

Research Items.

LAUGHTER.—In the *Fortnightly Review* for August J. A. T. Lloyd considers the problem of humour and mechanism. Bergson in his well-known study, "Le Rire," maintains the hypothesis that the essence of humour lies in the mechanisation of what ought to be spontaneous and not mechanical. The function of laughter is to punish and so to prevent the repetition of machine-like behaviour. The author of this paper criticises this point of view as being more true of Latin humour than of Anglo-Saxon and supports the theory that in the case of the latter, laughter is rather due to a feeling of superiority. He thinks, however, that recently a change has taken place, and that in Mr. Stephen Leacock's humour we approximate to humour as sensed by Bergson; he detects automata masquerading as human beings and we laugh, but not with the old laughter of superiority. A more fundamental treatment of the subject of laughter will be found in *Psyche* (vol. ii. No. 4), where Prof. McDougall develops at greater length a theory he put forward in *NATURE* some years ago. He believes that the theories usually advanced fail to answer the question, For what end did the human species acquire the capacity for laughter? Man is endowed naturally with the tendency to share the emotions of others, when he sees them expressed by them in action, thus rendering himself extremely susceptible to the suffering he sees around him. Were he to suffer sympathetically every pain he saw, he would very rapidly devalue himself; hence he has developed a compensatory mechanism whereby he laughs at the pains and sufferings which are not serious or with which he can have no concern. Laughter is then primarily and fundamentally the antidote to sympathetic pain. It is necessary to distinguish laughter from the smile which is the natural expression of pleasure.

RADULA OF THE HELICINIDÆ.—This, judging from the somewhat jejune remarks concerning the method of preparation and mounting and seeming want of acquaintance with the work of earlier writers on the subject, appears to be the author's first encounter with the molluscan radula. In these circumstances, Mr. H. B. Baker (*Proc. Acad. Nat. Sci. Philad.* vol. lxxiv.) must be held to have acquitted himself well and has rendered a useful and well-illustrated account of the radula of the Helicinidæ that will prove useful to future students of the group. Although the title gives no hint of the fact, the author attempts a classification of the North American Helicinidæ largely based on the characters of the operculum, and further essays a phylogenetic scheme.

THE STRUCTURE AND BIOLOGY OF THE HOG LOUSE.—Memoir 51 of the Cornell University Agricultural Experiment Station, by Miss L. Florence, is devoted to a study of this insect and forms a carefully executed piece of morphological work. With the exception of the human louse, very few detailed studies have been made of any species of Anopleura, and the present paper fills a very noticeable hiatus. The complete life-cycle from egg to egg at a temperature of 35° C., followed out in vials worn next the body, was ascertained to require 29 to 33 days. Of this period 13-15 days was occupied by the incubation of the eggs and three ecdyses were passed through during post-embryonic life. The difficult subject of the mouth-parts is very fully discussed, but their homologies are not touched upon more particularly owing to the necessity for developmental studies made upon

the embryo. The only investigator who has dealt, so far, with this aspect of the subject is Cholodkovsky, in his work on *Pediculus*. Miss Florence finds that the pharynx and mouth-parts of the hog louse are similar in plan to those of the last-mentioned insect. The result of the work, as a whole, is to emphasise the general morphological similarity of the Mallophaga and Anopleura, thereby supporting the conclusions of Mjoberg and of Harrison.

