

endemic species of the genus, also of a peculiar liliaceous epiphyte, *Astelia montana*. As characteristic plants of the Solomon Islands there are figured the epiphyte *Polypodium quercifolium*, an expanse of "alang-alang" grass, *Imperata arundinacea*, and a huge specimen of *Calophyllum inophyllum* growing close to the sea. A fine photograph of the stilt-roots of a *Ficus* is contained in this part. Mr. E. Ule has contributed the photographs from the "campos" in the Brazilian State of Bahia. Various cactus plants are illustrated, also some of the abundant leguminous trees. The cluster of palms, *Copernicia cerifera*, the species yielding Carnauba wax, forms an imposing group. The number devoted to the Algerian Sahara is also a xerophytic study. The plates include representations of *Limoniastrum Feei*, *Aristida pungens*, and *Pistacia terebinthus*. In the final double number Dr. Schenck presents some excellent studies of plants in the Swiss and Tyrolean Alps. The photographs that more particularly evoke admiration are those showing cushions of *Androsace helvetica*, flowers of *Ranunculus alpestris*, clumps of *Thlaspi rotundifolia*, and straggling plants of *Salix retusa*.

British Rainfall, 1907. By Dr. H. R. Mill. Pp. 100 +[280]; with maps and illustrations. (London: E. Stanford, 1908.) Price 10s.

This excellent work, which has now reached its forty-seventh annual volume, has, by the energy and ability of its founders, established for itself a unique position among general rainfall publications. It deals with the distribution of rain in space and time over the British Isles during the year 1907, as recorded by more than 4000 voluntary observers, and is supplemented by articles upon various branches relating to that subject. As it has appeared in practically the same form for many years (which is a great advantage for the purpose of reference), there is little to be said about it that has not been previously mentioned; the work of the British Rainfall Organisation is continually expanding, and the author receives no pecuniary assistance in the onerous labour of preparation and publication of the report beyond some subscriptions from persons interested in rainfall work.

Among the articles we may specially refer (1) to an interesting discussion of the typical thunderstorms of July 21-22, showing distinctly the linear arrangement of heavy rainfall in such storms and its disregard of the configuration of the land, and (2) to an instructive note on mapping rainfall. The discussions of droughts and rain spells, and the monthly and seasonal charts illustrating the rainfall of the year, are also of exceptional interest.

Arbeiten aus dem Gebiet der experimentellen Physiologie. By Dr. Hans Friedenthal. Pp. xi+493. (Jena: G. Fischer, 1908.) Price 8 marks.

This is a collection of fifty-five papers written either by Dr. Hans Friedenthal or by the workers in his laboratory. Dr. Friedenthal does not appear to have any university or other official post, but is the happy possessor of a private laboratory at Nicolassee, near Berlin, and he seems to be a prolific and versatile worker. The first paper of the collection is an obstetric one, written in 1894, but subsequently the various branches of physiological investigation appear to have had greater attraction for him, and he has produced since that time publications dealing with such subjects as absorption, immunity, digestion, colloids and ions, cardiac and sympathetic nerves, cancer, syphilis, the urine, and histological methods. The papers themselves are of considerable interest, and the collection is one of which any investigator may well be proud.

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LETTERS TO THE EDITOR.

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Observations on the Active Deposit of Radium in Mid-ocean.

IN the month of May, 1908, by the kindness of the captain and officers of the ss. *Lake Erie*, observations were made between Montreal and Liverpool on the radio-active matter collected on a negatively charged wire exposed to the air for three or four hours. The wire was insulated by ebonite rods, suspended from the flag halyards, and charged by a Zamboni dry pile. After exposure it was coiled on a skeleton reel and placed in an electroscope clamped to a board, together with the observing microscope. There was no difficulty in obtaining satisfactory readings, in spite of the slight motion of the ship.

The results obtained in mid-Atlantic appear to approximate to those found in Canada or in England, but it must be remembered that the amount of active deposit determined at any given locality is liable to considerable variations.

