

vessels and of bodies such as pendulums, when totally immersed in fluid, are also adverted to.

Twenty-five useful maps and charts are attached showing the general progress of the survey, particularly on the coasts of Florida, California, Oregon, and Carolina; together with illustrations of the apparatus used. As compared for instance with the precise drawings given by General Ibanez in his Reports in 1860 and 1865 on the Madrid base-line, there may perhaps be room for improvement in the finish of the illustrations given in this Report.

In the Report of the Superintendent for 1883 we shall look forward with interest to the results of the experimental researches on the force of gravity, by Assistant C. S. Peirce, who is now visiting Europe for the purpose of his inquiries.

In the success with which the Superintendent has been able to deal with the different branches of his department, much is due, as he indicates, to the forethought and systematic treatment of his eminent predecessors, particularly to Carlisle P. Patterson, to whose memory a graceful tribute is rendered in the Report; as well as to the able assistance which the Government have placed at the Superintendent's disposal.

AGRICULTURE IN SUSSEX¹

THIS Report bears evidence of a considerable amount of careful research bearing upon the agricultural practice of Sussex. The honorary secretary, Major Warden Sergison, must be congratulated upon his zealous administration of the finances, whereby an annual income of about 770*l.* has been secured for the three successive years of active operations. This Report deals with the results of the third year's work, which completed the period over which it was originally calculated that the work should be extended. We are therefore in a position to form some opinion as to the practical value of the results which have been gained. It appears from this Report that it is intended to extend this inquiry.

These experimental researches have been conducted by Mr. Thomas Jamieson, the Fordyce Lecturer on Agriculture in the University of Aberdeen, and it will be interesting to notice the improvements and economies which are claimed in his Report as resulting from this rather costly investigation. He says:—"The results are too numerous to give, . . ." but "an attempt will be made to give in a general way the lessons they seem to teach." He then proceeds to indicate these, placing them in the form of question and answer. We will take the first of these.

"What food do plants need? Prior to the experiments now recorded, the answer to this question would have been 'Nitrogen, phosphorus, potassium, sulphur, calcium, magnesium, iron.' The results of the experiments warrant us in saying that the latter four substances may be disregarded by farmers. We thus realise the value of experiments. If the farmer of 100 acres will lay his manure bill before a chemist, and ask him to calculate how much he has paid for those useless—or hurtful—ingredients, he will recognise the direct benefit of such experiments."

Those who have watched the good work which Mr. Jamieson has done in connection with the Aberdeenshire Agricultural Association, and who have recognised the opposition with which he had to contend, cannot but regret the hasty conclusion at which he has arrived. It is a very bold assertion to make that sulphur, calcium, magnesium, and iron are not needed as plant-food. He cautions his friends "not to be led away by opposed statements, however plausible, if unaccompanied by proof." In this case Mr. Jamieson shall supply his own proof, for which purpose we refer to the Report of the

Aberdeenshire Agricultural Association, 1875-76, p. 29. Here Mr. Jamieson reports a very valuable series of experiments which he made. White sand was supplied with all the ingredients found in turnips—except one—and turnip seeds were then sown. He says:—"Precisely the same sand, precisely the same seed, precisely the same watering, precisely the same ingredients added, except one—which was purposely omitted—*calcium*. In consequence of this omission, although all the other ingredients were present in abundance, the healthy seed produced healthy young plants, but speedily *the whole of them died*. Just as in an ordinary chemical experiment *the desired substance cannot be formed if one of the essential ingredients is absent.*" The lesson derived from this experiment is perfectly consistent with agricultural science, and it is a source of profound surprise to find that this substance—*calcium*—is one of the four bodies named in the Sussex Report as being unnecessary, and that it should be stated that "farmers will not hurt their crops by omitting these four elements." This is a *dangerous lesson* to deduce from this valuable series of experiments, and we regard it with the greater regret because the facts do not justify such a conclusion.

Other examples might be selected from this Report, which conflict with other experimental trials conducted with, at least, equal care, which also tend to show the necessity for taking more *practical* views of the results gained. The opinions expressed upon permanent pasture are also open to severe criticism. If the general series of Sussex experiments be placed in comparison with the investigations carried out for the Aberdeenshire Agricultural Association, they will be found devoid of those great national advantages which must long attach to the Scotch experiments. The value of the Aberdeen Association work has never been as fully appreciated as it deserves, and the agricultural public would have been highly gratified if the Sussex Association experiments had been equally definite and satisfactory.

