R/V *Marco Polo* cruising the Great Barrier Reef 22 June to 2 July 1973, from Brisbane to Lizard Island and return. The conveners have described the symposium as the most significant scientific meeting ever held in Australia.

Eight half-day sessions were held during the ten-day, 2000-mile cruise and have given rise to two volumes of almost encyclopedic dimensions, containing 114 papers.

Volume 1 is divided into eight sections. The first three fall under the general heading of productivity and contain papers on microorganisms and algae, inorganic and organic nutrients, and coral nutrition and coral reef communities. These are followed by sections on population strategies, ecological and paleoecological assemblages, biogeography, toxins and pharmacology, and *Acanthaster planci*. Volume 2 includes sections on regional studies and zonation, coral settlement and growth, microstructure of corals, carbonate sedimentation and diagenesis, Recent history, sea level change, geomorphology of reefs, field and theoretical techniques, and conservation. There are also an "introduction to the Great Barrier Reef" and a history of the reef committee's activities. In the last paper in the volume the symposium is chronicled in detail.

The majority of the papers deal with the organismic biology of corals and other reef-dwelling organisms or report on field studies (geography, geology, paleontology, ecology), and most deal quantitatively with their subjects. Papers on coral settlement and growth reveal the use of a wide range of sophisticated techniques for analysis of coral growth and skeletal accretion. These include x-radiography, radiometry, electron microprobe studies, staining with Alizarine Red S, and uptake of [^{3}H]thymidine. The date obtained had to do with biological activity, growth rates, and the influence of environmental conditions on growth. Although there are several papers on skeletal microstructure, there are none on the physiology of calcification, a major theme in contemporary coral biology.

Specific regional and zonation studies deal with reefs of southern India and Ceylon, the Solomon and Ryuku islands, the Netherlands Antilles, the Gulf of Panama, and Tulear (Madagascar), but the symposium includes papers that touch on virtually every reef area in the world. Likewise, although the sections on population strategies and ecological assemblages deal specifically with fishes, turtles, clams, echinoids, polychaetes, crabs, bryozoans, and foraminiferans, the volumes as a whole cover aspects of nearly every major phylum represented in coral reef communities.

Three groups of papers are worthy of special note. The sections on productivity serve as a useful indicator of the current status of information on the nutrition of reef corals. The autotrophic potentialities of corals resulting from the endosymbiotic dinoflagellates (zooxanthellae) associated with them are established beyond doubt. Experimental field studies show that the relative contributions of autotrophy (production by zooxanthellae and translocation to the coral host) and heterotrophy (uptake of bacteria, dissolved organic material, zooplankton) to coral nutrition are likely to vary inversely among coral species. The section on *Acanthaster planci* provides stimulating material for sustained debate on the causes of "population explosions" of these coral predators. Factors such as human activity, removal of predators, larval recruitment, and chemoreception are discussed. A highlight of this section is the dispassionate review of the "*Acanthaster* problem" by Ormond and Campbell. They propose that natural and man-made causes of population increases need not represent disparate views. *Acanthaster* may have a natural propensity for population increases and man's activities may modify factors that influence population levels. The section on conservation is short but poignant. It offers an account of how urbanization in Hawaii has contributed to the partial destruction of a once-flourishing fringing reef ecosystem. A companion paper describes the case presented by the oil industry to the Australian Royal Commission dealing with drilling on the Great Barrier Reef. It makes clear the determination of the oil industry to explore and drill on the reef. Conservationists are reminded again that the only common ground with industry and urbanization interests is the political arena.

The reader may gain some idea of the level of enthusiasm that prevailed at the symposium and is reflected in the pages of these volumes from the following excerpt from the account of the symposium by the secretary, Patricia Mather. "The visit to Heron Island was marred by a heavy swell, high winds, and heavy rain squalls, but the lifeboats still ran their shuttle service so that everyone who wished to go ashore—a hazardous operation that involved a leap from a pontoon into a heavy lifeboat, and, for some, a jump from the pilot's ladder through the gun-port door—could do so." Consider that 112 members elected to scuba dive, 168 to snorkel, and 90, no less intrepid, to walk the reefs of Heron Island.