To an arbitrary scale, after deducting the natural leak, the measurements of the active deposit were as follows:—

May 5.	Montreal	...	...	...	...	34
" 6.	"	...	...	...	...	26
" 14.	Ocean, lat. 50°, long. 45°	...	...	...	...	21
" 15.	" " 52° " 38°	...	...	...	...	64
" 16.	" " 54° " 30°	...	...	...	...	41
July 1.	Hornsea, E. Yorkshire Coast	...	...	...	...	28
" 2.	" " " "	...	...	...	...	80
" 15.	" " " "	...	...	...	...	53
" 20.	" " " "	...	...	...	...	60
" 22.	" " " "	...	...	...	...	48
Aug. 22.	Seascale, W. Coast, Cumberland	...	...	...	...	30
" 24.	" " " "	...	...	...	...	270

The large value at Seascale on August 24 was obtained on a vertical wire well exposed to a strong west wind. The small values at Montreal resulted from a horizontal wire on the roof of a house. An uncharged wire at sea gave no result.

These experiments, so far as they go, indicate that the active deposit due to radium is prevalent to nearly the same extent over land and sea. Observers have also found that the ionisation of the atmosphere, measured by Ebert's apparatus, is nearly the same over the ocean and over the land.

We may deduce, then, that in mid-ocean the radium emanation, which decays to half value in 3.8 days, and gives rise to the active deposit, cannot be entirely wind-borne from the land, but that the emanation enters the air from the ocean somewhat as from the ground.

This is contrary to expectation, for the average number of grams of radium per c.c. of rock is about 3.5×10^{-12} (Strutt) and per c.c. of sea water 3×10^{-14} (Joly). It is, however, probable that the emanation due to radium in solution in sea-water escapes more readily than the greater quantity generated in soil or rock. The emanation per c.c. in the atmosphere near the earth's surface would be in equilibrium with about 6×10^{-17} grams of radium.

Montreal, September 22.

A. S. EVE.

The Indigo Question.

IN an admirable article, "A Contribution to the Indigo Question," which appeared in NATURE of July 30 (p. 296), Prof. Meldola discusses the report of the work carried on by Messrs. Bloxam, Wood, Orchardson, Gaunt, and Thomas in the clothworkers' laboratory at Leeds University, and agrees with the authors in the opinion they express that there is still scope for considerable improvement in the manufacture of natural indigo. On the other hand, the general secretary of the Bihar Planters' Association (Mr. T. R. Filgalt), in replying to this article (NATURE, October 1), makes the remarkable statement, "nothing further can be done in improving the main processes."

Although Prof. Meldola has already dealt with this statement, I should like to be allowed to make a few remarks on the same subject. The most important point in the whole discussion is the question whether, in the future, it will be possible for the natural product to compete successfully with its coal-tar rival.

If the planters and their adviser, Mr. Bergtheil, can be induced to recognise and extend the results of the scientific investigations carried on in Leeds under my general supervision, I am strongly of opinion that there is still a bright future for natural indigo. The details of these investigations have been published in the *Journal of the Society of Chemical Industry*, and I cannot go into them again here, but I may be allowed briefly to state the main conclusions which were arrived at and confirmed in the fullest possible manner.

There can be no doubt that the indigo leaf contains much more indican than was formerly supposed to be the case, and this fact has hitherto been overlooked because of the defective analytical methods employed by the scientific advisers to the indigo planters. Mr. Bloxam and his colleagues very carefully investigated these analytical processes, and were able to prove conclusively that the persulphate method, carried out according to Mr. Bergtheil's directions, gives results which are quite untrustworthy. The first step, therefore, was to devise trustworthy analytical methods, and this was ultimately accomplished by the development of the isatin method for determining the indican in the leaf and the tetrasulphonate method for estimating the indigo in the finished cake. A very large number of control analyses, carried out under a great variety of conditions, have shown conclusively that these analytical methods are the only ones which give accurate results. The application of these new methods has proved beyond doubt that there is much more indican in the leaf than is converted into indigo under the present conditions of manufacture. In spite, therefore, of the statement of the general secretary of the Bihar Planters' Association that "nothing further can be done in improving the main processes," I am convinced that there is a great prospect of considerably increasing the yield of indigo provided all the details of manufacture are systematically subjected to searching and skilful scientific investigation.

A. G. PERKIN.

Memory in the Germ-plasm.

