he got hold of a gardener to give him some practical advice. However, with this slight drawback, the book is admirably designed for the teacher who wishes to work out an elementary course of instruction for a country school, either as an introduction to practical life or to a more special study of agriculture and horticulture.

I. *Clinical Lectures on Diseases of the Nervous System*. Pp. 279; price 7s. 6d. II. *Lectures on Diseases of the Nervous System*. Second series. Pp. 250; price 6s. net. By Sir William R. Gowers, M.D., F.R.C.P., F.R.S. (London: J. and A. Churchill, 1895 and 1904.)

In these two volumes Sir William Gowers has collected in revised form a number of clinical lectures which have appeared in various medical journals. In the latter volume he has also printed the Bowman lecture on subjective visual sensations delivered to the Ophthalmological Society, and the Bradshaw lecture on the subjective sensations of sound. The clinical lectures deal with many subjects in neurology; some are mainly descriptive, some speculative. In reading them one not only appreciates the original and suggestive way in which the facts are presented, but also the finished literary style. In a short notice it is impossible to deal with them in detail. The two lectures on the subjective sensations of vision and hearing are perhaps of wider scientific interest than the clinical lectures. In the first the visual phenomena experienced by sufferers from migraine are described and figured, and there is an admirable *résumé* of physiological teaching with reference to vision. In the second lecture the phenomena of tinnitus, of auditory vertigo, and other labyrinthine sensations are discussed in a luminous and attractive way. Both neurologists and physiologists will find much in these volumes to assist and to stimulate them in researches into nervous phenomena.

Lectures Scientifiques. A French Reader for Science Students containing Extracts from Modern French Scientific works in Chemistry, Physics, Mathematics, Physiology and Botany, with a Glossary of Technical Terms. By W. G. Hartog, B.A. Pp. vii+371. (London: Rivingtons, 1904.) Price 5s.

THE University of London now insists that candidates for a degree in science shall be able to read and understand accounts in the original of French and German scientific work. In compiling this book Mr. Hartog has had the needs of such students in mind so far as French is concerned, and he has succeeded in bringing together a varied and representative collection of extracts from French scientific works and scientific periodicals. Among the latter the *Revue générale des Sciences* takes a very prominent position, contributing to Mr. Hartog's collection as many as fifteen extracts. The book should be of service not only to the undergraduates referred to, but also to students of science everywhere, for it is now more than ever necessary that the man of science should be able to acquaint himself at first hand with the results of fellow-workers abroad.

L'Industrie oléicole (Fabrication de l'Huile d'Olive). By J. Dugast. Pp. 176. (Paris: Gauthier-Villars and Masson et Cie., n.d.) Price 3 francs.

THIS little volume, which belongs to the Aide-Mémoire series, is a practical account of the manufacture of olive oil, and indicates several directions in which the results of scientific research have been utilised to improve technical processes. The formation and composition of olives are first explained, then the methods of extracting the oil are described and an account given of the appliances necessary for the purpose. The properties and methods of preservation of olive oil and the utilisation of the oil-cake are also considered.

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.]

A Note on the Coloration of Spiders.

IT is well known that in a large number of animals, both vertebrate and invertebrate, the colour of the flanks and ventral side of the body differs from that of the dorsal. In the majority of cases the dorsal surface is most darkly tinted, the ventral palest, and the flanks intermediate in depth of tone between these two. This gradation of colouring has the effect of neutralising the shadows that are cast by the upper upon the lower portions of the body. Thus the animal does not stand out in prominent relief, but is, so to speak, artistically flattened, and thereby rendered less conspicuous.

To this general rule I have recently observed an interesting exception which affords strong evidence in favour of the truth of the above interpretation. The spiders belonging to the genus *Linyphia* are, almost without exception, darkly coloured upon the ventral surface; their flanks are variously slashed with oblique white bars and stripes, while their dorsal surface is yet more freely speckled with white or pale spots and lines. In these spiders, then, the scheme of coloration is the exact opposite to that which prevails elsewhere. Now the *Linyphiidæ* spin horizontal webs, in the centre of which they rest *inverted*, clinging to the lower side. Thus it is the ventral side of a *Linyphia* that is exposed to the strongest light, the dorsal side being in the deepest shadow. The inversion of attitude at once fully explains the inverted shading of the body.

