

coloured inks, marginal or thumb indexes, proportional differences, inverse functions, &c. On opening Blackie's "handy" volume, the reader will be disappointed to find that the compiler of the tables has paid little attention to the points enumerated above. A table of six-figure logarithms of four-figure numbers occupies twenty-two pages; the average difference for each row of figures is given, but there is no room found for proportional differences, so that the taking out of the logarithm of a five- or six-figure number involves an irritating calculation. Anti-logarithms are not included, but there is a table of hyperbolic logs. Sixteen pages are allotted to tables of natural and logarithmic functions of angles, for increments of one-sixth of a degree, without differences. Other tables include reciprocals, squares and square roots, cubes and cube roots, circumferences and areas of circles, heights and areas of circular segments, and rhumbs in degrees. There is an appendix giving some simple mensuration rules, some old-fashioned practical geometry, and definitions of the functions of angles, not as ratios, but as lengths.

The German tables are specially suitable for use in the chemical laboratory. The main feature is an eighteen-page table of five-figure logarithms of five-figure numbers, arranged, with proportional differences for each row of figures, like the four-figure logarithms contained in the first two pages. The collection of physical constants at the end is such as a chemist would be likely to require. There are no anti-logarithms, nor is there a marginal index. The size of page is ample, allowing of bold and effective type.

*Second Report on Economic Zoology: British Museum (Natural History).* By Fred. V. Theobald, M.A. Pp. x+197. (London: Printed by Order of the Trustees of the British Museum, 1904.) Price 6s.

THE recent development of British Museum activities in the line of economic zoology, for which the insight of the director is largely to be thanked, is re-expressed in a second report, following quickly on the heels of the first (see NATURE, January 28, 1904, vol. lxi. p. 290). We congratulated Mr. Theobald on his first report, and we repeat our congratulations, for the volume does credit to his energy and ability, and to the expertness of those inside and outside the national museum who have given him assistance. Everyone who has had even a little experience of the amount of work which is often required in order to answer apparently simple questions from outside will appreciate the skill which this report displays. The volume contains a large part of the information furnished by the director of the natural history departments of the British Museum to the Board of Agriculture and Fisheries between November, 1902, and November, 1903, besides replies to other correspondents and some special notes of present-day interest. The British Museum of Natural History is not only one of the greatest world-treasure-houses of scientific material, it has also, in its staff, an almost unrivalled wealth of learning, and we cannot refrain from giving expression to the widespread gratification that these resources of material and knowledge are now being utilised in behalf of the practical queries of the nation. The volume deals with mosquitoes, sheep scab, weevils, aphides, wire-worm, mites, leather-jackets, warbles, ring-worm, liver-fluke, and a hundred other economically interesting pests—and always in a way that leads us to respect Mr. Theobald's wide knowledge and practical shrewdness. We hope that there will be many such reports, for they are of a kind that enrich the nation as well as science. That they also contribute to art may be illustrated by the report on the grubs causing damage at Rye Golf Links.

NO. 1838, VOL. 71]

#### LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

#### The Heterogenetic Origin of Fungus-germs.

AN attempt has been made in NATURE (December 22, 1904, p. 175), by Mr. George Masee, of Kew, to question the validity of my conclusions because of certain observations of his own of a totally different kind, which have little or no bearing upon what I have brought forward.

What he says is this:—*Dematium pullulans* of de Bary produces exceedingly minute colourless conidia which are most widely distributed and are capable of passing through "thick" filter paper. "Under normal conditions," he adds, "these minute conidia on germination form delicate hyaline hyphæ which give origin to a Cladosporium. If cultures of these conidia become infested with bacteria that form Zoogloea, the hyphæ become invested with a comparatively thick, brown cell-wall, and form either compact masses of cells or irregular hyphæ consisting of short cells, constricted at the septa, exactly as shown in Dr. Bastian's Fig. 12." He then refers to an illustrated paper in the *Kew Bulletin* for December, 1898, in which he has shown this process as it occurs in a certain disease of *Prunus japonica*. He thinks his observations exactly illustrate some of the facts which I have brought forward, while I, after carefully reading his paper and studying his illustrations, think they are altogether beside the mark.

He supposes the widely distributed conidia are not only present in the hay infusion (which of course they may be), but that they are able to pass through two layers of very fine Swedish filter paper (not merely "thick" paper, as he loosely puts it). Looking to his Fig. 5 and the size of the conidia there shown, this, I think, is more than doubtful. It is, however, altogether immaterial whether such conidia are present in the original hay infusion and are able to pass through the filter used by me or not, because the next necessary step in his suggested explanation is altogether wanting in my observations. This step is that the conidia assumed to be present shall produce delicate hyphæ, and that these hyphæ, coming into contact with masses of Zoogloea, shall "become invested with a comparatively thick, brown cell-wall, and form either compact masses of cells or irregular hyphæ consisting of short cells constricted at the septa." But I had already privately assured Mr. Masee that all the phenomena which I have described may be witnessed without its being possible to meet with a single hypha of any kind or a single one of the thick-walled, brown cells to which he refers.<sup>1</sup> Yet for his explanation to have any weight "delicate hyphæ" should always be seen in relation with the Zoogloea masses, and as for the "thick-walled cells" which are then formed being exactly like what I have shown in my Fig. 12, I can assure Mr. Masee he is absolutely mistaken. What I have represented in that figure are colourless products of segmentation of a Zoogloea mass (wholly unlike the colourless conidia shown in his Fig. 5) which speedily assume a brownish-black colour, and then, *without any intervention of delicate hyphæ*, at once grow out into mycelial filaments of the same colour. In accordance with his explanation, the production of delicate colourless hyphæ should be the commonest thing possible, and should always be met with at an early stage of the changes that I have been describing; but, as a matter of fact, nothing is more remarkable than the rarity with which any of the myriads of Fungus-germs produced in a bacterial scum undergo a further stage of development, with the production of hyphæ either colourless or coloured, and I can assure Mr. Masee that he might work for three weeks or more with such infusions as I have described without finding a single specimen at all comparable with my Fig. 12. It seems deplorable that in regard to such an

<sup>1</sup> This was in reply to a private letter to me very similar to that which he subsequently sent to NATURE. In this reply I asked him to come and examine my specimens for himself, which he did not do.