

## LETTERS TO THE EDITOR.

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## The Effect of Grass on Plants.

In a review of the thirteenth report of the Woburn Fruit Farm which appeared in NATURE a short time ago, special reference was made to some of our experiments which seemed to prove conclusively that the injury done to trees by grass growing above their roots must be due to something excreted from, or resulting from the growth of, the grass, and not to its abstracting anything from the soil, or interfering mechanically or physically with the tree roots. In these experiments the trees were grown in plots of soil or sand, on which rested pans of soil or sand with grass growing in them. The pans had perforations in the bottoms covered by fine wire gauze. The trees used for comparison had, of course, similar pans placed above them, but without grass growing in them. The deleterious effect of the grass in these circumstances was nearly as great as when it was growing in the medium in actual contact with the roots.

These experiments are now being repeated on plants other than fruit trees, namely, tobacco, tomatoes, and barley; the plants are in every case growing in soil, but the pans contain soil in some cases, and sand in others. Where they contain soil the effect of the grass growing in them has been most marked, especially on the tobacco, where the plants are not one-quarter the size of those without grass; where the pans contain sand the effect has been much less, being noticeable chiefly by the paleness of the plant leaves, rather than by the stunting of growth. This indicates that the toxic effect varies considerably with the nature of the medium in which the grass is growing, and harmonises with previous observations that the effect of grass on trees varies considerably with the nature of the soil. With barley no certain effect of grass has yet been noticed, and it is quite possible that grass may not be deleterious to plants of the same order as itself.

It was observed that in all cases the plants with grass above them appeared just at first to do rather better than the others. This is consistent with other observations on this subject, and also with the recognised stimulating effect of toxins in minimal doses.

These experiments have not been completed, but the publication of a note on them may give others the opportunity of repeating them during the present season.

SPENCER PICKERING.

## The Local Races of Burchell's Zebra.

IN NATURE for June 6 (p. 364) there is a summary of a paper on zebras by Major Stevenson Hamilton, which was read before the Zoological Society on May 21. The author pointed out that it was possible to shoot in one herd in the Transvaal specimens exhibiting features claimed to be distinctive of such races as *E. burchelli wahlbergi*, *E. b. transvaalensis*, and *E. b. chapmani*. From this circumstance Major Stevenson Hamilton concluded that the subspecies or local races in question had been based upon inadequate museum material.

Presumably the zebras observed, since they were shot in the Transvaal, belonged to the race named *transvaalensis*. It is not surprising therefore that they presented the characters of that form. Moreover, since the Transvaal lies between the areas of South Africa occupied respectively by *E. b. wahlbergi* and

*E. b. chapmani*, the occurrence of zebras there showing features possessed by those two subspecies is precisely what one would expect. For the subspecific rank assigned to the two forms in question implies the known, or expected, existence of intermediate forms in an intermediate geographical area.

Hence the value of Major Stevenson Hamilton's contribution to the question at issue lies in the proof it supplies, not of the unsoundness, but of the soundness, of the conclusions reached by museum systematists, at all events so far as the races of zebras under discussion are concerned.

Zoological Society, June 12.

R. I. Pocock.

## Boulder Clay in Essex.

THE extensive deep sewerage works now being carried out under Mr. H. Tooley for the Essex County Council at Harlow have disclosed facts of considerable interest to students of glacial geology. The main sewer from Potter Street cuts through the hill of Boulder Clay between that place and Harlow at depths ranging up to 32 ft. The excavations and tunnels are entirely in the Boulder Clay, which assumes here an extraordinary till-like character, more so than in any exposure which has come under my observation in southern England. It is a black (rather slimy) clay, such as may well have been derived from the pounding up of Kimmeridge Clay, or Oxford Clay (as the latter is worked at the extensive works of the London Brick Company at Fletton, near Peterborough). Through this numerous chalk fragments are dispersed, and in the lower portions boulders (rounded, subangular, angular, and often beautifully striated) are met with in great quantity.

Among the erratics rocks have been recognised from the Carboniferous Limestone (abundant), the Rothliegendes, the Magnesian Limestone series, the Bunter (pebbles), the Lias, the Great Oolite, the Oxford Clay (by fossils), the Kimmeridge Clay (by fossils), the Chalk and the Eocene (sarsens and septaria), Jurassic fossils (*Ostræa*, *Gryphæa*, and five species of *Ammonite*), are sparsely distributed in fragments through the "till." Details are reserved for the B.A. Committee on "Erratic Blocks."

No trace of any crystalline rock (Scandinavian or otherwise) has been seen.

Referring to "Geology of Oxford and the Valley of the Thames," by the late Prof. John Phillips, F.R.S. (p. 461), one sees that the "northern drift" column receives ample confirmation from the facts stated above.

Taking into account the topography, it would appear that both the Harlow drift and the drift of the Upper Stort Valley have reached their present latitude through the "Elsenham Gap" (B.A. Report, 1910, p. 616), and it may perhaps be fairly inferred from all the facts to hand that the "till-like" Boulder Clay has been composed of material brought thus far south by a tongue of the inland ice of the Chalky Boulder Clay stage, while the drift deposits of the Upper Stort Valley represent in the main the later work of floating ice.

A. IRVING.

Bishop's Stortford, June 14.