OSWALD H. LATTER.

Charterhouse, Godalming, October 30.

Sir J. Eliot's Address at Cambridge.

AGAINST some of the main conclusions of Sir J. Eliot's opening address before Section A (subsection: cosmical physics) may be set the facts that south-east winds are rare on the south-east coast of South Africa, and that the rain of the greater part of the tableland and south-east coast comes mostly from some northerly direction.

My concern, however, is chiefly with the following remarks, reported in NATURE of August 25 last:—

"The chief features of the rainfall of the period 1895–1902, in the Indo-oceanic region were as follows:— . . . There was a marked tendency in each year for late commencement and early withdrawal of the monsoon currents, and for deficient rainfall throughout the whole season over the greater part of India. These features were very pronounced in the years 1896, 1899, and 1901. The most remarkable feature of the period was that the region to the south of the equator, including South and East Africa, Mauritius, and Australia, was similarly affected. . . Mr. Hutchins, Conservator of Forests, Cape Town, states that drought prevailed more or less persistently over the Karroo region in South Africa from 1896 to 1903, and that cattle and sheep perished by millions. He also states that the drought extended to British Central Africa from 1898 to 1903. The previous statements evidence the continuity, extension, and intensity of the drought. . . The preceding statements have shown that variations of rainfall for prolonged periods similar in character have occurred, and may hence occur again, over the very large area including the Southern Asian peninsulas, East and South Africa, Australia, and perhaps the Indian Ocean. The abnormal actions or conditions giving rise to these large and prolonged variations must hence be persistent for long periods, and be effective over the whole of that extensive area."

Now the question is, what is a drought? From one point of view there is nothing but drought over a very large area of South Africa. But I gather from the table you print, showing the variation of the mean actual rainfall from the normal in India, that by drought is meant unusual and prolonged general dryness setting up marked economic results such as "large loss of cattle and great loss of

capital," and so forth. If that interpretation is correct, then there has been no such drought in South Africa in the years stated.

This is proved by the accompanying table. It shows the average rainfall over each of the twenty rainfall districts of South Africa, during each year, in percentages of the means. These means have been computed for 160 stations having long records of twenty years, more or less, and are fully given and explained in my "Introduction to the Study of South African Rainfall." The information from which they are derived is open to all who take the trouble to look for it in the annual reports of the Cape Meteorological Commission.

The great mortality among cattle and stock can be explained without assuming that there has been a prolonged drought. In farming matters we live from hand to mouth. Farmers of the Karroo prefer to pray for rain rather than take the trouble to store it up when it comes. Therefore, if the rain is short in the late summer, and late in coming in the next spring, they have no reserve to fall back upon, and their cattle die. One year's drought kills off the stock almost as surely as fifty years' would. For instance, there was great loss of stock in 1897. Yet what were the facts of rainfall? At my station, where the annual mean is about 18.5 inches, the fall in December, 1896, was 8.42 inches; in the whole of 1897 it was 8.85 inches, and in January,

Percentages of Rainfall in the Various Districts of South Africa during the Years 1891 to 1902.