Considering how formidable was the task of assembling and editing 114 papers within a year of the symposium, these paperbacked volumes are very well produced. I estimated that there are more than 2500 literature citations. The papers are liberally embellished with tables and graphs; there are many detailed, freehand drawings of coral community assemblages, local maps, and facsimiles of reef topography. Halftones are adequately reproduced and range from panoramic aerial and underwater photographs to scanning electron micrographs. These volumes should serve as extremely useful reference sources for anyone with an interest in corals and coral reefs.

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Polymorphonuclear Leukocytes

The Phagocytic Cell in Host Resistance. Proceedings of a conference, Winter Park, Fla., Mar. 1974. JOSEPH A. BELLANTI and DELBERT H. DAYTON, Eds. Raven, New York, 1975. xvi, 348 pp., illus. $19.75. A Monograph of the National Institute of Child Health and Human Development.

The title of this volume is somewhat misleading in that most of the contributed papers deal with the topics of mechanisms of microbial killing by polymorphonuclear leukocytes (PMN) and random and directed locomotion of PMN (chemotaxis). These topics alone are quite complex and it is useful to have available a comprehensive review of them.

Following ingestion of particulate matter by PMN there is a burst of metabolic activity that includes activation of the hexose monophosphate shunt. Hydrogen peroxide, superoxide, hydroxyl radicals, and perhaps singlet oxygen appear in the phagocytic vacuole. All of these may be microbicidal under appropriate conditions, but there is considerable uncertainty which of them is the principal lethal agent. It is clear that the combination of hydrogen peroxide, the enzyme myeloperoxidase found in PMN, and halide or thiocyanate ions constitutes a potent antimicrobial system. Convincing evidence of a role for superoxide anion is afforded by the work of R. B. Johnston *et al.*, who caused PMN to simultaneously phagocytize test bacteria and latex particles coated with superoxide dismutase; under these conditions bacterial killing was strikingly reduced. It is stressed by several authors that systems involving peroxide, superoxide, and the like, important and fascinating as they are, may not be the most important microbicidal weapons. For example, rodent peritoneal macrophages lack myeloperoxidase, although they may produce superoxide. Many other microbicidal factors have been described but not adequately studied.

Chronic granulomatous disease, which is found predominantly in male children, is characterized by inability of PMN to kill ingested catalase-positive bacteria; those that are catalase-negative are killed. R. L. Baehner and R. K. Root discuss this and other inherited defects of microbicidal functions of human leukocytes. Evidence is presented that the principal defect is the inability of the cells to generate hydrogen peroxide. Indeed, when the defective leukocytes are caused to ingest latex particles coated with glucose oxidase the ability of the cells to kill catalase-negative bacteria is markedly improved.

Several papers discuss leukocyte locomotion and directed migration. A number of interesting observations are recorded, and there is no doubt about the importance of this line of investigation. However, at present there appears to be a need for improvement in techniques for conducting such investigations and for careful attention to the property of cells that is being assessed. Some of these difficulties are underscored in the contribution by M. E. Miller and in the summarizing remarks by J. G. Hirsch.

The volume includes an excellent brief review of the activation and role of complement components in phagocytosis (H. J. Müller-Eberhard), a short discussion of activation of macrophages by lymphokines (J. R. David), and some interesting studies concerned with an apparent role of macrophages in causing precocious humoral immune responses in neonates (R. M. Blaese). For a more comprehensive view of the biological roles of phagocytic cells and mechanisms of phagocytosis, the reader would be well advised to supplement this book with the symposium "Function of Macrophages" published in *Federation Proceedings* (**34**, 1723 [1975]).

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Measuring Stellar Diameters

The Intensity Interferometer. Its Application to Astronomy. R. HANBURY BROWN. Taylor and Francis, London, and Halsted (Wiley), New York, 1974. xvi, 184 pp., illus. $18.75.

