

this department Palmer, true to the masters and models from whom he drew his lore, never excelled and never even showed much interest. His history of Jerusalem, his introduction to the Koran, and writings of a similar class, on which Mr. Besant lavishes praise as freely as on his really marvellous exploits in other lines, are disappointing performances; and it is extremely unjust to his memory to speak of them as if they displayed any part of his real strength. The same want of discrimination appears in a more unpleasant form in the querulous tone which runs through the book and represents every honour conferred by his University on other Orientalists as a gratuitous insult to Palmer's reputation as a scholar. The University was certainly happy which possessed in its two Arabic chairs men like Palmer and Wright, so different from one another, yet each unrivalled in his own line. But it is absurd to fasten a charge of unfairness on the University because in the candidature for the Adams chair it preferred the senior scholar. For the maintenance of the scientific *diadoche* in the characteristic features of the modern European school of Semitic learning Dr. Wright had qualifications to which Palmer never pretended—*e.g.* a profound comparative knowledge of the dialects—and the choice which Mr. Besant ascribes to petty motives was made on principles obvious to all who knew the case, and received the unanimous approval of learned Europe. The personalities which disfigure this part of the biography are based on a perfect tissue of errors as to fact; and the groundless charge of intrigue brought against honourable names acquires all its plausibility from statements which with the smallest care might have been seen to be erroneous. The very year of the election is wrongly given—1871 for 1870—a somewhat important error, as in the earlier year none of Palmer's principal writings had appeared; the salary is given at 300*l.* instead of 70*l.*; the fellowship at Queens', subsequently conferred on Dr. Wright to facilitate the conversion of a non-resident into a resident chair, is represented as a bribe to induce Dr. Wright to be a candidate, whereas in point of fact the election took place without his knowledge or consent. That Mr. Besant's researches into the facts on which his interesting record is based have been very slight appears all through the book—he is for example unable to say positively whether Palmer wrote articles which have appeared *with another signature* in the "Encyclopædia Britannica"—but the carelessness of the bookmaker deserves a stronger name when it touches the honour of men who are still living, and with whom Palmer himself continued to maintain friendly relations after the "insult," as Mr. Besant calls it, which "never was forgotten or forgiven."

The life of Palmer, who learned so much from the living voice, and had a unique gift of adapting himself to every kind of human life, must have been rich in incidents of the most interesting and instructive kind. Unhappily he does not seem to have kept full record of these, and except in the account of his last wonderful journey from Gaza to Suez we seldom hear his own voice in this volume. The reviewer knows from his own intercourse with the gifted traveller that but a small part of Palmer's observations in the East was ever given to the world, and as he certainly had many jottings—at least in Arabic if not in English—there was some reason to hope that the

biography might make important additions to our knowledge of a land and race in which science as well as literature has a deep interest. This hope has not been realised; little is added to our knowledge of Palmer's earlier travels except one or two striking anecdotes. Are there no note-books to be found which can still supply this blank?

One is sorry to find so many grave faults with a book which after all gives a brilliant if not a discriminating picture of a very remarkable and attractive character; and it would be wrong to close without a word of thanks for the history of the heroic task, undertaken in no foolhardy spirit but in a spirit of courageous patriotism, which cost Palmer his life and England one of her most brilliant sons. Many points in the tragedy still remain obscure; but enough has now been set forth to leave upon the reader a profound impression of the intrepid bravery, the ready resource, the genuine devotion to duty, which, still more than his rare gifts of intellect, will keep the memory of Palmer green in the hearts of a people which prizes true manhood above the profoundest learning.

W. ROBERTSON SMITH

ANTS AND THEIR WAYS

Ants and their Ways. With Illustrations, and an Appendix giving a Complete List of Genera and Species of the British Ants. By the Rev. W. Farren White, M.A., M.E.S.L., Vicar of Stonehouse, Gloucestershire. (London: The Religious Tract Society, 1883.)

ANT literature is now so extensive and the subject is so popular, that it was an excellent idea to give in a handy volume a *résumé* of all that is known of the economy and life-history of these interesting insects. The writer is well fitted for the work, having made ants his special study for more than twenty years, during which time he has observed in their native haunts nearly every species of British ant, and has been able to confirm some of the most curious facts of their social economy. Although full of detailed and interesting information, and containing the results of the most recent observations of Sir John Lubbock, Dr. McCook, Forel, and other writers, the book is written in a lively and gossiping style well fitted to attract the young and persons who are not usually readers of scientific works; but many will think that liveliness of style is carried too far when we find such sensational headings as "Political Demonstration in the Ant-world," "Funeral Rites," "The Ants at their Toilet," &c., &c.

Coming however to the original observations of the writer, we find him disputing the statement of Sir John Lubbock, that ants dislike light. He says:—

"That they prefer working underground is certainly true, and that they construct their chambers and passages out of sight is clearly established, and that they will not work against the sides of the bell-glass if exposed to the light is undoubted fact. But it is not, I believe, because they dislike the light, but because, for sanitary, educational, and protective reasons, it is necessary that their many chambers should be arranged at certain depths below the surface, and therefore at varying distances from the light of day."

