

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 spectroscopic, 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 spectroscopic, 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 more prominent lines. The wave-lengths of the lines initially determined by Ramsay and Collie (marked R. and C.) are added for comparison.

Visual observations of three of the more prominent lines in the yellow and green are also given:—

Intensity	Observed λ	Remarks	Intensity	Observed λ	Remarks
5	5721	(Visual)	15	4350.3	
8	5583	(R. & C. 5725)	7	4340.9	H=4340.66
3	5593	(Visual)	4	4223.8	
4	5084.5	"	10	4203.7	
4	4979.0	R. & C. 4985	7	4188.2	
10	4801.3	H=4461.49	20	4166.6	
4	4817.2		10	4114.9	
5	4721.5		2	4102.2	H=4101.85
10	4681.1	R. & C. 4690	4	4045.4	
10	4644.7	R. & C. 4650	15	4013.0	
8	4623.8	K. & C. 4630	12	3972.0	
7	4609.9		7	3957.3	
4	4604.7		4	3917.5	
7	4578.7		—	3888.9	H=3889.15
9	4509.0		6	3867.6	
10	4460.0		10	353.6	
8	4435.7		7	3739.9	
6	4391.8		10	3664.6	
4	4372.1		5	3622.2	

A more detailed list of lines will be published later. We understand that Sir William Ramsay showed a photograph of the spectrum of the emanation at the meeting of the Royal Society on June 25. It will be of interest to compare the two spectra.

E. RUTHERFORD.
T. ROYDS.

University, Manchester, July 4.

The Recent Nocturnal Glows.

THE peculiar light phenomenon at midnight on June 30, which was seen, according to the papers, on the northern part of the sky at Copenhagen, Königsberg, Berlin, Vienna, Biala, and other places, was also observed by me at Prague. At 1h. 30m. a.m. on July 1, I saw in the direction N.E. and N.N.E. a peculiar strong orange-yellow light over the horizon, the colour of which was more orange in its lower parts and more yellow in its higher parts. Its upper limit was lying twenty to thirty degrees above the horizon. The whole sky was cloudless. Other people saw it here at 11 p.m. on June 30.

It is reported that magnetic disturbances were experienced on the telegraphic lines, but I saw no trace of the characteristic auroral bands or columns. I may be allowed to add that, according to Arrhenius, this time of the year corresponds to the minimum of auroral display (activity). Interesting is the fact that a high barometric maximum was lying in the north, and that we had winds from that direction for a whole week.

BOHUSLAV BRAUNER.

Bohemian University, Prague, July 4.

A Long-lived Solar Halo.

THERE has been visible here to-day a solar halo remarkable both for its vivid intensity and for its protracted duration. It was first noticed by me at 12.35 p.m. It then formed an unbroken ring, of which the most intensely luminous portion was to the south of the sun, and the least luminous portion to the west-north-west. Half an hour later the southern and northern quadrants of the circle were equally bright, but the northern appeared the more compact and definite; meanwhile, the eastern and western portions continued comparatively feeble, more especially the latter. *These conditions remained unchanged for fully 1½ hours!* After 2.15 p.m. the northern segment of the halo was alone conspicuous, and after 3.30 p.m. the ring was never again complete, though two mock suns (to the southward and eastward respectively) still testified to the original configuration. By 4.50 p.m. nothing remained but a diffused, pale rainbow-coloured mock-sun to the north of the sun; but after 5.15 p.m. this became less indefinite, and by 6 p.m. fully a semicircle of a halo was again traceable above the sun, but this faded gradually, nothing surviving after about 6.20 p.m. The unusually strong tone of rusty orange colouring, and the conspicuous darkness of the region enclosed, made the halo an unusually striking object when at its best (12.30 to 2 p.m.).

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Throughout the day cirrus cloud has strewn the sky in most interesting disorder and variety of forms. Telescopic observation of the sun's image showed (in the features of atmospheric distortion of the sun's limb) the existence of two distinct drifts of the atmosphere, viz. an upper current, of *great velocity*, passing over from the south-east above the drift from north-north-east that alone affected the local weather-cocks and chimneys' smoke. I may add that my experience as an observer of halos (both solar and lunar) has led me to the conclusion that cirrus clouds, or the conditions conducive to the formation of cirrus cloud, do not in themselves constitute the whole cause of the formation of halos, but that these are further the outcome of *cross-currents* in the region of cirrus formation.

CATHARINE O. STEVENS.

10 Woodstock Road, Oxford, June 30.

P.S.—Portions of solar halos were also seen here intermittently during July 1 and 2, thus giving a record of three successive days of halo formation.

Genial June.

THE month just past has fully upheld its character, as it did in the Jubilee year, 1887, and on other occasions.

There were a great number of dates suitable for observation (sixteen out of the last seventeen), but I found shooting stars rare.

The nights before June 29 were, I thought, unusually dark, the stars and Milky Way being beautifully bright and distinct; but on June 30 the firmament was abnormally luminous, with a very strong glow all over the north at midnight. Few stars could be seen, and the Milky Way was hardly distinguishable. On July 1 the phenomena of the previous night were repeated in rather a different aspect. There were many clouds of various tints, and the light was again intensely strong, the northern sky being involved in a brilliant aurora. I have never seen June nights so dark, and the Milky Way so gorgeously displayed in the heavens, as this year to June 28, nor have I ever noticed the sky so bright as it appeared on the nights of June 30 and July 1.

The aurora offered so vivid a spectacle that on the dates mentioned the shades of night may be said to have been quite dispersed, for even at midnight the reflected light from sky and cloud was so strong that terrestrial objects could be seen just as at dusk, say at about 10 p.m. on an ordinary June night.

W. F. DENNING.

Bristol, July 2.

THE DARWIN-WALLACE JUBILEE CELEBRATION AT THE LINNEAN SOCIETY.

ON July 1, 1858, Sir Charles Lyell and Dr. J. D. Hooker communicated to the Linnean Society a remarkable paper entitled "On the Tendency of Species to form Varieties; and on the Perpetuation of Varieties and Species by Natural Means of Selection," by Mr. Charles Darwin and Mr. Alfred Wallace. The history of this paper is familiar to every student of biology. Darwin had for many years been studying the question of natural selection and its bearing upon the origin of species, but, although his views were well known to several intimate friends, he had refrained from publishing them, and was still occupied in the collection of evidence when he received from Wallace a manuscript essay "On the Tendency of Varieties to Depart indefinitely from the Original Type," in which the same ideas were set forth. At the request of the author this manuscript, after perusal, was forwarded by Darwin to Sir Charles Lyell, with the added suggestion that the essay should be published as soon as possible. After consultation with Hooker, Darwin was induced to allow an extract from his own work on the subject to be published simultaneously.

The reading of this joint paper at the Linnean Society formed the starting point of a revolution in scientific thought the effect of which it would