with such small quantities are obtainable, but they are costly, and it would be out of the question to employ them in the numbers and in the manner required, for instance, for opsonic determinations. As the author says, "it is a technique for conducting quantitative tests in uncalibrated capillary tubes with minimal quantities of reagents."

Briefly, the method consists in the use of glass pipettes, formed by drawing out a piece of glass tubing in the blow-pipe flame into a fine stem. By adapting a suction apparatus in the form of a rubber teat to the undrawn-out portion, and making a mark somewhere on the drawn-out stem, we have the means of taking up any number of minute similar volumes of a fluid and of making any mixtures of fluids and dilutions thereof required with considerable accuracy.

By an adaptation of these principles, Sir A. Wright has devised methods for estimating the bactericidal, agglutinative, and opsonic powers of the blood, for measuring the coagulation time of the blood, and for estimating quantitatively its alkalinity, content of magnesium and calcium salts, and anti-tryptic power. The making of blood-films and preparation and standardisation of therapeutic vaccines are also dealt with.

Full details are given for the manipulation of the glass in the blow-pipe, the making of the apparatus required, and the carrying out of the various procedures. The descriptions are supplemented by a profusion of illustrations in the text and five plates, four of which are coloured. Truly no bacteriological or pathological laboratory can afford to omit this book from its working library, and we fancy that the chemist and physicist might gather some hints of value from it.

R. T. HEWLETT.

Lines in the Arc Spectra of Elements. By F. Stanley. Pp. 140. (London: Adam Hilger, Ltd.) Price: cloth, 12*s.* 6*d.*; half-morocco, 15*s.* 6*d.*

IN this publication the wave-lengths of the chief lines in the arc spectra of fifty-five elements are given. These are arranged in one long table in the order of the wave-length numbers. The intensities of the lines in the spectrum of the undiluted element are also given on a scale of 1 to 10, the latter denoting the brightest lines. In a separate column and on the same horizon as any particular line will be found the wave-length of the next prominent line belonging to the corresponding element. This is very useful in determining whether any element is present in a substance under investigation. The most persistent lines of any given element—that is, the lines which last longest as the proportion of the element in question is gradually decreased—are specially denoted. The wave-lengths, which extend from λ 7900 to λ 2200, are given to the nearest tenth of an Ångström unit, and have been taken from the most recent and trustworthy measures available. The pages opposite the wave-length tables are left blank for the insertion of notes. To practical workers in elementary spectroscopic analysis the compilation will be decidedly useful.

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.*]

X-rays and Crystals.

MESSRS. FRIEDRICH, KNIPPING AND LAUE have recently published (*K. Bayer. Akad. der Wiss.*, 1912, p. 303) some remarkable effects obtained by passing a fine stream of X-rays through a crystal before incidence upon a photographic plate. A curious arrangement of spots is found upon the plate, some of them so far removed from the central spot that they must be ascribed to rays which make large angles with the original pencil.

The positions of these spots seem to depend on simple numerical relations, and on the mode in which the crystal presents itself to the incident stream. I find that when the crystal (zincblende) is placed so that the incident rays are parallel to an edge of the cube in the crystal the positions of the spots are to be found by the following simple rule. The atoms being assumed to be arranged in rectangular fashion, any direction which joins an atom to a neighbour at a distance na from it, where a is the distance from the atom to the nearest neighbours and n is a whole number, is a direction which a deflected (or secondary) pencil will take, and it will in doing so form one of the spots. In other words, we have to seek for all the cases in which the sum of three squares is also a square, and we then recover the positions of all the spots on the diagram. For example, secondary pencils take the directions (2, 3, 6) (4, 1, 8), and so on. In a few cases the sum of the squares is one short of a perfect square, *e.g.* (5, 7, 11), but in no case is it on the greater side; and there is at least one direction (2, 5, 14) which ought by the rule to be on the diagram and is not. Otherwise the rule is quite successful.

Until further experimental results are available, it is difficult to distinguish between various explanations which suggest themselves. It is clear, however, that the diagram is an illustration of the arrangement of the atoms in the crystal.

The rule has suggested itself to me as a consequence of an attempt to combine Dr. Laue's theory with a fact which my son pointed out to me, viz. that all the directions of the secondary pencils in this position of the crystal are "avenues" between the crystal atoms.

W. H. BRAGG.

Leeds, October 18.

Glaciation and Striation.

IN your issue of September 26, Dr. A. Irving asks whether in my plate 17 (Phil. Trans., Ser. B., vol. ccii) I have not overlooked the fact that the striations are on the original cortex of the flint nodule. My answer is that I have not done so; the striations are *not* on the original cortex of the flint nodule—as is clear both from my description of the specimen and from the carefully drawn figure.

Dr. Irving also asks whether I have overlooked the probability that the markings shown in Fig. 2 are the etched-out skeletons of some spongoid fossil. My reply is that no such probability exists, and that, in consequence, I have not overlooked it.

Your correspondent appears to be under some misapprehension. He has never seen the specimen referred