

insects from two distinct points of view—for food, and as fertilisers. While it lays itself out to catch and eat miscellaneous small flies with its gummy leaves, it also lays itself out to allure bees with its comparatively large and handsome mask-shaped flowers. . . . Why should these totally distinct plants [butterwort and sundew], living in precisely similar circumstances, have acquired this curious and uncanny habit of catching and devouring live flies? Clearly, there must be some good reason for the practice: the more so as all other insect-eating plants—Venus's fly-traps, side-saddle flowers, pitcher-plants, bladderworts, and so forth—are invariably denizens of damp watery places, rooting as a rule in moist moss or decaying loose vegetation. Now, in such situations it is difficult or impossible for them to obtain those materials from the soil which are usually supplied by constant relays of animal manure; and under such circumstances, where the roots have no access to decaying animal matter, those plants would flourish best which most utilised every scrap of such matter that happened to fall upon their open leaves."

"The bird which came northward at the close of the glacial period, to inhabit the now thawed plains of northern Europe, much as the American partridge might take possession of Greenland if all its glaciers were to clear away in a more genial era, was doubtless a more or less southern and temperate type of grouse-kind. Coming into Britain, it would soon be entirely isolated from all its allies elsewhere; for it is of course a poor flyer for distance, and it inhabits only the northerly or westerly parts of our island which lie furthest from the Continent, separated from Holland and Scandinavia by a wide sea. Here it could not fail to be subjected to special conditions, differing greatly from those of the European mainland, partly in the equable insular climate, partly in the nature of the vegetation, and partly in the absence of many mammalian foes or competitors. These conditions would be likely first to affect the colouring and marking of the feathers, the spots on the bill, the naked scarlet patch about the eye, and so forth: for we know that even freer-flying birds in the south, which cross often with Continental varieties, tend slightly to vary in such ornamental points; and a very isolated group like the red grouse would be far more likely to vary in similar directions. Meanwhile, the main branch of the family, separated on the great continents from this slightly divergent group, would probably acquire the habit of changing its plumage in winter among the snows of the north, by stress of natural selection, just as the Arctic fox and so many other northern animals have done; for in a uniform white surface any variation of colour is far more certain to be spotted and cut off than in a many-coloured and diversified environment. Thus it would seem probable that the Scotch grouse has slowly become accommodated to the heather, among which it is so hard to discover; while the willow-grouse has grown to resemble the snow in winter, and the barer grounds of its northern feeding-places in the short Scandinavian and Icelandic summer.

"If this be so, we must regard both birds as slightly divergent descendants of a common ancestor, from which, however, our grouse has varied less than its Continental congener. Of course, it is just possible that the common ancestor had already acquired the habit of changing its coat in winter before the divergence took place; and if so, then it is the Scotch grouse which has altered most: but this is less probable, because the usefulness of the change would certainly be felt even in a Scotch winter, and the white suit is not, therefore, likely ever to have been lost when once acquired. Though the winter is not severe enough in Scotland to make such a change of coat inevitable where it does not already exist, it is yet quite severe enough to preserve the habit in animals which have once acquired it, as we see in the case of the varying hare, a creature which in colder ages spread over the

whole of northern Europe, and which still holds its own among the chillier portions of the Scotch Highlands. Hence we may reasonably infer that if our grouse had ever possessed a winter coat it would have always retained it for an alternative dress, as the ptarmigan still does in the selfsame latitudes. Accordingly, analogy seems to point to the conclusion that the Scotch grouse is a truly native breed, slightly altered by the conditions of its insular habitat from a closely allied Continental species, whose representatives elsewhere have now all assumed the guise of Scandinavian willow-grouse. In other words, the two isolated groups into which the species has split up have altered each in its own way, but the Continental variety has moved faster away from the primitive type than its British congener."