SOCOTRA¹

FOUR years have elapsed since an expedition was sent out from this country by the British Association and the Royal Society to explore the Island of Socotra. With the exception of diplomatic visits by the resident at Aden in the two or three preceding years, and of a short exploration in 1847 by the French naturalist Boivin, there is no record of any European having sojourned on the island since the date, forty years ago, of its abandonment by the Indian troops which had occupied it for this country during four years, and Wellsted's account of his survey of the island (in *Fourn. Roy. Geog. Soc.* v. 1835) made in 1834, has been up till now the most recent and most satisfactory. It is remarkable that an island so long neglected and forgotten should be visited in two successive years by exploring expeditions; yet this has happened. In 1881 a party of German explorers followed the British Expedition. This German Expedition to Socotra formed part of a scheme of scientific exploration of many unknown or but little-known regions of the globe set on foot by Dr. Emil Riebeck, and for which his liberality provided the means, and the results of this portion of his undertaking, some account of which now lies before us, must be gratifying to him as they are valuable to and welcomed by science. Dr. Riebeck was accompanied to Socotra by the well-known traveller Dr. Schweinfurth and two other companions, Drs. Mantay and Rosset—a quartet of observers well qualified to take advantage of every opportunity of extending our knowledge of nature. Many

¹ "Ein Besuch auf Socotra mit der Riebeck'schen Expedition." Vortrag von Professor Dr. Schweinfurth. (Freiburg, 1884.)

"Allgemeine Betrachtungen über die Flora von Socotra," von G. Schweinfurth. Sep. Abd. aus *Engler's botanischen Jahrbüchern*, v. (1883).

"Land-Schnecken von Sokotra," von E. von Martens, aus *Nachrichtsbl. d. deutsch. Malakol. Gesellschaft*, No. 10 (1881).

¹ "The Annual Report of the Proceedings of the Sussex Association for the Improvement of Agriculture in Sussex. Season 1883."

difficulties and dangers beset their progress to the island, and their leave-taking appears to have been no less troubled; but eventually it has been their good fortune to bring to Europe a magnificent collection of specimens illustrative of its structure, its products, and the character of its inhabitants.

Most of the collections have now been worked out either in this country or on the Continent—Schweinfurth's large herbarium having been, with rare generosity, sent by him to this country to be examined along with that of the British Expedition—and the details regarding them are published in various periodicals. Herr von Martens' paper above mentioned is a supplement to the first part of Godwin-Austen's account (*Proc. Zool. Soc.* 1881, p. 251) of the shells brought home by the British Expedition, and deals with some new forms collected by the German explorers not mentioned in that account. It appeared, however, when the second part of Godwin-Austen's paper was in the press, and this overlapping of the papers has unfortunately led to some forms being described by both authors and under different specific names.

In the other pamphlets before us Schweinfurth gives us in his usual lucid and vigorous language a general *résumé* of results so far as they have been at present determined. It is satisfactory to find that his conclusions, drawn from considerations of the physical features and the fauna and flora, are almost entirely in consonance with those deduced by the British observers (see Bayley Balfour in *Rep. Brit. Ass.* 1881, and *Proc. Roy. Instit.* for April 1883). The antiquity of the island, the strong affinities of the animals and plants with those of the adjacent African and Arabian coasts, the presence in the flora of Mediterranean and general tropical types, as well as of forms related to those found on the highlands of Abyssinia, South Africa, and West Tropical Africa, are features insisted on by both. There is, however, a divergence of opinion regarding the Madagascar affinities. Godwin-Austen supports these points to the conclusion that in Socotra and Madagascar we have remnants of an ancient and more advanced coast-line on the western side of the Indian Ocean, which was probably continuous through Arabia towards the north. Martens questions the identifications upon which this supposition rests, and does not agree with it, and Schweinfurth, though without advancing any cogent reasons, concurs with him.

