September 1923, 37,000 tons were manufactured by the acid, and 9000 tons by the basic Bessemer process. Very large quantities of basic Bessemer steel are being made in Germany and Belgium at the present time.

So far, therefore, as the above quotation relates to the Bessemer process, it is entirely inaccurate and the revisers are quite justified in giving details. The funeral of the Bessemer process has frequently been predicted, but it has never taken place.

H. C. H. CARPENTER.

Royal School of Mines,
South Kensington, London, S.W.7,
November 19.

PROF. CARPENTER is evidently right, and I am glad that he has corrected my mistake in reference to the Bessemer converter,—the statement as to the Leblanc process was, I believe, correct. It would be of interest, however, if Prof. Carpenter could give the date of construction of the last new Bessemer plant erected in Great Britain for steel manufacture. If new plants are not being constructed, the view that the Bessemer process for steel is really "of historical interest only," would not be altogether unjustified, since this process would then rank, like the hansom cab, as one of the products of the Victorian age, of which the usefulness is likely to diminish rather than to increase in the twentieth century.

THE REVIEWER.

The Spectra of Fifth Group Metals.

WE have photographed the absorption spectrum of bismuth and also the spectrum of the thermionic discharge at potentials ranging between 4 and 60 volts. Several stages in the excitation of the arc spectrum, and at least two classes of spark lines, have been recognised; 64 arc lines have been classified. The spectrum of the neutral atom is characterised by wide doublets, and most of the energy-levels so far identified are of *p*-type.

Electrical measurements of the arcing potential and potentials of inelastic impact were made by two of the authors and the late Dr. Oswald Rognley in 1918. They found inelastic collisions at intervals of $2{\cdot}0 \pm 0{\cdot}2$ volts and ionisation at $8{\cdot}0 \pm 0{\cdot}5$ volts. The interpretation is as follows:

The first resonance potential, 2·0 volts, represents the mean of the excitation voltages for several weak spectral lines of the type $mp - np'$. At 4·0 volts, we obtain the strong *raies ultimes*, λλ 3067 and 4722 Å.U. Excitation stages above 5 volts are difficult to separate. The first spark spectrum appears near 14 volts.

The absorption spectrum at 800°–1000° C. shows lines due to the atom, and prominent bands which have not been described previously. A group of seventeen bands lies between 2874 and 2672 Å.U., while a second group extends from 2205 Å.U. toward shorter wave lengths. At lower temperatures the bands disappear though the lines still may be recognised. They lie at 3067, 2276, 2230, 2228, and 1954 Å.U., and all originate on the lowest energy-level of the atom. No absorption lines arising from other levels were observed, even at a temperature of 1050° C.

Practically all the arc lines of arsenic between 3119 and 2000 Å.U. can be classified by means of constant differences found by Kayser and Runge (*Ann. d. Physik*, v. 52, 1894). We have discovered a few additional classifications. This spectrum is remarkable in that it possesses no lines in the visible region. There is a range of 38,000 cm.$^{-1}$ and another of 32,000 cm.$^{-1}$ in which no energy levels have been found. If there are energy levels in these regions, they can probably be detected only by the discovery of new lines, or the utilisation of lines at present listed in the spark spectrum. The potential of inelastic impact, 4·7 volts, given by Foote, Rognley, and Mohler (*Phys. Rev.*, 13, 59, 1919) corresponds to the mean of the wave numbers of the *raies ultimes*. The classification of the spectrum shows that the ionisation potential must be at least 10·6 volts, while the experimental value is 11·5 volts.

ARTHUR E. RUARK.
F. L. MOHLER.
PAUL D. FOOTE.
R. L. CHENAULT.

Bureau of Standards, Washington, D.C.,
November 8.

Tracts for Computers.

I REGRET that certain errata have been found in No. III. of the above Tracts. As they might cause confusion to any one computing from one of the formulæ affected, I have had an erratum slip printed, which can be obtained by purchasers of the above series by sending a stamped and addressed envelope either to Mr. C. F. Clay, Cambridge University Press, Fetter Lane, E.C.4, or to The Secretary, Biometric Laboratory, University College, Gower St., W.C.1.

KARL PEARSON.

Biometric Laboratory,
University College, London,
November 17.

Mesozoic Insects of Queensland.

LEST the reference in NATURE of July 7, p. 20, to Queensland Geological Survey Publication, No. 273, may lead readers to think that the account of the Coleoptera is the first published work on the insects from the six-inch seam containing insect remains at Ipswich, I would point out that a series of papers dealing with these insects has already been published by Dr. R. J. Tillyard (Queensland Geol. Survey, Pub. 253, 1916; and "Mesozoic Insects of Queensland," Nos. 1 to 9, Proc. Linn. Soc. N.S.W., 1917 to 1922).

A. B. WALKOM,
Secretary.

Linnean Society of New South Wales,
Sydney, October 2.

[The paragraph to which Dr. Walkom refers was intended to direct attention to a particular piece of work, and no attempt was made to mention earlier publications on the same subject, though the contributor was familiar with them.—EDITOR, NATURE.]

Hafnium or Jargonium.

THE recent discovery of hafnium in minerals containing zirconium serves to remind us of the discovery of jargonium by Sorby in 1869 (*Chem. News*, vol. 20). He found that many zircons contained as much as 10 per cent. of the new element. The two closely related elements, zirconium and jargonium, could be most readily distinguished by spectroscopic methods. Sorby and Forbes found that there was such a marked difference in the solubilities of the chlorides in strong hydrochloric acid, that it was possible to make a qualitative separation. Three years later Cochran investigated this subject and suggested that zirconia and jargonia were identical. My object in bringing this matter before readers of NATURE is to suggest that the work of Sorby may possibly entitle him to rank as the discoverer of the new element of atomic number 72, and that jargonium may have priority over hafnium and celtium.

T. L. WALKER.

University of Toronto.