But in thus recommending Mr. Allen's latest work, we do not wish to appear unduly tolerant of inaccuracy. All we should wish to say is that, assuming Mr. Allen or any other expositor of science to be an amateur not thoroughly versed in technical matters, and therefore liable to fall into technical errors, we do not feel on this account that he need be precluded from publishing his observations and his theories for whatever they may be worth. Sooner or later these are sure to be duly winnowed, and even though they may contain more chaff than Mr. Allen has been in the habit of presenting, they may also contain some seeds of germinative value.

GEORGE J. ROMANES

AGRICULTURE IN INDIA

Field and Garden Crops of the North-Western Provinces and Oudh. Part I. With illustrations. By J. F. Duthie, B.A., Superintendent of the Saharanpur Botanical Gardens, and J. B. Fuller, Assistant Director of Agriculture and Commerce, North-West Provinces and Oudh. (Printed at the Thomason Civil Engineering College Press, 1882.)

THIS brochure is the first of a short series in which it is proposed to describe the cultivated products of the North-West Provinces of India. With the exception of an introduction of considerable length, treating generally of the physical, social, and agricultural peculiarities of the North-Western Provinces, the volume is chiefly devoted to a description of farm crops. Many of these, such as wheat, barley, oats, maize, hemp, tobacco, millet, and poppy, are as familiar to European cultivators as to Asiatics. Others, such as opium, rice, sugar-cane, and cotton, betoken the tropical nature of at least a portion of the season. The botanical descriptions of the various crops are contributed by Mr. Duthie in the usual language of the text-books, affording little room for original remark of any kind. By far the greater portion of the work has been compiled from the reports of Settlement Officers and other Government records, or contributed by Mr. Fuller. The agricultural information is of a highly interesting character, and the illustrations are particularly excellent. The work is, however, in a manner disfigured and rendered obscure by the peculiar views of the authors as to the first rule of arithmetic. Sixty-seven millions, &c., are expressed as 6,79,06,496, and six millions, &c., as 64,96,567. Ten millions, &c., are written in figures as 1,09,57,837. This principle of notation renders the statistical portion of the work difficult to follow, and it is not easy to see why it has been adopted.

The text is not free from remarks betokening a want of knowledge as to the progress of research on certain points. When, for example, treating of the enemies which affect the wheat crop, the author (presumably Mr. Fuller) writes as follows:—"But by far the most extraordinary disease to which wheat is liable is *schwan*, in which the young wheat-grains are found to be filled with minute worms . . . The most extraordinary fact connected with this disease is, however, that the worms can retain their vitality for a long time," &c. A footnote is then added as follows:—"Since the above was written, the worms have been identified as belonging to the order *Nematoidea*, and are apparently of the genus *Tylenchus*"! This is really too gross and wilful ignorance. The well-known and often-described "pepper brand" or "ear-cockle" attributable to the *Vibrio tritici*, now known as the *Tylenchus tritici*, is paraded as a "most extraordinary" disease, the precise nature of which has been ascertained "since the above was written." If such is the fact, the figures 1882 should be withdrawn from the title-page, and 1828 be substituted in their place. Neither do the authors appear to be at home in treating of the varieties of the cultivated plants. The varieties of rice, we are told, are more numerous and more strongly marked than those of any other crop. Forty-seven distinct varieties are announced, in support of this statement, as existing in Bareilly, although the writer proceeds somewhat naively to add, "Probably in the Provinces their number considerably exceeds 100." Now, as 300 varieties of wheat have been propagated by one naturalist, the forty-seven varieties of rice do not strike us as bearing out the statement as to the extraordinary variability of the plant.

Another point we cannot forbear to notice is the evident carelessness on the part of the authors as to whether their work should be understood by Englishmen in England. What is a "lakh," a "maund," or a "seer"? In vain we look for an English equivalent, and yet it is "maunds" *per acre* which are constantly spoken of, and which we long to translate into bushels or some intelligible unit of measure or weight. Viewing the volume as a whole, we cannot but pronounce it interesting and readable. The introduction is especially rich in information regarding the climate, irrigation, and cultivation of the North-West Provinces, a vast district comprising, in the quaint method of enumerating employed by the authors, 6,79,06,496 acres.