RESEARCHES ON DIPTERA.—In Bulletin No. 5 (n.s.) of the Canadian Department of Agriculture, Dr. A. E. Cameron contributes a well-illustrated paper on the structure and biology of *Simulium simile*, a small black fly infesting cattle in Saskatchewan. This insect, however, has not been observed to suck the blood of man, although it may cause mild annoyance to human beings by flying persistently around their heads. The aquatic larvæ and pupæ of this species are extensively preyed upon by a fish known as the sucker (*Catostomus commersonii*), which is proving itself one of the most successful controlling agents. As the result of experimental tests with miscible (phinotas) oil it is shown that the *Simulium* larvæ can be killed. The experiments, however, did not prove to be quite so satisfactory with the larvæ of *S. simile* in the river as with those of other species in a small stream. In *Bulletin of Entomological Research*, vol. 12, Part 4, Major W. S. Patton contributes revisionary notes on the genus *Musca*: in this first part of the paper he deals with Oriental and Australasian species. The rôle which these insects play in the dissemination of disease renders the exact determination of very closely allied species a matter of practical importance. Mr. F. W. Edwards (*Entomologist's Monthly Magazine*, July) describes a new species of Sciarid fly, *Plastosciara pernicioso*, the larvæ of which were found damaging cucumber roots and stems in a nursery at West Worthing, where they were present in very large numbers.

MANGANESE IN PLANT NUTRITION.—Since the discovery of manganese in the soil and in plant ashes by Scheele in 1774, numerous investigations have been made on the occurrence, distribution, and probable function of this element in its relation to agriculture. In the July number of the *Journal of the American Chemical Society*, Mr. J. S. McHargue, of the Kentucky Agricultural Experiment Station, describes a careful series of experiments, with purified materials (lack of care in this respect having caused errors in previous work), the results of which seem to point definitely to the conclusion that manganese has a function to perform in the production of chlorophyll, and consequently in carbon assimilation and possibly in the synthesis of protein.

FORMATION OF MARINE DEPOSITS ABOVE SEA-LEVEL.—The Report of the Secretary of the Smithsonian Institution for 1921 quotes some observations made by Dr. Paul Bartsch at the south-east point of Hanouma Bay, Hawaii, where he found a marine flora and fauna living at a considerable elevation (the precise height not given) above the level of the sea. Algae, molluscs, crustaceans, echinoderms, and other marine organisms, says Dr. Bartsch, "occupy pools and puddles kept moist and supplied with fresh water by the spray from the breaking surf, which incessantly pounds that shore. I consider this an important observation, since the occurrence of fossiliferous laminæ bearing marine organisms between sheets of lava has been held to indicate that they

were deposited at or below sea-level, and their occurrence above this has been held as evidence of elevation. We have here an instance which indicates that this is not necessarily the case, for such a lamina would be produced if a new outpouring of lava were to cover up the place mentioned."

CAINOZOIC FISHES OF CALIFORNIA.—In a paper on the fossil fishes of the diatom beds of Lompoc, California (Leland Stanford Junior University Publications, 1920), David Starr Jordan and James Zaccheus Gilbert direct attention to beds of Miocene age, probably formed in a quiet, shallow, marine bay; they are rich in large diatoms and "heavy" radiolaria. At one special horizon an extinct herring, *Xyne grex*, is represented by an immense number of individuals, all adult, all about six inches long, and unmixed with any other fish. They appear to have entered the bay with the view of spawning, and to have been killed suddenly "with no evidence of agony or distortion." In a subsequent paper, on "The Fish Fauna of the California Tertiary" (Stanford Univ. Publications, Biol. Sci., vol. i. No. 4, 1921), Dr. Jordan gives very interesting restorations of a number of fossil fish in a series of captivating plates, preceded by photographs of their skeletons. He refers again to the remarkable shoal of herring, which provides 8 or 10 specimens to the square foot over an area of four square miles. It is estimated that 1200 million individuals perished on this one occasion. Though it is said that Dr. Mann has offered an explanation, we are unable to trace it in these memoirs.

