Research Items.

SANATORIUM TREATMENT OF PULMONARY TUBERCULOSIS.—"Although it was at one time believed that sanatoria were effective in curing phthisis, and at the present time it is tacitly assumed that they are at least effective in favourably influencing the progress of the disease, it has never been satisfactorily proved that such is really the case." With the assistance of M. Noel Karn, Dr. Percy Stocks has made an elaborate study of the first 2794 consecutive cases of undoubted pulmonary tuberculosis brought under the survey of the Belfast Tuberculosis Dispensaries from 1914 onwards. His results, published in *Annals of Eugenics*, vol. 1, parts 3 and 4, show that the average ultimate progress, as estimated over a period of six years unless the patient had been previously lost to view, was undoubtedly worse in the case of the sanatorium-treated than in the case of patients otherwise treated, for cases first seen in the incipient stage, but was not significantly different for patients first seen in advanced stages. Judged by the proportion in whom the disease became arrested or apparently cured, sanatorium treatment showed a temporary superiority during the first two or three years which was lost in subsequent years. While length of stay at a sanatorium was not found to be correlated with ultimate progress, there was an appreciable relation between regularity of dispensary treatment and progress. No consistent evidence was found that bad housing conditions, as judged by rent, class of house, state or cleanliness of rooms, or overcrowding, had any influence on ultimate progress or rate of recovery. The authors suggest that sanatorium treatment should be reserved for patients diagnosed *very early*, those so ill as to require hospital treatment, or those whose circumstances demand their removal from home.

LOUISIANA MOUND BUILDERS.—Dr. J. Walter Fewkes, Bureau of American Ethnology, has been engaged during last winter in excavating on the Red River mounds near Marchville, Louisiana, which are, it would appear, of an origin entirely obscure. Breastworks two-thirds of a mile long and 20 mounds, of which the largest, flat on top, is 12 feet high and covers 3 acres of ground, suggest a population of some considerable size. Yet the archæological evidence which has been obtained by excavation suggests a culture of low standard precariously existing in an unfavourable environment. The structure of the mounds varies considerably from that of the Mississippi tribes, Natchez, Choctaw, and others east of the river, or of the Caddo, to the west. The mounds appear to be older than those of the Mississippi Valley, and contain no evidence of contact with the white man. They are very poor in artefacts, and it is clear that the living afforded by the area was precarious and meagre. The larger of the mounds contains remains of many skeletons. There are 8 lodge-sights, circular excavations supported by a low embankment. When settlers first visited the country the site of the mounds was occupied by a small tribe of Avoyelle Indians.

LUMINESCENCE IN EARTHWORMS.—G. E. Gates (*Records Indian Mus.*, vol. 27, part 6) has observed that four species of earthworms which occur in Rangoon eject from the dorsal pores, after mechanical or chemical stimulation (*e.g.* weak ammonia solution), a mucoid substance which is luminous in various degrees according to the species of worm from which it has issued. The light is not immediately forthcoming on the discharge of the mucus, but appears after a short interval and gradually increases to a maximum. The earthworms are respectively three species of Eutyphœus and one species of Megascolex; no species of either genus has hitherto been reported as luminous.

THE PREVENTION OF DAMAGE BY TERMITES.—Termites or 'white ants' are among the most destructive pests in tropical and subtropical countries. They are well known in these lands to cause serious injuries to woodwork and foundations of buildings, and to furniture and other manufactured articles, as well as injuring trees, crops, and other vegetation. At one time it was believed that the life of a termite colony was dependent upon the presence of the greatly enlarged queen individual, and if she were destroyed, the community would be quickly exterminated. We now know that in the event of her destruction, the life and reproduction of the colony is maintained by other types of queens which, although showing little increase in size, make up in fecundity by their numbers. In *Farmers' Bulletin*, No. 1472 of the U.S. Department of Agriculture, Dr. T. E. Snyder has provided a useful brochure dealing with combating these insects. He recommends that the foundation of buildings should be made of stone, brick, or concrete, including stone or metal columns in the basement to support the floor above. Walls and flooring in basements or cellars should be of concrete, and in no case should untreated timbers be sunk into the ground. Where timber is the only practicable material, it should be first impregnated with coal-tar creosote. Complete dryness of foundations of basement flooring is an important means for rendering buildings safe from attack. Many details referring to termite attacks under various conditions will be found in this bulletin, together with recommendations concerning their elimination from cultivated lands.