An alluvial soil and a climate by which the year is divided into two complete seasons certainly are conditions highly favourable to vegetation and to agriculture. In the colder season, wheat, barley, and oats are brought to perfection, while in the kharif, or hot season, rice, cotton, sugar-cane, and maize thrive. Not only do these highly-favoured provinces enjoy a temperate and a tropical climate, but each half of the year is again divided into two definite sub-seasons fitted for producing crops peculiar to it. We cannot but wonder whether the strange climatal vagaries to which the western world has latterly been exposed have disturbed the pleasant division of the year into kharif and rati in the North-West Provinces of India; but on this point our authors are silent.

JOHN WRIGHTSON

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. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

Auroræ of October 2 and November 17, 1882

THE article of Mr. Rand Capron in the *Philosophical Magazine* on the aurora of November 17, 1882, has proved to me that my observation of that phenomenon has not been without value, but it appears that Mr. Capron has been obliged to consult a not quite accurate abstract or translation of my description which I had inserted in the *Utrecht Journal*; it was from lack of time that I did not immediately send translations of it to foreign periodicals.

Perhaps you will still be so kind as to admit into *NATURE* a translation of both my articles on the auroræ of October 2 and of November 17; they were written immediately after observing the phenomenon.

J. A. C. OUDEMANS

Utrecht, June 9

Translation of the Article in the "*Utrecht Journal*" of October 3, 1882

Yesterday evening, between seven and eight o'clock, there appeared here a brilliant aurora. Before seven there was visible a white arc running from west to east. This arc grew clearer and clearer, and rose slowly, till at 7h. 5m. (mean time) there emanated brilliant beams from its whole circumference.

At 7h. 10m. there rose also a bright column from the east-north-east, which phenomenon was repeated now and then also from the west.

In the southern part of the sky a magnificent sight was the large white spots, looking like brightly illuminated white clouds, but proving by their variable brilliancy to be no clouds, but to be connected with the auroral light. At 7h. 15m. such a large white spot was just before Aquila, *i.e.* north of the equator, but the spots showed a movement to the south, so that at 7h. 30m. the zone formed by them was some degrees south of the equator.

At 7h. 42m. there arose a large beam through the quadrangle of Ursa Major to β Ursa Minoris; this beam moved to the west, and was dissolved a few minutes afterwards.

At 7h. 50m. there appeared again a cloudy patch in Aquila.

At 7h. 54m. a brilliant shooting star descended almost vertically from the space between Lyra and the Dragon through Hercules; this observation was, however, not made with accuracy.

At 8h. the last cloudy patches in the south vanished; in the north also I saw no more upward radiating beams.

Long afterwards the auroral light remained visible in the north. After 8h. 30m. I did not longer look for the phenomenon; it seemed to me to have come to an end.

Utrecht, October 3, 1882

J. A. C. O.

Translation of the Article in the "*Utrecht Journal*" of November 18, 1882

Yesterday we had again a brilliant aurora, differing entirely in its details from that of October 2.

In the east as well as in the west there appeared at 6h. mean time a red gleam like that of a distant fire. Both these extended red patches were united through the north by an arc much resembling that which appeared in the aurora of October 2. The splendid vertical beams remarked on that occasion were now fewer in number and not so intense; they were of the same reddish hue as the above-mentioned patches visible in the east and in the west.

At 6h. 23m. there appeared suddenly in the east a bright featherlike¹ appearance, which in the beginning showed some resemblance to a comet; the end of it was exactly above Aldebaran. In no more than two minutes this feather had lengthened over an arc that passed above Saturn, through the quadrangle of Pegasus, and south of the Aquila stars, and as the front or western end proceeded, the eastern end followed. With the aid of a star-map we see that the arc, covered successively by this featherlike appearance, was elevated 20° above the

¹ By this word I did not mean that the borders or edges were not fairly defined.