CARBON-BLACK IN THE UNITED STATES.—Recent articles in NATURE have directed attention to the various products obtainable from natural gas, among which petroleum, allied light oils, and helium figure prominently. An important industry also exists for the purpose of manufacturing carbon-black from this source, this product forming the basis of such commodities as printers' ink, paints, varnishes, polishes, cement colours, etc. It is also considerably used in the rubber industry for increasing the resiliency and toughness of rubber tyres. The processes of extraction of carbon-black from natural gas are confined principally to the United States, Louisiana being the leading state in this respect, the other producing states being West Virginia, Kentucky, Oklahoma, Pennsylvania, Montana, and Wyoming. The industry thrives best where there is an abundant supply of natural gas available in fields sufficiently isolated as to inhibit the use of the gas for domestic purposes. The yield of carbon-black per thousand cubic feet of gas ranges from 0.2 lbs. to 3.5 lbs., and in 1921 more than 31 million pounds were produced by Louisiana alone, the average yield being 0.97 lbs. per m. cub. feet. The total production for the United States for that year amounted to 59,766,315 lbs., valued at 5½ million dollars (E. G. Sievers, Min. Resources Unit. States, 1921, pt. ii. p. 33). Recent legislation in some states, in particular Louisiana, has tended to check the progress of this industry, since the rapid advancement of natural gas gasoline manufacture (a far more valuable product) has resulted in the conservation of natural gas for that purpose. Operators are therefore compelled to extract the gasoline from the gas before the latter is burned in the carbon-black plants. In some cases this has served to eliminate the industry altogether, but by adapting and by using the gasoline and carbon-black plants in conjunction, such calamity can be, and is being, fortunately avoided.

THE COURSE OF PHOTOGRAPHIC DEVELOPMENT.—Forty-five years ago, Abney (*Phil. Mag.*, 1877) coated exposed plates with a second sensitive film before

development. After development he stripped off the second film and found that a part of the image was in it—that is, the development had spread from the exposed to the unexposed sensitive material. On the contrary, common experience with gelatine plates shows conclusively that when the exposure is insufficient it is impossible to develop an image of the maximum density that the plate can yield. If development spreads at all from exposed to unexposed particles, the spreading effect must be very limited. Recently, this matter has been investigated in the modern, microscopical manner, by tracing the changes in the particles themselves. Prof. The. Svedberg has shown that developability is not conferred by developable grains upon contiguous grains, and that the percentage of grains developed is not increased when the grains are "closely packed together." In the September number of the *Journal of the Royal Photographic Society*, Messrs. A. P. H. Trivelli, F. L. Righter, and S. E. Sheppard, of the Research Laboratory of the Eastman Kodak Company, give details of their experiments, which show that where a group of two or more grains forms a "clump," this clump develops as a unit, and if only one of the constituent grains has been made developable, the whole group is completely developable. They used Svedberg's methods. They consider that developability in his case was not transferred from one grain to another, and ascribe their apparently contradictory results to the character of the emulsion. Svedberg used a special emulsion with mostly spherical grains of nearly uniform size, while the authors' emulsion had a wide range of grain sizes and contained many large polyhedral tablets. Obviously this matter is of fundamental importance from a theoretical point of view.

UPPER AIR RESEARCH.—Part I. of an aerological survey of the United States, the results of observations by means of kites, by Mr. W. R. Gregg, is published as Supplement No. 20, U.S. *Monthly Weather Review*. An abstract by the author is also given in the *Monthly Weather Review* for May last. The object of the discussion is to furnish results so much needed at the present time in connexion with aviation and ordnance. Much detailed information can be obtained from the numerous tables and diagrams as to the characteristics of the free air over the United States east of the Rocky Mountains. Kite observations are made at six stations established by the Weather Bureau during the period 1915 to 1918, and there are data from other sources. Various meteorological results for the upper air are given for the several months, the season, and the year. The values at Blue Hill, Mass., and Mount Weather, Va., each based on a long series of observations with kites, are included in the discussion. Free-air results will augment the general knowledge of atmospheric circulation, and of the movements of cyclones and anticyclones. It is rightly claimed that they will give information of value in connexion with the laying out of a permanent flying course or "air-way." Near the surface the turning of the winds is generally to the right, and the deviation is greater in winter than in summer; moreover, it is greater at northern than at southern stations. The average wind velocity at lower levels increases most above surface south-easterly to south-westerly winds, but at greater heights the largest increases are found above surface south-westerly to north-westerly winds. The velocities are least in all seasons and at all heights above surface north-easterly to east-south-easterly winds. A review of pilot-balloon observations is foreshadowed at a future date.