

Verdant Vale estate has a coefficient for November rain of  $0.65 \pm 0.05$ . The apparent importance of adequate rain during November in the Northern Range of hills is interesting, and this and many other points require further study.

Generally speaking, rainfall seems to be a fundamental factor underlying the whole economic activity of Trinidad. A close connexion was found by the writer between rainfall in Port of Spain and the electric tram-car takings, and between the business done in the shops. The latter is partly due to synchronic weather changes, and partly the effect of the previous year's rainfall and crop yields affecting the purchasing power of the inhabitants.

On the principal rubber estate I found the well-known connexion between daily rainfall and the quantity of rubber tapped from the trees. The connexion here is due to purely physical reasons, rain causing the latex to flow over the bark instead of down the central channel into the cup. The influence of rainfall on sugar-cane and coconut yields was not studied, but it may be of interest to mention that considerable work on the former relationship has been done in other countries. The most important, perhaps, of this work is A. Walter's analysis of climatic factors and the cane crop in Mauritius, that of M. Koenig in the same Colony, and the work of T. A. Tengwall and C. E. van de Zyl in Java, which has recently established a positive correlation between sugar yield per bouw and amount of rain in October and November. A very good summary of the results obtained in the United States in regard to weather factors and cotton, Indian corn (maize) and tobacco, is to be found in J. W. Smith's "Agricultural Meteorology." Most of the correlations obtained in connexion with rainfall and tropical and sub-tropical crops have been in the neighbourhood of 0.60 with probable errors indicating a fair degree of significance.

In conclusion, I should like to emphasise the importance of this work not only from the point of view of physiology and agriculture, but also from the wider point of view of economic geography. Conditions in tropical countries have, for the most part, been fully described; what is needed now is statistical analysis and co-ordination, and from a broad administrative point of view. In Trinidad the general complaint is that short cacao crops are due to drought. On many of the best and largest estates my work indicates that the trouble is the result—or partly the result—of too much rain. W. R. DUNLOP.

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#### Astrophysics without Mathematics.

SIR JOSEPH HOOKER in 1869, in undertaking to review a book for a journal of science, made the following remark: "I hope that . . . will give us better analyses of books than reviews in general afford us. We have no end of reviews, but they are generally the author's views on the subject of the book to be reviewed and convey no precise information as to the books themselves. This is a crying evil." The review by "E. A. M." in NATURE of January 10 of my book, "Modern Astrophysics," is a particularly good specimen of the type of review to which Hooker very properly took exception. The reader of this review who has not seen the book will have not the remotest idea of what I have tried to do, or of the intended (E. A. M. calls the book "amorphous") structure of the book as revealed, say, by the titles of its sections and chapters. Instead of this relevant and, one would have thought, indispensable matter, he is treated to a catalogue of E. A. M.'s misapprehensions of the subject and of his differences from me in matters of opinion.

The book is condemned from the literary point of view; it is implied that it is difficult to comprehend; and a large number of "omissions" and "errors" are selected as examples of "looseness" of reasoning. With regard to the first two points, E. A. M.'s remarks, when examined, condemn themselves, and need no comment. He is entitled to his opinion, which he is unfortunate enough not to share with a single one of the critics whose qualifications to review the book are of a literary character. I wish only to remark that E. A. M. has either not read or forgotten the preface to the book, and that his statement that the reader "is conducted twice round the whole existing observational material" is untrue.

The main part of the "review" is occupied with criticisms of points of detail. E. A. M. has evidently been peering into the book in order to make a collection of all the trivial points to which he can object, and as a result he puts forward eleven points of this kind. The reader of the "review" will probably be surprised to learn that the whole of the material in the book dealing with all except one of the points criticised by E. A. M., when put together, would make up almost exactly one page. The material dealing with the remaining point occupies four and a half pages. The book contains about 475 pages.

It is clearly an abuse of a reviewer's authority to concentrate on points of this kind, even if his criticisms on those points are valid. E. A. M., however, has not even that excuse. The only criticism in which I admit he is justified is that I have omitted to describe the general method of determining cluster parallaxes. For pointing out that omission I am indebted to him. On the other matters I have written to him personally, pointing out where he has blundered. If, after reading my letter, he so wishes, I am quite prepared to discuss any or all of the points with him when, where, and in whatever reasonable manner he may choose, in public or in private. Considering the tone in which his "review" is written, it is incumbent upon him to accept this offer or to withdraw his remarks at once.

It is very unpleasant to have to reply to a review, but the misrepresentation and tone of E. A. M.'s essay leave me no alternative in the interests of the truth I have tried to present in my book.

HERBERT DINGLE,  
Imperial College of Science and Technology,  
January 15, 1925.

I AM sorry that my review has caused Prof. Dingle so much pain; and I must beg him to accept my assurance that purely scientific considerations were in my mind. My review contains evidence that there were portions of the book which I read with pleasure, and I take this occasion to say so explicitly. I cannot see that my criticisms were outside the province of a reviewer, but I deeply regret that they should have been expressed in language which Prof. Dingle finds discourteous.

With regard to the substance of my criticisms in the main part of the review, I should not have made them unless I were fully prepared to justify them. After carefully examining the arguments brought forward by Prof. Dingle in his personal letter to me, I am unable to withdraw any of the ten points to which he objects, but I am willingly availing myself of the opportunity of discussing them with him privately. I am unable to agree with Prof. Dingle that the points raised are trivial. They all seemed to me either to be of fundamental importance in themselves or to involve fundamental principles.

E. A. MILNE.

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