

the beginning—and this was another major entrepreneurial decision—that NASA's work would be done by contract. NASA would act as an allocating, coordinating, evaluating, and planning administrative superstructure, with manufacturing or hardware largely in the hands of private-enterprise contractors. NASA administrators were thus empowered to create an immense, mission-oriented structure using industrial enterprises as modular building blocks, replaceable—it was assumed—as changing mission strategy required new structure. Conceivably the entire edifice could be disassembled at the will of the public with a minimum of damage to the component parts.

Assuming that this will not be the last of big technology, or of public-private enterprise, something of value might be learned from studying the administrative history of NASA. On the authority of a provision of the Space Act of 1958 encouraging the study of long-range effects of the program, NASA has subsidized the writing of its history. Such an effort can be wasteful of public money if the history is not critical. Rosholt's volume, despite the handicaps that the official historian of contemporary institutions must accept, is substantial and critical.

How did Rosholt accomplish this? For one thing, he makes use of NASA's own self-evaluation studies. In February 1960, for example, NASA contracted with McKinsey & Co. for a management study appraising its contracting policies and, among other things, "the report revealed that NASA's record in managing its contract efforts was spotty" (Rosholt, p. 157). Rosholt summarizes the findings of the report as well as NASA's constructive response. Administrator T. Keith Glennan also had a study of NASA's organization made (the Kimpton Report); it seems that NASA—and Rosholt—made good use of this report, even though, according to Rosholt, the report "has developed the reputation of having been too bland." Rosholt does not make this judgment himself; he gathered this impression from NASA officials he interviewed. This is the other means he employs to write a critical and provocative study. He, like others experienced in oral history, realizes that while the participants in events may not know "why," they do know many of the right "why" questions to ask. Rosholt uses oral-history sources to help him formulate the hypotheses.

Later, historians and social scientists can pursue the leads and test the hypotheses.

Already Rosholt has stimulated a dialogue that might eventually clarify murky issues. In his foreword, Administrator James Webb, after complimenting the author for the scholarly quality of the study, forcibly questions Rosholt's interpretation of Webb's managerial style in the first year or so of his administration. Webb believes that a more penetrating analysis will show the wisdom of the kind of flexible organizational framework he initially provided; Rosholt, according to Webb, believes that a narrower control would have been better. Rosholt is not as dogmatic as this suggests, however, for he usually provides alternative interpretations of controversial subjects. Yet, Webb and his administrators should have the more penetrating analytical studies, and this provocative survey of organizational structure, administrative procedures, and procurement administration of a momentous public endeavor may well bring them forth.

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Wall-less Bacteria

A Microbial Enigma. Mycoplasma and Bacterial L-Forms. YORK E. CRAWFORD, PAUL F. SMITH, CHARLES PANOS, and RAYMOND J. LYNN. World, Cleveland, Ohio, 1967. 274 pp., illus. \$10.

Many investigators concede that mycoplasma may be L-forms in search of a parent bacterial cell and that this is sufficient reason for considering the properties of both forms of cell-wall-less microorganisms in the same context. This monograph makes no such assertion, nor does it attempt to disprove this view. Rather, it brings together detailed information relating to specific areas of current research on these organisms, with no attempt to integrate the diverse material. Each contribution is by an authority in the relevant field and is built around its author's own research interests. This is the intent of the series Monographs in Microbiology, of which this is the first volume.

It is also intended that each contribution contain descriptions of proven techniques that may be used as routine

laboratory procedures. This is exemplified by York Crawford in his compilation of methods found successful for the isolation and identification of mycoplasma of man, primarily those of the upper respiratory tract. Experienced researchers may prefer modifications of these techniques, but Crawford's experience is a good guide for those newly about to venture forth.

Various techniques found useful for serological differentiation of mycoplasma are summarized by Raymond Lynn, whose detailed description of the preparation of antigens will enable investigators to avoid the more common pitfalls associated with obtaining suitable antisera. The more esoteric aspect of serological comparison between L-forms, mycoplasma, and the possible revertant bacteria isolated from such cultures is touched only briefly, for the more recent techniques of nucleic acid homology may give more significant results.

Ranging from the chemical requirements for growth to the principal metabolic and biosynthetic activities, Paul Smith presents an overall view of the physiology of the mycoplasma, stressing those unusual features of the limiting lipoprotein membrane and associated lipids which may allow the mycoplasma to reproduce in an osmotically hostile environment. In contrast, Charles Panos attempts to correlate certain specific properties of stable L-forms with their altered structure and physiology. Of particular interest is his comparison of a group A streptococcus and its derived L-form. The L-form, with its disorganized structure and a much lower growth rate, is nevertheless capable of balanced growth. The ability of protoplast membranes, but not L-form membranes, to incorporate rhamnosyl units, the difference in distribution of monomeric and polymeric rhamnose in the protoplast and L-form, and the elevated fatty acid and increased octadecenoic acid content in the L-form membrane are indications of the bizarre changes that have occurred between the parent cell, protoplast, and L-form. These findings, and many others presented in this volume, will stimulate research to clarify the relationship and role of the wall-less bacteria, whatever their name.

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