The kind of statement put forward in order to do honour to Manson, but really of a misleading nature, is exemplified in the following from Dr. Sambon's letter in NATURE of May 27. He writes: "Sir Ray Lankester ignores Manson's brilliant interpretation of the 'flagellating' malarial parasite, looked upon by the Italians as a form of degeneration; by Manson as the prelude to a further all-important developmental stage outside the body of man." The reader of Dr. Sambon's letter would suppose that Manson had in this matter had "a happy thought" and had put forward a successful speculation. Such is not the case. The nature and significance of the flagelliform bodies developed by the malaria parasite were first discovered by Dr. W. G. MacCallum, of the Johns Hopkins University, Baltimore, and published by him at the meeting of the British Association in Toronto, August 1897, and more fully set forth with admirable illustrations in the *Journal of Experimental Medicine*, vol. iii., 1898. He describes the rapid formation of these bodies in the Halteridium of birds (crows) as others had already done both in that case and in the malarial parasites of man. What is of capital importance in MacCallum's paper is the careful description and drawings of the active—even violent—union of the liberated flagelliform bodies with certain granular spheres or female gametes. A single flagelliform body was thus seen to fuse with one female gamete. MacCallum, having once recognised this sexual process, observed it daily, and then observed the same process in the æstivo-autumnal parasites taken from two cases of malaria in a human subject.

In discussing the significance of his discovery, MacCallum writes that the whole Italian school believed the flagelliform bodies to be due to degenerative changes. "Manson," he writes, "as is well known, has advanced the idea that the flagellate bodies represent the forms in which the parasite exists outside the human body, that the flagella penetrate from the stomach into the body of mosquitoes which have sucked the blood of infected human beings, and that, after a further unknown process of development, they come again (through the water in which the mosquitoes deposit their eggs and die) into the human body." This and other suppositions were entirely set aside by MacCallum's discovery. MacCallum insists that Manson's idea is not based on any observations, but is pure hypothesis. Manson's interpretation of the flagellating malarial parasite was, though erroneous, a legitimate hypothesis, but it certainly was not "brilliant," although we are asked by Dr. Sambon to regard it as being so. E. RAY LANKESTER.

June 5, 1922.

The Isotopes of Tin.

THE insensitivity of the photographic plate in recording positive rays when compared with its sensitivity to light has long been observed, and has been accounted for by the fact that the action of positive rays is purely a surface effect. There has, therefore, always been the hope that considerable improvement could be made in this direction by increasing the concentration of the bromide particles on the surface of the gelatine. This hope has now been realised to some extent by the use of a method which, I understand, has been devised for the production of Schumann plates. It consists essentially in dissolving off more or less of the gelatine by means of acid. I have not yet succeeded in obtaining certain or uniform effects, but in the most favourable cases the sensitivity of the "Half Tone" plates used in the mass-spectrograph has been increased ten to twenty times without seriously altering their other valuable properties.

The immediate result has been the definite proof of the complex nature of the element tin which had been previously suspected (*Phil. Mag.* xlii. p. 141, July 1921). Tin tetramethide was employed, and a group of eight lines corresponding approximately to atomic weights 116 (c), 117 (f), 118 (b), 119 (e), 120 (a), 121 (h), 122 (g), 124 (d) was definitely proved to be due to tin. This conclusion was satisfactorily confirmed by the presence of similar groups corresponding to $Sn(CH_3)$, $Sn(CH_3)_2$ and $Sn(CH_3)_3$. The intensities of the various components indicated by the letters in brackets agree quite well with the accepted chemical atomic weight 118·7, and incidentally preclude the possibility that any of the lines, with the possible exception of the extremely faint one at 121, are due to hydrides.

The spacing of these eight lines, which are only just resolved, show that their differences are integral to the highest accuracy, but the lines themselves compared with known lines on the plate give atomic weights always tending to be 2 or 3 parts in 1000 too light for the above whole numbers. That this remarkable divergence cannot be explained as experimental error is very strongly indicated by the following consideration. The discharge tube had been used previously to investigate some very pure xenon. The line due to Sn^{120} (CH_3) should therefore have appeared exactly halfway between the two strong xenon lines 134, 136. It was actually quite unmistakably nearer the former, so much so that the two were only partially resolved. The same irregular grouping repeated itself in another portion of the field in the following spectrum. It seems, therefore, difficult to resist the conclusion that the isotopes of tin have atomic weights which are less than whole numbers by one-fifth to one-third of a unit of atomic weight, but satisfactory settlement of this important point will probably have to be deferred till a more accurate mass-spectrograph has been made.

Incidentally I may add that the presence of the two faint components of xenon 128 and 130 previously suspected has now been satisfactorily confirmed.

F. W. ASTON.

Cavendish Laboratory, Cambridge, June 7.

The Spiracular Muscles of Hymenoptera Aculeata.

I DESIRE to direct the attention of entomologists to a recently discovered muscle (see *Bee World*, vol. iii. p. 282, April 1922) present in the honey bee (*Apis mellifica*), and probably in many others of the Hymenoptera Aculeata.

The abdominal (respiratory) muscles of *Apis mellifica* were described by Carlet (*Comptes rendus*, Acad. Sci., Paris, 1884, vol. 98, p. 758). His list is incorrect; it misplaces the posterior attachment of the internal oblique muscle and omits the interdorsals and the spiracular muscles. To the latter it is desired to direct attention here. They run from the lateral sternal apophysis to the larger of the two cones of the spiracle on the tergum of the same segment. Thus, when the abdomen is expanded, this muscle is under tension, and will pull open the closing apparatus of the spiracle. During expiration, the abdomen is contracted; the spiracular muscles will therefore be slack during this process, and it appears highly improbable that the spiracles actuated by them can open during expiration. The expired air must therefore pass out of the system mainly through the thoracic spiracles; a fact which renders comprehensible