GENETICS OF THE SWEET PEA.—The sweet pea, *Lathyrus odoratus*, was one of the earliest objects of genetical study in the beginning of the neo-Mendelian period. The first case of what is now known as linkage and crossing-over was described in this material. As the genetical work with this plant proceeds, the number of linkage groups of characters is still, in the work of Punnett, fluctuating about the haploid number (7) of chromosomes. Partial studies of the pollen development have been made, but the first thorough cytological investigation has recently been published by Miss J. Latter (*Annals of Botany*, April 1926). Several discoveries of much interest are recorded; no more critical paper has appeared in cytology for several years. During the thread stages of meiosis in the pollen mother cell, a definite dark-staining body is discovered in the nucleolus, and it is shown to be invariably connected with a loop of the spireme. It grows in size and apparently serves to pass elaborated material from the nucleolus on to the thread. There is some evidence that it is derived from a crystalline body which is constantly present in the nucleolus at an earlier stage. The spireme thread shows a telosynaptic history, which is traced with great accuracy. Finally, seven loops are formed radiating from the centre of the nucleus. This is the stage which Gates has called brochonema. During this stage the two arms of each loop, representing a pair of chromosomes, are frequently twisted about each other, thus providing a possible basis for

genetical crossing over. Hitherto such crossing over has only been considered to occur in connexion with parasynapsis or side-by-side pairing of the chromosome threads.

RAINFALL AND VEGETATION IN NIGERIA.—"The Physiography of Southern Nigeria and its effect on the Forest Flora of the Country," by Mr. J. R. Ainslie, is the title of No. 5 of the Oxford Forestry Memoirs (Oxford: Clarendon Press; London: Oxford University Press, 1926. Price 4*s.* net). After a summary of the main physical features of the country, Mr. Ainslie shows that three physiographical regions can be distinguished—the littoral, the plain, and the upland. The distribution of rainfall decreases from the littoral region, where it is more than 100 in., to the uplands, with less than 50 in. These three physical divisions closely correspond with the forest types. The littoral region, apart from mangrove swamps, is characterised by tropical rain forests of a more or less hygrophilous type with much undergrowth. Beyond this most of the plains were originally covered with deciduous forest of large trees with a good deal of evergreen undergrowth. In the small areas of upland that occur this gives way to savannah forest opening out to the grasslands of the north. Apart from these climatic formations Mr. Ainslie recognises certain edaphic formations due to ground water. As a rule these follow rivers and entail the invasion of the drier by the wetter formations. Contrary to the general rule in Nigeria of a decrease of moistures with increasing distance from the coast, in one area the loss of rainfall is partly counterbalanced by frequent mists, with the result that in the north of Ondo a neck of rain forest projects into Northern Nigeria. The paper is well illustrated.

COLD WEATHER RAINS IN INDIA.—A discussion on "Rainfall Types in India in the Cold Weather Period, December 1 to March 15," by Sir Gilbert T. Walker and Dr. J. C. Kamesvara Rav is given in *Memoirs of the Indian Meteorological Department*, vol. 24, Part 11. It is agreed as essential for progress in weather forecasting that existing knowledge should be kept on record so that time should not be wasted in discovering facts familiar to predecessors. For the present inquiry, the occurrence of appreciable rainfall of more than 2 inches at stations in the Daily Weather Report is the only meteorological effect considered, and that is collated for the twenty-one winter seasons, December 1900-March 1921. The bursts of rainfall are classed according as they are associated with a late monsoon or with a western disturbance. The rainfall types are classified in different tables and subdivided where distinction is possible. From the analysis, such facts as the following are obtainable: "A fall of pressure at a northern station occurred 67 times and was succeeded by a northern track 55 times and a southern track 5 times, while 7 were neutral; after 25 falls of pressure at southern stations there are 12 northern tracks and 6 southern."