## Campaign against Rats.

I BELIEVE that it is now unanimously admitted that the rat, both black and brown, is an unmitigated nuisance, both on account of the damage these rodents do and also because of the danger of plague and other diseases being spread by them.

The Sheffield and District Working Terrier Association has for the last two years been doing its best to lighten the scourge in this district; but, of course, isolated effort is useless. Why should not ratting clubs be formed in various parts of the country to try

to deal with the pests? An appeal in the daily Press has brought us inquiries as to the formation of clubs from Newcastle, Darlington, Blackburn, Walsall, Burton, Hull, Grimsby, Birmingham, Shrewsbury, and Bristol, whilst in the Manchester district such a club is already in being. We should be very glad to put any of your readers in touch with the local men in these districts, or to aid others to form similar clubs. Everything we can do to forward the destruction and thinning out of rats all over the United Kingdom we shall be only too happy to do.

WALTER HUTTON, Hon. Sec.

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### THE PROGRESS OF RADIOTELEGRAPHY.<sup>1</sup>

THE volume opens with an interesting *résumé* by Prof. Ferdinand Braun of his contributions to wireless telegraphy, the paper being, in fact, a Nobel lecture delivered in Stockholm in December, 1909. The first question of importance which the author touches on is the invention of the transmitter with coupled circuits, *i.e.* the use of a primary with large capacity to excite the aerial by induction instead of charging the aerial directly as was done by Marconi at that date. Prof. Braun's historical notes are interesting in connection with recent litigation in this country. Among other researches which he describes, the most important are probably those on directive telegraphy. He ends with a quotation from his first lecture in 1900:—

Wireless telegraphy has so far been called spark-telegraphy, and no doubt it has hitherto been impossible to avoid having a spark in some part of the apparatus . . . what I have attempted to attain is, however, what one might call sparkless telegraphy.

The first number also contains papers by Prof. J. H. Nicholson, P. Barreca, and H. Rau. The substance of Nicholson's paper has already been published in English. In Barreca's paper we have a description of a method of measuring the radiation from an antenna and instances of the application of Barkhausen's method of using a Braun's oscillograph for the determination of the power in a high-frequency current circuit. The chief result is a measurement of the sum of the ohmic resistance and radiating power of a particular station, and a proof that for geometrically similar antennas the non-ohmic part remains constant.

H. Rau gives interesting photographic records of the primary and secondary discharges in ordinary spark telegraphy and in shock excitation. In the practical section of this number the greater part of the space is given to descriptions, in considerable detail, of the new Telefunken system and recent Marconi apparatus.

Among papers throughout the volume on the transmission of electrical waves over the earth's surface are those by Somerfeld, Epstein, Schmidt, and Uller. Somerfeld's paper is one of the most important that has hitherto been published on this subject. The whole question of the effects of different characters of earth surface in the propagation of electrical waves is very thoroughly

discussed, among other things the question of surface waves and waves in free space being satisfactorily worked out.

Epstein contributes a method for determining the actual lines of force propagated over various soils, with diagrams showing their forms in several cases; while Schmidt deals with experimental measurements of the resistance of seawater in the North Sea, and Uller extends these to the Baltic, giving conductivities in terms of a formula in which the variable is the concentration of sodium chloride.

The volume contains a number of interesting articles by Nesper and others on detectors, and there are numerous papers on methods of measurement by various authors. The papers dealing with the production of high-frequency current are mainly concerned with the shock-excitation method, with the notable exception of those dealing with Goldschmidt's alternator.

In addition to Rau's article, mentioned above, there is a paper by Max Wien on shock-excitation with quenching tubes, *i.e.* vacuum tubes in series with the spark-gap in the primary, or shock, circuit. The result is an increase of primary damping and of efficiency. Nesper discusses the employment of shock-excitation for wireless telephony, and particularly the advantages of a controlled exciter giving a uniform spark rate over an irregular discharge. A paper by Eccles and Makower on the efficiency of quenched spark methods and a number of smaller articles complete the contributions on this subject.

Goldschmidt gives an exceedingly interesting description of his remarkable high-frequency alternator, and Rausch discusses it from the mathematical point of view.

There are a number of articles on a subject which has recently been very rapidly developed in practice, *viz.*, the transmission of musical tones and methods of acoustic tuning for the improvement of selectivity. Abstracts of patent specifications, reviews, and notes on practical problems are also included, and the whole volume forms an excellent review of the year's progress in technical matters.

In quality and arrangement of the matter, as well as in printing and illustration, the "Jahrbuch" attains a very high standard. The only criticism which suggests itself is whether its utility and circulation would not be considerably increased if space could be found for more articles dealing with the engineering and even the commercial side of wireless telegraphy. At present the contents are largely academic in character, and are mainly theoretical and experimental investigations into first principles rather than discussions of actual problems and what has been accomplished towards their solution. A certain number of engineering notes are given, and it is the amplification of this section that appears advisable to the present writer, so that it may include not only descriptive matter, but also discussions of the problems occurring in everyday engineering practice.

J. ERSKINE-MURRAY.

<sup>1</sup> "Jahrbuch der drahtlosen Telegraphie und Telefonie." Unter besonderer Mitwirkung von Prof. Dr. J. Zenneck. Herausgegeben von Dr. G. Eichhorn. Band 4, Heft 1-6. Pp. 664. (Leipzig: J. A. Barth, 1910-11.) Price 20 marks.