Sections	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902
I. Cape Peninsula	101	135	87	82	92	80	97	118	106	86	98	142
II. South-West	85	137	107	93	105	69	89	117	110	106	108	149
III. West Coast	97	139	103	94	86	57	84	122	128	122	99	122
IV. South Coast, W.	104	131	104	95	82	100	81	80	68	105	116	142
" " E.	133	112	116	89	88	104	111	95	64	87	103	125
V. Southern Karroo, W.	98	104	(105)	110	78	99	80	79	80	118	123	144
" " E.	138	103	116	85	74	101	86	65	55	93	104	130
VI. West-Central Karroo, W.	73	122	92	94	87	72	92	84	66	125	123	128
VI. West-Central Karroo, E.	135	112	114	147	98	101	82	86	87	131	93	87
VII. East-Central Karroo	134	97	115	99	95	97	74	91	64	105	103	97
VIII. Northern Karroo, W.	111	91	121	123	92	81	60	88	116	135	107	66
" " E.	163	107	111	110	102	98	55	104	95	97	105	82
IX. "Northern" Border, W.	130	104	97	153	83	83	43	78	173	132	95	53
" " E.	162	93	99	155	97	83	51	105	106	89	111	94
X. South-East	138	103	127	93	94	103	83	95	75	82	92	96
XI. North-East	162	112	128	99	94	105	55	110	98	88	97	82
XII. Kaffraria	136	108	150	98	99	107	80	107	72	69	91	94
XIII. Basutoland	125	104	127	92	104	106	68	107	98	83	105	101
XIV. Orange River Colony	143	111	108	101	108	83	70	105	104	94	92	87
XV. Natal	114	96	153	98	120	107	90	119	87	74	112	97
<i>Summary—</i>												
Area of Winter Rains	94	137	99	90	94	69	90	119	115	105	102	138
" Spring and Autumn Rains	109	114	107	95	82	95	90	81	67	106	114	134
" Summer Rains	138	103	121	114	99	96	68	100	98	98	100	86
South Africa	124	111	114	105	94	92	77	98	93	101	104	106

It is pretty plain that the area of winter rains, including the west coast and Cape Peninsula, was short of rain in 1896; that 1897 was a dry year over the area of summer rains, which comprises the greater part of South Africa; and that the south coast and adjacent districts, where the rainfall is fairly uniform throughout the year, had a dry year in 1899, and one not very wet in 1895. The area of summer rains, being so much greater than the rest, of course sets the tone of the mean rainfall of the whole country, making 1897 a dry year on the whole, and 1891 a very wet year.

There seem to be dry areas somewhere or other in pretty well every year. For example, the rainfall was short in the western part of the area of summer rains in 1902, although the fall was good enough further east. It was short over the east-central Karroo and south-east in 1899 in sympathy with the dryness of the south in that year. Even in 1891 there was a short fall over an extensive region.

I fancy that the impression of unusual dryness over South Africa in recent years arises from the misleading mean values used by the Meteorological Commission for comparative purposes. These are taken from Buchan's rather futile "Rainfall of South Africa," and average fully two inches (equal to perhaps 10 per cent.) too great. Buchan used only the rainfall of the ten years 1885-94 in constructing his results, and therefore got inflated averages in consequence of the heavy rainfall of 1891; whence the rainfalls of recent years are made to appear *minus* as compared with what is called the mean, whereas, as compared with the better means of longer periods, they would be often *plus*.

1898, it was 8.43 inches. Thus there was a drought during 1897, many cattle died, and there was much praying for rain. The year 1903 was probably almost the same as 1897, the fall at Kimberley being only some 65 per cent. of the mean, whereas the fall during the last half of 1902 was good, and during the first half of 1904 excellent. But with the exception of these years there has been nothing that can properly be called drought, in the sense of Sir J. Eliot's address, over any extended region of South Africa within the past fifteen years at least. Thus there is nothing to justify the statement that we have been under the same influence as that which set up the prolonged drought in Australia and the dry years in India. J. R. SUTTON.

I TRUST to your courtesy to give my reply to Mr. Sutton's criticisms on certain portions of my address at the recent British Association meeting.

My address was in part based on an investigation I have had on hand for nearly two years, and which will be shortly published as a paper in the *Indian Meteorological Memoirs*. In that will be found a statement of the chief features of the meteorology of South Africa during the period 1892-1902. It is confessedly based upon very imperfect information—partly derived from newspaper reports, partly from data in certain meteorological reports received from Cape Town by the Calcutta Meteorological Office, and partly from data obtained from Mr. Hutchins, Conservator of Forests, Cape Colony, with whom I have been in correspondence for many years on the meteorology of South Africa and