If "a lamb's tail is shortened" and the germ-cell "records" the event, surely there is more to be "remembered" by it than a "momentary cut," viz. a permanent change of shape? Setting aside mutilations, there remain use-acquirements. From infancy forwards a man develops physically and mentally, principally under the stimulus of use. For instance, the muscles of an infant's limbs do not grow unless used. His mind is almost blank at birth, but grows under the influence of experience (use). In this way he learns to coordinate his muscles and a vast deal more. Prolonged parental protection affords the opportunity. In proportion as animals are low in the scale of life they appear to be less and less capable of making use-acquirements until they are quite incapable. Most insects, for example, are not protected by their parents, and must come into the world fully equipped physically and mentally to cope with the environment. They have no need for use-acquirements, and apparently make none. It seems clear, then, that the power of developing under the stimulus of use (plasticity, as it is called) is a product of evolution. It confers the immensely valuable trait of adaptability on the individual. The position, then, appears to be this: low animals cannot make use-acquirements, and therefore can transmit none; higher animals can make use-acquirements, but obviously transmit none, for in them the innate has been progressively replaced by the acquired. When we speak of the transmission of a use-acquirement, we do not really mean that the child has inherited the parental trait—we mean that the trait has been *transmuted* into something very different and much less useful, an innate character. In other words, we suppose that the adaptability of the parent is replaced by rigidity in the child, and we suppose this

in spite of enormous and conclusive evidence to the contrary. We close our eyes carefully to facts, and found our science on vague analogies.

Southsea, October 9.

G. ARCHDALL REID.

A Red Rainbow at Sunset.

OCTOBER 9 was a mild day with south-west wind, and slight showers in the afternoon. The sky was overcast until sunset, when breaks appeared in the clouds. In the west there was a fine effect of orange-yellow sunset colour, while in the south-east at the same time the clouds were pink. Here, on some pink clouds near the horizon, a fine, nearly vertical patch of rosy-red rainbow appeared, which shone more brilliantly, and was of a rather yellower red than the surrounding clouds. The colour, varying in intensity, lasted for about three minutes, and the patch appeared to be from 10° to 12° in length; the occurrence took place about 5h. 30m. G.M.T. A similar rainbow is described in the current number of the *Gazette astronomique*.

E. ARMITAGE.

Dadnor, Herefordshire, October 10.

OXFORD UNIVERSITY MUSEUM.

THE fiftieth anniversary of the opening of the Oxford University Museum was celebrated on Thursday last, and a large number of distinguished men of science, representing the universities and scientific societies and institutions of Great Britain and Ireland, assembled to do honour to the occasion. The proceedings were short, and may be very shortly described. The guests assembled in the Sheldonian Theatre, where the honorary degree of Doctor of Science was conferred on Prof. Svante Arrhenius and Mr. A. G. Vernon Harcourt. Fifty years ago Mr. Harcourt was acting as Brodie's lecture assistant, and was engaged in setting up the apparatus for the first lectures delivered in the new museum. Hearty congratulations were tendered by those present on his unimpaired vigour and energy after so many years' active and distinguished scientific work. After receiving congratulatory addresses from universities and learned societies, the Vice-Chancellor read a letter from the Chancellor, and delivered an address which was singularly felicitous both from its style and from the evident sincerity with which he expressed his sympathy with the progress of scientific studies in the University of Oxford.

In the afternoon Dr. Vernon Harcourt gave an address on the early history of the museum. It was unfortunate that the lecture theatre of the museum was too small to accommodate a larger audience. Many were unable to gain admittance, but those who were more fortunate had the privilege of hearing an interesting story luminously told, and enlivened by many humorous passages and personal reminiscences. After Dr. Harcourt's address, the Vice-Chancellor unveiled a bust of the late Prof. W. F. R. Weldon, and the company dispersed to tea and to visit the various departments of the museum.

Though, as the Vice-Chancellor said in his address, fifty years is not a long period in the history of education nor in the history of the University of Oxford, it was fitting that this anniversary should have been commemorated. The building of the Oxford Museum was an indication of a great change in the opinions of educated men in this country, and it is probable that half a century hence the present time will be looked back upon as equally important in the history of the progress of scientific education. In our opinion, too much stress has been laid upon the opposition to the project of building the University Museum; too little credit has been given to the large and enthusiastic support which enabled the project to be realised.