

an elementary manual to highly technical methods. The last three chapters, on reagents and processes, microchemistry of plant products, and detection of adulterations in foods and drugs, would, if published separately, provide a most useful and attractive summary for advanced students.

Elements of Angling. A Book for Beginners. By H. T. Sheringham. Pp. xvi+259. (London: Horace Cox, 1908.)

We always open Mr. Sheringham's contributions to angling literature with the expectation of being beguiled by very pleasant reading, and, incidentally, of acquiring much useful information. In the case of his "Elements of Angling" we were in no wise disappointed. The book is primarily addressed to and intended for the young angler, that is, the angler young in his art, for our author will not acknowledge that any man is too old to begin; it is wide in its scope, but does not enter into so much detail as to be likely either to confuse or weary a prospective fisherman. If such a term may be excused, we would describe it as an elementary text-book of fresh-water fishing, and, like many other text-books, we think it is well worthy of study even by those well versed in the subject of which it treats.

The information and advice given are throughout of an eminently practical nature, and Mr. Sheringham is not above citing his own misfortunes as an example and warning to those whom he would instruct. Fishing for coarse fish, whether on the bottom or at the surface, is clearly and concisely dealt with, and much practical information as to gear and baits is given. The trout is discussed at somewhat greater length, and the differences in the tackle required for wet- and dry-fly fishing, together with the reasons for such differences, are clearly explained; the grayling has a chapter to itself, and, as in the case of the trout, a short but well-selected list of the flies of most general utility is given.

Exigencies of space prevent the salmon and salmon-fishing from being dealt with at great length, but this, we think, is right in the case of a fish the capture of which depends so much upon a thorough knowledge of the particular water to be fished. Care is, however, taken to direct attention to the differences between salmon and trout, whether as parr or adults, and to the difficulty which sometimes attends the recognition of a well-mended kelt and its distinction from a clean fish. While on the subject of specific distinctions, we notice that Mr. Sheringham regards the "bull-trout" as a distinct species (*Salmo eriox*), and states that it is found in the Tweed and in some rivers of the south and west; surely there is some confusion here that might well be cleared up in future editions. Last, but not least, there is an excellent index. L. W. B.

Elements of the Theory and Practice of Cookery. By Mary E. Williams and Katharine R. Fisher. Pp. xix+347. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1907.) Price 4s. 6d. net.

DOMESTIC science and art, so far as they relate to cookery, are here combined to produce an educational and practical course of work. The book is not merely a collection of recipes, but a guide to the experimental study of principles and their application in the selection and preparation of food. The instructions for experiments and other work are explicit, and much good advice is given as to the conditions of healthy living and intelligent housecraft. Unfortunately, as many of the terms used in describing the utensils and ingredients required are unfamiliar in British homes and schools, the book is at a disadvantage on this side of the Atlantic, though its merits are many.

LETTERS TO THE EDITOR.

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Spectrum of the Radium Emanation.

A FEW months ago, through the generosity of the Academy of Sciences of Vienna, one of us was loaned a radium preparation containing about 250 mg. of radium. Observations were at once begun to purify the emanation produced by it, and to determine its volume. An account of these investigations was read before the Academy of Sciences of Vienna on July 2. It was found that the maximum volume of the emanation per gram of radium was in good accord with that to be expected from calculation (about 0.6 cubic mm.), and the initial volume was about one-tenth of that determined by Ramsay and Cameron (Journ. Chem. Soc., p. 1266, 1907). In the course of this work we have had occasion to test the purity of the emanation by the spectroscopy, passing an electric discharge in the capillary in which the volume was measured. We have on four different occasions during the last two months determined the spectrum of the radium emanation by visual observations, using a direct-reading Hilger spectroscopy, leaving a more accurate determination of its spectrum until the measurements of the volume had been completed. We have now photographed the emanation spectrum, using a prism of 2 inches base. Pure emanation, corresponding to the equilibrium amount from 130 mg. of radium, was condensed by liquid air in an exhausted spectrum tube of about 50 cubic millimetres capacity, provided with thin platinum electrodes. Two photographs were immediately taken, one giving about thirty of the more intense lines, and the other, with much longer exposure, showing more than one hundred lines. For a comparison spectrum a helium tube was used. The colour of the discharge in the tube was bluish. Visual observations of the spectrum were made during the exposure of the photographs.

When the emanation was condensed in a side tube by means of liquid air, the great majority of the lines vanished at the moment of condensation, which was readily noted by the phosphorescence of the glass. The colour of the discharge then completely changed, and became of a pale rose colour. At the instant of volatilisation, the emanation lines flashed out again. The hydrogen lines were visible in the spectrum, and these became much more brilliant when the emanation was condensed. In the electrodeless discharge of previous experiments, the hydrogen lines were never observed. Their occurrence in the present experiment was probably due to the platinum electrodes. By observations of the intensity of the phosphorescence when the emanation was condensed, it was noted that the amount of pure emanation in the tube gradually diminished with increase of time of discharge. The spectrum of the emanation, however, persisted until practically all the emanation had been driven into the walls of the tube. The phosphorescence on the walls of the tube showed that the occluded emanation was fairly uniformly distributed. This effect has been observed by us on several occasions.

The first determination of the spectrum of the emanation was made in 1904 by Ramsay and Collie, who determined the wave-lengths of about eleven lines by visual observations. As shown by them, the spectrum of the emanation is a bright line spectrum with sharply defined lines. We observed also visually a weak band spectrum in the yellow, which slightly decreased in intensity when the emanation was condensed. This, however, may not be connected with the emanation itself. The wave-lengths of the lines of the photographic plate were accurately measured, using a Kayser's measuring machine. The accuracy obtained is indicated by the agreement of the wave-lengths of some of the hydrogen lines with their known values. In most cases, for well marked lines, the error is not more than half an Angström unit. The following table gives the wave-lengths of the lines initially determined by Ramsay and Collie (marked R. and C.) are added for comparison.