

puts forward a theory of language which ignores the main problem, namely, the origin of grammatical forms, which are often more complex in unwritten than in written languages.

In his "Analysis of War", he points out that aggressive behaviour is usually displayed within the group, whereas war is a conflict between two separate groups. Savage warfare, engaged in at first to obtain sacrificial victims, and later for loot, is usually unaccompanied by any feelings of enmity towards those attacked. In this essay, as in some of the others, he tends to overestimate the originality and importance of his discoveries; but all his writings, whether one agrees with them or not, are interesting and stimulating, and are written in excellent English.

There can be little doubt that Malinowski himself will be long remembered. By the enthusiasm of his teaching he was largely responsible for the advancement of anthropology in our universities. His "functional theory", though theoretically weak, has impressed upon students the fact that people do not move from one watertight compartment labelled "religion" to another labelled "family life". His insistence that in order to describe a rite it is not enough to take down an account of it from an informant, but that it is necessary both to witness it and to discuss it with the participants in their own language, has greatly improved the standards of field-work. Finally, he has brought home to the general reader the fact that savages are not "half devil and half child", but are human beings very much like ourselves.

RAGLAN

## 916 THE SUBSTITUTIONAL CALCULUS OF ALFRED YOUNG

### Substitutional Analysis

By Dr. Daniel Edwin Rutherford. (Edinburgh University Publications, Science and Mathematics, No. 1.) Pp. xi+103. (Edinburgh: University Press; and Oliver and Boyd, 1948.) 25s. net.

THE work of the late Dr. Alfred Young is now more widely known and more appreciated than it was fifteen years ago. His purpose was to construct a calculus of operators which should yield all the irreducible concomitants of a set of algebraic forms. He partly achieved this aim; but in pursuit of it he discovered an ancillary calculus, that of his famous "tableau" operators, by the aid of which he obtained his important matrix representations, the "natural" and the "semi-normal", of the symmetric group.

The papers of Young are still, however, not easy reading, partly because, here as in other cases, the order of discovery is not necessarily the best order for the exposition of the results. Dr. Rutherford, having devoted many years to the study of Young's memoirs, has composed a treatise of substitutional analysis. He has chosen his own order, and has aimed first at obtaining the semi-normal and orthogonal representations. It is well known how Young, having developed a theory of tableau operators in two papers of 1900 and 1902, resumed the work after an interval of twenty-five years by singling out a special set or basis, the famous "standard tableau" operators, the "Young symmetrizers", as they have been sometimes called. These yielded a "natural" (one might rather say "rational") representation of the irreducible sub-algebras of the group algebra of the symmetric group. None the less, the advantage of rationality

was offset by the disadvantage of a loss of symmetry of procedure, perceptible already in the group of order 5!; the operators required modification by linear combination. For this and other reasons, Young proceeded to transform the natural representation into the semi-normal representation, which is at only one remove from the orthogonal representation.

Dr. Rutherford has chosen to lay emphasis, rightly in our opinion, on the semi-normal and the orthogonal representations, and on the work of the American algebraist, R. M. Thrall, in developing these *ab initio* without reference to the natural representation. The two earlier chapters are devoted to preliminaries, the calculus of permutations and the calculus of tableaux; the two later chapters contain applications to group characters and to the solution of substitutional equations. This last is original work by the author himself. But throughout the book the treatment is very far from being a transcription of Young's material or methods. It is individual both in choice of order and in the use made of matrix algebra.

The book is a worthy addition to the literature of these topics, a literature which includes the original memoirs of Frobenius and Schur on group representation, those of Schur himself on the homomorphisms of the linear group, the papers of Young, and the treatises of Weyl, Murnaghan and D. E. Littlewood.

It is a feature of interest that the book is the first mathematical treatise to be published by the recently founded Edinburgh University Press. The format and typography are excellent; we have failed to note any errors in the intricate printing.

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## 716 BIRDS OF A GREAT METROPOLIS

### London's Birds

By R. S. R. Fitter. Pp. 256+23 plates. (London: William Collins, Sons and Co., Ltd., 1949.) 10s. 6d. net.

HERE is a history, assembled from the voluminous but scattered literature and brought up to date, of the birds recorded in the County of London. A map is provided showing the County's limits, but the author frequently strays into Greater London in search of rarer species. The birds are grouped into chapters according to habitats: birds which nest on or frequent buildings, the ground, trees and shrubs, marshes and the Thames, and even the air itself has a chapter; followed by chapters on migration and predators, including man's influence for evil and good. This treatment has resulted in some overlapping and repetition, but otherwise the book is absorbing, and of great value as a guide for the many Londoners interested in birds.

It is a depressing history in its revelation of the number of rare, vanishing and lost species on London's bird-list. This decline has been going on for more than a hundred years, and is due primarily to the failure of food supply which has followed intensive building and the disappearance of open spaces. Direct persecution by man (shooting, bird-catching and egg-collecting) is only a subsidiary factor in this decline, as is the virtual disappearance from the streets of horse-droppings, on which finches and other birds formerly thrived.

On the other hand, there has been an increase of certain adaptable species which would have astonished