tables of their horizontal and vertical distribution, and an excellent bibliography. Close on eighty forms, if we include those in the appendix, are dealt with, and the photographs of shells are mostly particularly good.

PROTOZOA AND POTATO MOSAIC.—As recently reported in NATURE (July 21, p. 111), Ray Nelson has reported in America that a protozoal organism is associated with the phloem of potato plants affected by the disease known as mosaic, which is usually grouped among the "virus" diseases in which the causal organism is assumed to be ultra-microscopic. The July issue of *Phytopathology*, the journal issued by the American Phytopathological Society, contains no less than four brief papers, with which the names of seven investigators are associated, all pointing out that the structures described by Nelson are also present in the phloem of Solanaceous plants which are not affected by mosaic but, so far as can be determined, are perfectly healthy. There seems to be little doubt that Nelson has redescribed and photographed peculiar protoplasmic inclusions, present in the phloem of some Angiosperms but not in all, and which, as Irving W. Bailey and other writers point out in *Phytopathology*, are probably identical with the "slime bodies" described by Strasburger (in 1891) in the phloem of *Robinia Pseudacacia*. These "slime bodies" do not seem to be identical with nuclei, though they often are seen in contact with them. Ernst W. Schmidt, in his recent monograph upon the Angiosperm sieve-tubes (Jena, 1917), concluded that the nucleus was typically present in the Angiosperm sieve-tube. Possibly this recent American rediscovery of these other cytoplasmic inclusions will lead to a re-exploration of the cytology of the sieve-tube, a subject which would seem to be by no means exhausted.

POPLARS.—Forestry Commission Bulletin No. 5, just issued by H.M. Stationery Office, price 1s. 6d., is a remarkably full account of the different poplars which are suitable for the production of timber on a commercial scale in Great Britain. The first chapter, due to Prof. A. Henry, is concerned with their botanical description, and is illustrated with two plates, showing clearly the distinctive characters of

the twigs and leaves of the twelve important species and hybrids. The second chapter, by Mr. W. H. Guillebaud, who specially investigated the growth of poplars in the north of France, is devoted to silviculture, and discusses fully propagation, planting, thinning, pruning, rate of growth and yield. In the third chapter, Dr. J. W. Munro deals with injurious insects and Mr. W. E. Hiley with fungi and bacterial diseases. The last chapter, by Mr. W. H. Dallimore of Kew, is an admirable account of the character and uses of poplar wood, and should prove of great interest to both landowners and manufacturers, as the use of home-grown poplar timber is capable of great extension. For example, the wood of aspen is indispensable for the match industry, and has hitherto been mainly imported from Northern Russia. The recent plantation on a large scale of this tree in Argyllshire by Messrs. Bryant and May indicates that supplies of aspen timber from abroad at a reasonable price cannot in the future be depended upon.

UPPER-AIR OBSERVATIONS IN NORTH RUSSIA.—A Professional Note, vol. 3, No. 32, carried out by Mr. W. H. Pick, has been published on the above by the Meteorological Office, Air Ministry. The observations are based upon pilot balloon ascents between February 25 and September 13, 1919, at three stations in north-west Russia. The stations are Murmansk, at the head of the Kola Creek, in latitude about 69° N., Archangel on the south-western coast of the White Sea, in latitude 64° 33' N., and Lumbushi on the Murman Railway, in latitude about 68° N. The ascents were all carried out with one theodolite only, the balloon being given a vertical lift of, theoretically, 500 ft. per minute. The high latitude in which the observations were obtained renders them of value. There were at Murmansk 57 occasions on which the surface wind was in the north-east quadrant, and on 10 of these—that is, 17.5 per cent. of the total—the wind backed continuously up to 2000 feet. On the other hand, there were 164 occasions on which the surface wind was not in the north-east quadrant, and in only 5 of these—that is, 3.0 per cent. of the whole—did the wind back continuously upward. At Murmansk three ascents reached to a height of 40,000 feet, where two of the winds were N.W. and one S.W. Two ascents reached to 60,000 ft., where both winds were S.W. Seven ascents reached 20,000 ft., at that height four of the winds were S.W. and two N.W. Of the ascents carried out at Archangel only one reached 20,000 ft., where the wind was southerly. Of the ascents at Lumbushi, six attained a height of 20,000 ft., giving two north-westerly winds, three north-easterly, and one southerly.

THE CLIMATE OF KHARTOUM.—Physical Department paper No. 9, prepared by Mr. L. J. Sutton, has recently been issued by the Ministry of Public Works, Egypt. The discussion deals with the meteorology of Khartoum, which place was installed as a second-order station in 1900, and is approximately 390 metres above sea-level. Maps of isobars are given for the several months which show the normal distribution of pressure over the surrounding region, which is of great help in following the changes of weather conditions which occur at Khartoum in the different seasons. It is during the period from the middle of June to September that the weather conditions are most disturbed. Thunder-storms and *haboobs*, or storms of wind, are frequent, and the short rainy season is experienced. In October to May there is

an entire absence of rain. The observations are discussed for the period of twenty-two years, from 1900 to 1921. Atmospheric pressure varies very regularly throughout the year; a minimum is reached about the beginning of May, and a second minimum occurs about the beginning of October. The diurnal range of the barometer is very regular and does not vary much in the course of the year. The coldest month is January, with a mean temperature of $22^{\circ}.5$ C.; the warmest month is June, with a mean temperature of $34^{\circ}.1$ C. The short rainy season causes a second minimum, $31^{\circ}.2$ C. in August. The second maximum temperature occurs about the end of September, approximately, the same time as the second minimum of pressure. Diurnal range of temperature is greatest, $14^{\circ}.5$ C., in April, and least, $10^{\circ}.1$ C., in September. Statistical values are also given of humidity, vapour pressure, cloud, sunshine, wind, and the upper winds. The amount of rainfall is small, averaging only 148 mm., or rather less than 6 in. for the year; nearly 90 per cent. of this falls in July, August, and September. The discussion will serve as a specimen for other stations.