This book recounts the entire story of a project from conception through completion. Its subject is the optical intensity interferometer utilizing two large, mobile light collectors built at Narrabri, Australia, mainly for the purpose of measuring 32 stars. R. Hanbury Brown has been the protagonist of the project, being responsible for the original idea as well as for its implementation. His training as a radio engineer permeates the style of the project to such an extent that it bears almost no resemblance to customary optical astronomy facilities.

The book is well written and enjoyable and may be particularly recommended to persons having only a marginal acquaintance with the subject. The initial historical chapter especially deserves to be singled out for its refreshing personal flavor, uncommon in scientific work. It includes a genial narration of the storm of controversy that arose upon initial publication of the idea of intensity correlations. Such correlations presented an awkward discord with naive (and erroneous) notions stemming from a quantum viewpoint. The explanatory theoretical chapters unfortunately lapse back into the passive, and their clarity is slightly diminished as a result. The simple and the elaborate aspects of the theory are conveniently sorted into separate chapters, however.

The book does not replace the author's earlier article, "Measurement of stellar diameters" (*Annu. Rev. Astron. Astrophys.* **6**, 13 [1968]). In that article, for example, the fact that the method is restricted to blue, high-temperature stars was more emphatically clear. As another example, the effects of path difference receive an unnecessarily muddled account in this book. Path differences are tantamount to small pointing errors that jiggle the position of the fringes (illustrated in figure 2.2 of the book) so as apparently to smear them out. On the whole, however, the explanations are remarkably clear.

My principal objection is to the restricted, almost myopic, presentation of the topic. There is not a word on how intensity interferometry complements speckle interferometry and there is only one mention of heterodyne interferometry. Both of these more recent techniques are also used for measuring stellar diameters. And the comparison with the older Michelson stellar interferometry is somewhat unjust, because it presupposes visual detection for the Michelson technique whereas the intensity interferometer profits from the advantages of photoelectric detection. A moderately imaginative use of a Michelson interferometer with photoelectric detection might prove to be very beneficial.

The real problem with any interferometer, it seems to me, is the difficulty of being sure that an absence of fringe visibility (or correlation) is truly a result of resolved source diameter rather than of some spurious cause such as maladjustment. Hanbury Brown has been meticulously thorough in addressing that problem. His success may very well be a result of that thoroughness rather than of inherent advantages of the intensity interferometer.

The book does not discuss applications of intensity interferometry other than measuring stellar diameters. Possible spectroscopic applications were once suggested. Was there some reason, other than neglect, for their fading away? Also absent is the discussion of the remarkable fact that laser light does not exhibit intensity correlations. Some comment on that would have been welcome.

It is indeed fortunate that Hanbury Brown had the idea of the intensity interferometer as early as he did. In the present climate it is unlikely that such an exceptional project would receive support. If the conception had been delayed we probably would have been deprived of both the knowledge attained from the project and a good book.

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Improving Plant Protein

High-Quality Protein Maize. Proceedings of a symposium, El Batán, Mexico, Dec. 1972. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1975 (distributor, Halsted [Wiley], New York). x, 524 pp., illus. $28.

Nutritional Improvement of Food Legumes by Breeding. Proceedings of a symposium, Rome, July 1972. MAX MILNER, Ed. Wiley-Interscience, New York, 1975. xvi, 400 pp., illus. $20.95.

Dietary protein has been in short supply in the economically disadvantaged groups throughout the world. It has been estimated that within one generation there will be a greatly expanded need for food protein, possibly amounting to 100 million tons a year. The cereals and the food legumes (pulses) are now the major source of both calories and total protein for a large segment of the peoples of the world. There is a consensus that increases in protein quantity or quality or both in these groups of crops can be effected more readily than adequate increases in the supply of animal protein. Furthermore, it is well established that cereal-legume dietary combinations provide an adequate amino acid balance. Thus genetic improvement in both crops would be desirable. The books under review are the proceedings of symposia held to explore the nutritional adequacy of and opportunities for improvement in these two important sources of plant protein.

In *High-Quality Protein Maize*, primary