

but we are rather sorry to find the authoress enthusiastic at the passing of the "Injurious Insects" Act of Parliament, which we prefer to consider the outcome of a scare furthered by speculators. All we can say for the "Introduction to Entomology" is that it will possibly serve to give the class for whom it is intended sounder ideas on the subject than generally prevail with them; the Glossary at the end is too short to be of much service.

Zinn: eine geologisch-montanistisch-historische Monographie. Von E. Reyer. 8vo. (Berlin: Reimer, 1881.)

IN this monograph, as is indicated by the agglutinative adjective on the title-page, the author has collected the results of his studies on the technological history of the metal tin under the threefold head of geology, mining, and history; or rather the reader may do so for himself from the material which is presented in an abrupt fashion without either preface or index. The first part of the volume is devoted to descriptions of the tin-producing districts of Saxony and Bohemia, the geological features of each district being first considered, then its history as derived from the local archives and notices in published chronicles, the whole of the facts concerning production being summed up in a chronicle of tin mining in Bohemia and Saxony, with tabular statements and diagrams of the production from the earliest period for which records are obtainable, about the year 1400, down to the present time. From these we gather that the total production of both countries, which was about 100 tons in the year 1400, reached in 1500 a maximum of about 1000 tons, since which time it has steadily declined, the produce at intervals of fifty years varying from 75 to 125 tons annually. At the present time the production is practically confined to Altenberg in Saxony, where about 50 tons are obtained from the treatment of a stamiferous granite containing about 8 lbs. of tin ore per ton. In subsequent sections of the volume the productions of Cornwall, Banca, and Australia are treated in a similar manner; a descriptive sketch of the geology of each locality being given in each case, followed by a chronicle of events and prices. These being mainly compiled from well-known sources, such as De la Bêche's "Cornwall and Devon," Von Diest's "Banca," the reports issued by the Australian and Tasmanian Colonial Governments, &c., present less of novelty than the first part, which contains much original matter derived from the author's own investigations; but the skillful manner in which the information is presented is likely to render the volume very useful to those interested in the subject. An unnecessary difficulty has been introduced by the adoption of the new-fashioned phonetic system of spelling which has latterly become prevalent in Berlin, and will doubtless prove a puzzle to many readers.

H. B.

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. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

The Progress of Meteor-spectroscopy

IN the profound and eloquent review of the progress of British and other discoveries in science during the last half century given in the Opening Address to the British Association at its recent Jubilee Meeting in York by its President, Sir John Lubbock, I am credited (*NATURE*, vol. xxiv. p. 409) with some meteor-spectrum observations which, while they certainly unfold some of the most important results arrived at in meteor-spectroscopy since its commencement in the year 1866, yet owe their recognition as scientific discoveries of some material weight and real consequence, to quite a different author.

Although with the first use of a meteor-spectroscope I recognised in the persistent streaks of the August Perseids of that year numerous examples of the yellow-sodium line, yet no proof was furnished by the slender spectroscopic power employed, of the existence in the meteor-streaks of any other substance. It was by a Hungarian astronomer, von Konkoly, that the presence of "lithium, potassium, and other substances" in the streaks of shooting-stars was afterwards discovered; and of some of these substances Herr von Konkoly obtained such repeated and well-verified observations, that the identification of their spectroscopic presence in certain meteor-streaks may be regarded as satisfactorily established.

The instruments made by Mr. Browning for the British Association Meteor-Committee in the year just mentioned were intended to be used in studying the spectra of the November Leonids, whose magnificent display took place as expected, but was of such short duration that nothing of great importance was, unfortunately, elicited as regards their spectra. A more successful trial of the instruments had however been made previously on the 9th-11th of August of the same year,¹ and abundant evidence was then obtained of the existence of two classes of meteor-streaks, both equally persistent, one of them affording a continuous spectrum only, like what hot sparks or train-matter would produce; the other more or less charged with, and sometimes consisting entirely of the yellow sodium-line.

No distinct evidence was obtained, however, in that first year's experimental trials of the occurrence in meteor-streaks of any other elementary spectrum-lines besides the solitary sodium one. The spectra of the nuclei were continuous, the brightest ones showing all the prismatic colours in perfection; and only one or two at the same time allowed some traceable evidence of sodium to be detected in their light. But a few of the green "Leonid" streaks were noticed in November to be, to all appearance, monochromatic, or quite undispersed by vision through the refracting prisms; from which we may at least very probably infer (by later discoveries with the meteor-spectroscope) that the prominent green line of magnesium forms the principal constituent element of their greenish light.

Meteor-spectroscopes of a more efficient kind were afterwards devised and produced by Mr. Browning. But they remained, as far as I am aware, without any successful application until the nights of July 25th and 26, 1873, when the spectra of three streak-leaving shooting-stars were observed through one of them by the enthusiastic astronomer of O'Gyalla, near Komorn in Hungary, Herr von Konkoly.² The streaks of the first two meteors seen showed only the sodium-line; but in that of the third, which was an emerald-green meteor, the green spectral line of magnesium (Fraunhofer's solar line *b*) was plainly visible in addition to the yellow sodium-line. The spectra of the nuclei were continuous, only the green region of the spectrum in that of the last meteor being of unusual brightness.

On the morning of the 13th of October in the same year Herr von Konkoly again observed with Browning's meteor-spectroscope the long-enduring streak of a large fireball, which was visible in the north-east at O'Gyalla. It exhibited the yellow sodium-line and the green line of magnesium very finely, besides other spectral lines in the red and green. Examining these latter lines closely with a star-spectroscope attached to an equatorial telescope, Herr von Konkoly succeeded in identifying them by direct comparison with the lines in an electric Geissler-tube of marsh-gas.³ They were visible in the star-spectroscope for eleven minutes; after which the sodium and magnesium lines still continued to be very brightly observable through the meteor-spectroscope; and the streak faded out of sight in a comet-seeker, at last, twenty-five minutes after it was first observed.

In July and August, 1879,⁴ and in August, 1880,⁵ Herr von Konkoly observed spectra of the nuclei and streaks of many Perseids and other meteors with the Browning's meteor-spectroscope. The yellow sodium-line was conspicuous in most of the streak-spectra, and adjoining it there were seen in many cases the red line of lithium and another more distant red line supposed to be that of potassium; but the violet line of potassium,

¹ *The Intellectual Observer*, vol. x. pp. 38 and (with a coloured plate) 61; August and October, 1866.

² *Monthly Notices of the Royal Astronomical Society*, vol. xxxiii. (1872-73), p. 575.

³ *Monthly Notices of the Royal Astronomical Society*, vol. xxxiv. (1873-74), p. 82. The description "lightning-gas" there given of the tube is, as Herr von Konkoly afterwards informed me, a misprint for "lighting," or "coal-gas," "mit welchem die Strassen beleuchtet sind."

⁴ *The Observatory*, vol. iii. p. 157.

⁵ *Ibid.*, p. 577.