GOLDFIELDS OF WESTERN AUSTRALIA.—The Department of Mines of Western Australia has issued an important description of the gold deposits of Western Australia, written by Mr. A. Gibb Maitland. The author classifies the gold-bearing deposits under the following five heads: 1. Simple or fissure veins, carrying auriferous quartz with or without accessory minerals. 2. Composite veins or lodes, which are made up of a number of more or less parallel lenticular veins. 3. Sheeted zones, consisting of a series of closely spaced and parallel veins, generally of small dimensions. 4. Stockworks, which are irregular networks of small auriferous quartz veins. 5. Shear zones or bands of schistose rocks, impregnated with various sulphides, iron pyrites often predominating, and containing little or no quartz. In addition to the above classification, the author, when discussing the individual goldfields, also mentions the so-called "lode formations," which he defines as "impregnations of zones of previously existing rocks and confined largely to shear zones, characterised by much crushing and fracturing as well as the deposition of quartz along such fractures." It would appear that such lode formations are especially important in the Boulder and Kalgoorlie districts of the East Coolgardie gold-field, which is itself by far the most important of the Western Australian gold-fields, having produced over 17 million ounces of gold out of a total of 31 million ounces produced by Western Australia, whilst no other individual goldfield has produced above 3 million ounces. The gold production of Western Australia reached a maximum in the year 1903, when the output was just above 2 million ounces; since that time it has been gradually declining, until in 1918 it was only 876,511 ounces, but the account here published shows that there is good reason to hope that the present output may be reasonably expected to be maintained for a considerable time to come.

THE EARTH'S MAGNETIC FIELD.—In the issue of *Terrestrial Magnetism and Atmospheric Electricity* for March-June, Dr. L. A. Bauer gives the chief results of a preliminary analysis of the earth's magnetic field for 1922 based on the British Admiralty magnetic charts for 1922 and those of the United States Hydrographic Office for 1920 corrected to 1922. He finds that the field at any instant is compounded of an internal field having a potential and representing about 94 per cent. of the total, an external field also

having a potential and a non-potential field of about equal strengths. The time change of the field is equally complex. On the whole, during the past 80 years the north end of the axis of the internal field has moved slowly towards the west and south, and the intensity of magnetisation has decreased at the rate of 1/1500 of itself per annum. The intensity over land areas is greater than over ocean areas in the same latitude, and the decrease during the past 37 years greater over ocean parallels than over land parallels of latitude.

PRODUCTION OF SMOKELESS FUEL.—A pamphlet entitled "The Story of the Scott-Moncrieff Retort for producing Smokeless Fuel," printed by Moultons (Printers) Ltd., Brighton, contains material of some historical interest in connection with the efforts which have been and are being made to solve the problem of the low-temperature carbonisation of bituminous coal for the production of smokeless fuel. It deals with the recent and pioneering efforts (dating back to 1870) of Mr. W. D. Scott-Moncrieff. Since 1921 he has been engaged in experiments made at the Newhaven Gas Works in order to perfect a retort for which "final success" is claimed. In an enclosed analytical report are given tables of results of carbonisation trials which seem typical of those to be expected from the carbonisation of Durham and Yorkshire coals at temperatures about 600° C. The fuel produced is stated to be "smokeless and suitable for transit," and the "results exceed all expectations." Insufficient evidence is adduced to enable the reader to judge the validity of these claims. One can only await with interest the appearance of further details, with the hope that, if a solution has been found of a problem which has proved so baffling, both on the technical and the economic sides, credit will fall to one of the pioneering workers.

OXIDATION OF CARBON.—The well-known method of oxidation of organic substances by a mixture of chromic and sulphuric acids has been recently re-examined by J. L. Simon, and the results, some of which were unexpected, have been communicated in a series of notes to the *Comptes rendus* of the Paris Academy of Sciences. With the usual mixture of potassium bichromate and sulphuric acid some compounds are completely, others only partially, oxidised. The substitution of silver bichromate for potassium bichromate in the mixture was found to give complete combustion in some cases where the classical mixture gave only partial oxidation. Interesting and unexpected results were obtained on applying these two mixtures to the oxidation of the various forms of carbon. Pure graphite, using the silver oxidising mixture, was completely oxidised to carbon dioxide (with a trace of carbon monoxide) in half an hour at 100° C.: in the absence of silver the combustion was partial, from 66 per cent. to 72 per cent. being burnt. In a later communication (July 23) it is shown that the deficit in the absence of silver is related to the constitution of the compound, and the aromatic compounds can be clearly distinguished from others by the different figures given by the two reagents. As regards the different forms of carbon: in the presence of silver, graphite is completely burnt, diamond is not oxidised at all, while for various forms of charcoal, coke, and coal, only from 1 per cent. to 6 per cent. is burnt. The fact that it is possible to oxidise graphite by thirds is in agreement with the view of a hexagonal distribution of the carbon atoms, and there is a marked experimental difference between graphite and certain varieties of black carbon which it is natural to attribute to a difference in constitution.