He then goes on to record a series of experiments showing that ants are attracted to the sunlight and bring their young beneath its influence for the sake of the

warmth which accompanies it, and that in the same way they are attracted by the light of a candle placed close to the sides of the *formicarium*; the glass being warmed and becoming a source of radiant heat. The elaborate experiments of Sir John Lubbock, showing that ants preferred the red end of the spectrum and avoided the violet end, are all explained by their preference for the greater warmth accompanying the red rays, though he also thinks they dislike the effect of the chemical rays. His general conclusion is, that there is no evidence that they distinguish colour or prefer one colour to another, but that they always prefer warmth, and dislike the action of the chemical rays of light, while to light itself they have no objection whatever.

Mr. White reproduces from the *Proceedings of the Linnean Society* for 1861 a remarkable account of some Australian ants burying their dead in a methodical manner strongly resembling our funerals, and supports it by some curious observations of his own. In one of his newly procured nests there were many dead ants, which were carried up from below and placed against the glass. Three small card trays containing honey for the ants were placed in the *formicarium*, but instead of eating the honey the trays were used as cemeteries, and in two days 140 dead ants were placed in one tray and 180 in each of the others. In another case he observed the ants burying the dead in subterranean cemeteries, the bodies being covered with earth and the passage leading to the vault being stopped up.

A good account is given of the various creatures found in ants' nests, such as the crustacean *Platyarthus Hoffmannseggii*, the various species of beetles, some of which are never found elsewhere, and seem to depend on the ants for their subsistence, and the aphides which the ants actually breed for their own use just as we do cattle. Some ants have small colonies of other ants domiciled with them, apparently as guests or lodgers, while others capture the pupæ of distinct species and bring them up to work for them like veritable slaves. This extraordinary habit of slave-making is fully described in two very interesting chapters, and Mr. White is one of the few Englishmen who have been so fortunate as to witness the slave-hunters at their work.

We cannot better illustrate our author's style and his mode of viewing the subject of ant-economy than by quoting the passage in which he sums up the result of his observations and inquiries:—

"And now, surely enough has been said, ample evidence has been brought forward, my own personal testimony having been confirmed when necessary by the experience of others, to warrant me in earnestly demanding for my little clients a favourable verdict. When you bear in mind the self-devotion of the queen for the commonwealth; the loyalty of her subjects, their affection towards their youthful charges, preserving as they do a happy medium between undue severity and over-indulgence; their liberal system of education without the aid of privy councils and revised codes; their plan of drainage, most effectual before boards of health and city corporations had ever been heard of; their public works and national enterprises, planned and executed with the most surprising promptitude, uncontrolled by parliamentary committees, orders in council, and circumlocution offices; their social institutions, their provident clubs and savings banks, gathering as they do their meat in the

summer—the continental and foreign ants grain and honey, the British ants their aphides for future use; when you bear in mind their perseverance under difficulties, that no poor-house or assessment committee or sanitary authorities are needed, for all live as brethren, all sympathise with each other in trouble and difficulty, and share everything in common as members of the same happy family, 'he that gathers much having nothing over, and he that gathers little having no lack;' when you remember their habits of early rising, of cleanliness, of moderation, of economy, of temperance, their love of fresh air, their skill and industry in their many trades, the magnificent scale on which they construct their houses; their language, which, though more difficult to acquire than Chinese, yet is to them so intelligible that there are no misunderstandings, all speaking it fluently, and by means of its mysterious agency communicating their ideas to each other; when you recall how they carry out concerted plans thoroughly, noiselessly, uninterruptedly, not resting till their work be finished, animated by one spirit, pursuing thus the end, fulfilling thus the law of their brief existence—you must allow that surely this 'little people' are 'exceeding wise.'"

Though somewhat anthropomorphic and highly coloured, this passage brings before us in a striking manner the many marvellous characteristics of the habits and instincts of ants, and also serves to show the thorough and enthusiastic study which the writer has bestowed upon them.

The book is well illustrated with numerous woodcuts from original drawings; and in an appendix is given a complete list of British ants with careful descriptions of all the species, forty-one in number. It will therefore be of great assistance to any entomologist wishing to commence the study of our native ants; while as an interesting volume for the general reader, or as a gift-book for children with a taste for natural history, it may be safely recommended as among the very best of its kind.

ALFRED R. WALLACE

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.]

The Matter of Space

In his letter on this subject in *NATURE* (vol. xxviii, p. 148), Prof. Morris strikes, I believe, a keynote of very great interest in the general theory of motion, when he lays it down as a primary principle that all motion naturally tends to attain a condition of stationariness in which, though it still constantly springs or swings hither and thither, it is yet permanently localised in some fixed field, contained within definite inclosing boundaries.

Singular as the law appears that motions, bound and hemmed in as we see them everywhere around us, are only ostensibly confined to their spheres by combinations of directed forces, while they are really inclosed in them by a governing principle in matter which constantly models its directed courses either by continuous or by interrupted stages into forms of stationariness; and strange as the statement sounds, that all matter thus tends constantly to form *in situ* veritable universes¹ externally re-

¹ A pamphlet, "The Universe, or the Science of the Twentieth Century," maintaining exactly this microcosmical theory (by what course of reasoning arrived at I cannot guess), reached me not long ago from a writer, Mr. John Tate of Portadown, in Ireland, with another ("A New Theory of Electricity,") describing electricity as a kind of twisting power, both of which, from the independent practicality of their treatment, seem to have been entirely prompted and suggested to the author by exact meditative study and by clear original reflections.