Living Together
The Biology of Animal Parasitism

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Foreword

William Trager has been an avid student of parasites for over 50 years at the Rockefeller University. Around the turn of this century, parasitology enjoyed a certain vogue, inspired by colonial responsibilities of the technically advanced countries, and by the exciting etiological and therapeutic discoveries of Ross, Manson, Ehrlich, and others. For some decades, the Western hemisphere's interest in animal parasites has been eclipsed by concern for bacteria and viruses as agents of transmissible disease. Only very recently, initiatives like the Tropical Disease Research programs of WHO–World Bank–UNDP, and the Great Neglected Disease networks of the Rockefeller and MacArthur Foundations have begun to compensate for the neglect of these problems by United States federal health research agencies. Throughout that period, however, the Rockefeller Institute (later University) has given high priority to the challenges of parasitism, corresponding during a formidable period with Dr. Trager's own career.

The present work then, is a distillation of the insight collected by our principal doyen of parasite biology, informed but by no means confined to his own research. It is addressed to the reader of broad biological interest and training, not to the specialist. The disarmingly unpretentious style makes the work readily accessible to college undergraduates or even to gifted high school students; but do not be deceived thereby, as it has an enormous range of factual information and theoretical insight, familiar to few, but potentially important to most biologists. This was a shrewd and well-contrived choice, and I am sure the book will add much to the current momentum of interest in the field.

Trager's work is organized by themes of biological interest, not by the taxonomy of the parasites or of the disease syndromes of the hosts; but these are not neglected where pertinent. As the title implies it concerns the biology of parasitism, not just a survey of parasites. The writing is therefore in the tradition of Theobald Smith, McFarlane Burnet, and Rene Dubos whose writings have been so important in bringing bacteria and viruses, and their parasitic behavior, into the mainstream framework of evolutionary biology. Like these forerunners, Trager focuses on the developmental, biochemical, and

genetic adaptations by which the parasite exploits its special ecological niche, and by which the host seeks to retain its own Malthusian fitness in the face of that challenge. Extraordinarily, he is able to unite a half-century of experience with the latest findings and perspectives of molecular biology, which is, of course, bringing this field of study into a revolutionary new phase.

What impressed me, and what will enrich a generation of new molecular parasitology entrants seeking key research problems, is the range of fabulous stories in this book. It is a veritable Arabian Nights of narrative, not of the human imagination, but of Nature's, in the exposition of phenomena of adaptation and specificity. On every page, the author exhibits his profound awareness of the conundrums they pose for physico–chemical and developmental–genetic principles still to be elaborated—to explain specificity for hosts and organs, tropisms, response to host rhythms, and endocrinology; the morphogenetic cycling of vegetative/reproductive phases, and the questions these raise for the differential control of gene expression. Nothing in the biology of the parasitic relationship escapes notice, be it the nutritional requirements of the parasite, the molecular genetics of the kinetoplasts, the mechanisms of pathogenesis, the host defenses, or the rationale and means of chemotherapy. Amusing and challenging are the reports of ways in which parasites alter host behavior and even growth towards the ends of the parasite.

I am tempted to borrow his examples; but that would be transparent and redundant plagiarism—the reader has but to turn to random pages, or scan the logically organized Contents. The work is also enriched by a systematic set of life cycle diagrams, indispensable for an overview of parasite natural history. For writing so easily digested, it is also fully documented in the bibliography following each chapter. It should be said that parasite here is meant to embrace animal parasites of other animal species, though the principles will be of great pertinence to parasitism by fungi, bacteria, and even viruses.

Many young scientists will, I hope, read this work: There are enough research challenges to keep them all fully occupied in an area which is as rich with human needs as it is with challenges to biological imagination. Others will find great stimulation and enjoyment, and a small lament that we do not have multiple lifetimes to enjoy and observe what the next decades of research will bring to the field, which Trager sings of so eloquently.

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