The question, who are the Socotrans, and whence have they sprung? is one to which the German Expedition gave special attention, and Schweinfurth devotes a considerable portion of his address to its discussion. At the present time he estimates the population at ten to twelve thousand inhabitants. Of these about one-tenth are Arabs, colonists from the adjacent mainland, who live in the coast-villages, and are the merchants of the islands. Along with these are found many negroes, most of them runaway slaves. But the dwellers on the hills are the true Socotrans, and speak a language quite peculiar. Amongst them Schweinfurth recognises, as did Vincenzo in the seventeenth century, two races—a darker with curly hair, and a lighter one with straight hair. In addition he finds an apparently Semitic type, characterised by small head, with long nose and thick lips, straight hair, and lean limbs. The Socotran generally is of average height and size, with a quick, intelligent eye. The type of the true Socotran is quite different from that of the Somali, Galla, Abyssinian, South Arabian, and Coast Indian. From the little known of the Mahra and Qara tribes which inhabit the hill regions of middle South Arabia opposite, Schweinfurth is inclined to consider the Socotran resembles them most nearly. Many skulls were obtained from the grave caverns, and these are now in the hands of Prof. Welcker, whose report upon them may be looked forward to with interest.

From a study of the peculiar Socotran language the Germans anticipated much aid in elucidating the problem

of the origin of the people. Unfortunately difficulties with interpreters prevented their achieving much success in this line. Schweinfurth notes, however, regarding the language two marked features. Firstly, its resemblance with the Mahra dialect, which is quite different from the old and the new Arabic, and is a peculiar element amongst the South Arabian dialects. This is opposed to the statement of Capt. Hunter, who says it in no way resembles Mahra. But Schweinfurth in support of his statement quotes the report of Wellsted, that the Mahras and Qaras could understand the Socotrans whilst coast Arabs could not do so; and further, a comparison of the vocabularies made by Wellsted and by his own expedition with the results of von Maltzahn's studies on the Mahra dialect show many similarities between them. Secondly, it contains many foreign elements, and this is especially noticeable in the names of plants and animals, many of them having a thoroughly Greek sound.

Turning to history for a clue to the origin of the Socotrans of to-day, we find many references to their island in the older writers, and to these Schweinfurth refers. The author of the "Periplus" speaks of the people as a mixture of Arabs, Indians, and Greek merchants; and the presence of the Greeks is explained by subsequent writers by the story that Alexander the Great on the advice of Aristotle sent a colony of Greeks—some say Syrians—to cultivate the aloe. Cosmas relates that under the Ptolemies many colonists were settled on the island, and Jakut in the thirteenth century tells of the Greeks who had become Christians dying out and thus making room for an incursion of Mahra Arabs from the opposite coast. In these old narratives there is, as Schweinfurth points out, much that is contradictory and conflicting, and unfortunately there is at the present day but little internal evidence confirmatory of the existence in earlier times of a cultured race on the island. The visit of the Wahabees in 1800, as Wellsted says, may probably account for the disappearance of monuments and temples. Schweinfurth speaks of certain small heaps of ruins as perhaps representing old altars—but the only definite relic of this character now known is a series of hieroglyphics upon a wide limestone slab at Eriosch near Kadhab. These have attracted the attention of all who have visited the island in recent times, and Dr. Riebeck has paid especial attention to them. His interpretation has not yet been made public, but Schweinfurth states that in them some rows of Greek cipher are to be recognised. It may be hoped that their explanation may afford some clue which will help the solution of the interesting problem of the derivation of the Socotrans. The evidence existing at present is of so imperfect a character that it is impossible to determine with certainty their stock. Schweinfurth conjectures that in the Semitic element he observed may be traced a Greek type, and that the Mahra Arabs have most probably had a great share in forming the features of the present people. Future exploration must settle the question.

Altogether these papers by Schweinfurth are of the greatest interest, and his long experience amongst the native tribes of Africa gives to his observations regarding the people of Socotra great value. The material obtained by the two expeditions—British and German—has enabled us now to obtain a fair idea of the general character of the people, the natural history and physical features of Socotra; but the short time for work possible to the members of the expeditions—little more than six weeks in each case—naturally renders their results somewhat fragmentary. What has been done as yet is but preliminary, and from it we learn that there is still a vast field for future explorers—not only in Socotra itself but on the adjacent mainlands of Africa and Arabia. Until such further investigation takes place many most interesting problems—ethnological as well as concerning the distribution of plants and animals—must remain unsolved.