THE NEW ATOMIC THEORY.—In his address to the Scandinavian Mathematical Association last August, Prof. Niels Bohr intimated (NATURE, December 5, 1925, p. 845) that the atomic theory of the moment required re-editing as a branch of the mathematical theory of quadratic or bilinear forms. How far this process has been effected during the year may be judged from a summary of it by Prof. Leon Brillouin in the May issue of the *Journal de Physique*. He shows that the representation of the quantities which specify the atom as bordered matrices leads directly without further hypotheses to the same results as the older quantum theory with its special hypotheses known as the principles of 'selection' and of 'correspondence,' and he anticipates great advances in our knowledge of the atom from this method of attack. A shorter article dealing with the same subject, but entitled "The New Quantum Theory," by Dr. H. T. Flint, is to be found in the July issue of *Science Progress*. The author adopts a vector notation as being more familiar to physicists than the notation of matrices. He points out that the new theory gets rid of the anomalous half quantum which it has been necessary to introduce into the old quantum theory to explain band spectra.

THE COUPLING BETWEEN ELEMENTARY RADIATION PROCESSES.—In a communication from the Reichsanstalt, published in the *Zeitschrift für Physik*, June 16, Dr. W. Bothe describes a series of experiments in which a piece of thin copper or iron foil placed in a narrow space between the front surfaces of two Geiger counters was caused to fluoresce by means of a beam of molybdenum $K\alpha$ radiation. The K fluorescence radiation from the foil passed through two thin aluminium windows into the counters, L radiation and photoelectrons given off from the foil being kept back by the aluminium. The interior of the counters was filled with argon, which greatly increased the number of photoelectrons recorded by the counters. Air does not absorb the K-radiations of copper and iron very much, and when it is used the deflexions are mainly due to electrons from the walls of the counters. The sensitiveness of the apparatus was such that according to the absorption statistical theory of Bohr, Kramers, and Slater, a considerable number of coincidences between the deflexions in the two counters should have been observed. In the first set of experiments such coincidences were seen, but it was shown that they were due to radioactivity of the brass of which the counters were made and not to the K-radiation from the foil. When the counters were reconstructed using zinc of low radioactivity, the number of coincidences was no greater than was to be expected with a haphazard distribution of the deflexions. The results indicate that quanta given out by the foil travel in one direction only and are absorbed in a single elementary act.

THE DISCOVERY OF OXYGEN.—In his presidential address to the Indian Chemical Society, printed in the Society's journal (vol. 3, No. 1), Sir P. C. Rây gives an account of the parts played in the discovery of oxygen by Priestley and Lavoisier. He emphasises the great service rendered to chemistry by Lavoisier, who alone of contemporary chemists was able to see the real meaning of Priestley's work, and by his own experiments and reasoning to lay the foundations of chemistry as it exists to-day. The services of Lavoisier have never seriously been called into question, but his claim to the discovery of oxygen can scarcely be entertained. Nothing which Sir P. C. Rây brings forward in the slightest degree alters the position, which has been most exhaustively studied by former historians of chemistry. That Lavoisier had any claim to be an independent discoverer of oxygen cannot be maintained on the evidence available and the important services of the great French man of science neither require nor justify any such claim. It is not clear from his paper whether Sir P. C. Rây wishes to reassert this claim, but his concluding sentence seems to indicate that he does not. "It is not necessary to belittle the one in order to magnify the other. Each was great in his own way and has extended the boundaries of our science."