Book Reviews

Early Settlements and Their Environs

The Uruk Countryside. The Natural Setting of Urban Societies. ROBERT MCC. ADAMS and HANS J. NISSEN. University of Chicago Press, Chicago, 1972. xii, 242 pp., illus. $17.50.

So long as archeologists conceived their main aim to be the recovery of remains, they concentrated on the sites which would yield the most elaborate remains. In the case of Mesopotamia, this meant tells, which are the sites of protohistoric and historic cities, and, within the tells, temple compounds, where the most advanced examples of art, architecture, and writing are to be found.

Now that attention has shifted from the remains to the peoples who produced them, Mesopotamian archeologists have come to realize that studies of the city dwellers and their temple communities are not sufficient. We also need to know about the country dwellers, who supplied the cities with food and the other materials necessary for their survival.

Robert McC. Adams first began to fill this gap in our knowledge with his *Land behind Baghdad: A History of Settlement on the Diyala Plains* (University of Chicago Press, 1965), in which he studied a sustaining area within central Mesopotamia. Now he extends the same approach to Uruk in lower Mesopotamia, an older and larger urban center which is more representative of the beginning of urbanism. He is responsible for the first half of the present volume; the second half, by Nissen, is a report on the surface collections obtained during the course of the research.

Adams originally planned a long-range program, of which the survey reported in the present volume was to be the first step. He intended to follow up the survey with more detailed, problem-oriented studies of restricted areas, emphasizing the hydrology and ecology of the ancient irrigation systems. Political developments in the Middle East prevented the completion of the project, and Adams stresses the tentative nature of his conclusions.

According to the so-called hydraulic theory, the first cities were able to develop only with the support of large-scale irrigation systems, and the first states arose to meet the need of organizing and maintaining these systems. Adams finds on the contrary that the first Mesopotamian city-states were not accompanied by an extensive system of irrigation canals; such a system did not develop in the Uruk area until the Parthian and Sassanian dynasties, after the time of Christ. The earlier farmers relied instead upon the natural watercourses, though they did modify them, for example, by straightening them and building dikes. They only constructed short offtake canals into the adjacent fields. As a result, the protohistoric and early historic farming settlements were situated along streams rather than on canals, as the hydraulic theory assumes.

Adams further concludes that swamps were much more widespread in lower Mesopotamia during protohistoric and early historic time than they are today. At that time, the Uruk countryside consisted of a complex mosaic of three kinds of microenvironments: agricultural land; steppes, which were suitable only for grazing; and swamps, from which the inhabitants obtained fish and fowl for food, reeds for making baskets and buildings, and fodder for their livestock. The parts of this mosaic shifted frequently in the absence of an extensive irrigation system. Sand dunes, which are now a prominent feature of the landscape, are believed by Adams to be largely a consequence of draining of the swamps by construction of the recent irrigation systems.

The Uruk area seems to have been originally settled between the middle of the fifth and fourth millennia B.C. by farmers and herdsmen who lived in widely scattered villages and small towns. The numbers of these settlements increased markedly during the latter part of the fourth millennium B.C. and they began to be clustered in areas of favorable water supply. At the same time, Uruk itself began to achieve urban status, apparently because the people in its vicinity were attracted by its importance as a religious and commercial center. Other cities subsequently came into existence in a similar way, with consequent depopulation of the surrounding countryside. By the end of the third millennium B.C., as a result, the entire population of the Uruk area was concentrated in a relatively small number of cities. Even the farmers seem to have lived there and to have cultivated only the fields within walking distance of the cities. They lacked an irrigation system which would have enabled them to extend their farms beyond the local microenvironments.

It was not until the second half of the third millennium B.C. that the population expanded any distance from the cities into the surrounding countryside and an artificial system of canals began to be constructed. These developments were soon aborted, however. Primacy shifted from the Sumerians in southern Mesopotamia to the Babylonians in the central part of the valley, and there was a marked decline of population in the south, which was not reversed until Parthian time.

Although these conclusions are tentative, there can be little doubt that previous archeologists have been mistaken in projecting modern ecological conditions, the present irrigation system, and the contemporary settlement pattern back to Sumerian time. Contemporary conditions cannot be used to explain the rise of the world's first civilization, as the hydraulic theorists have assumed.

IRVING ROUSE
Department of Anthropology,
Yale University,
New Haven, Connecticut

Space Politics

The Russian Space Bluff. The Inside Story of the Soviet Drive to the Moon. LEONID VLADIMIROV. Translated from the Russian by David Floyd. Dial, New York, 1973. ii, 190 pp. $5.95.

This description of the Soviet space program, by a former Soviet science writer and magazine editor, is packed with interesting stories concerning the activities and personalities of engineers, cosmonauts, and political figures. It is at times of only historical interest because the author left the Soviet Union

in 1966 to live in Britain, and even before that his experiences and contacts with the events and developments he describes were very limited; but because of the secrecy surrounding the Soviet space program a Westerner welcomes any glimpse of the Soviet viewpoint and of Soviet options during the early years of the space age.

The hero of Vladimirov's epic is Sergei Korolyov, the chief designer of spaceships, and the villains are the Soviet leaders and their political system. Vladimirov tells how Korolyov carefully studied the well-publicized American schedules of space missions and, by choosing projects accordingly, was able to achieve many "firsts" in space, including the launching of the first satellite in 1957, and to hold many space records until the Gemini program came into full swing. This successful strategy was, of course, popular with the Soviet leaders, so that Korolyov was able to obtain and keep political support and high priority for his programs. In Vladimirov's opinion this led to the illusion that the Soviets were far ahead of the United States, that they were indeed the number-one space power; hence the title, *The Russian Space Bluff*. I do not like the title; it is not descriptive of the book's content, and in fact there was no bluff in the usual sense of the word.

To me the greatest disappointment with the book lies in the author's failure to analyze the launch requirements for going to the moon. Although he argues that the Russians did not have any capability to compete with Apollo in a race to land a man on the moon, he does not mention the need for new large space launchers or any Soviet work on them. Clearly the booster was the key; it must be very large, it takes years to develop and test, and it requires large industrial facilities. Without a new launcher the Soviets were obviously not going to the moon.

The first Soviet test of a new large launcher was the orbiting of the Proton 1 satellite in July 1965. This launcher was in the same class as the U.S. Saturn 1, which had orbited the Pegasus 1 satellite in February 1965. However, a still larger launcher was needed for a manned landing on the moon. The Saturn 5 was first tested by the launch of Apollo 4 into earth orbit in November 1967. Although there have been occasional rumors that the Soviets were developing a comparable launcher, none has emerged.

The Zond 4 (March 1968), Zond 5 (September 1968), and Zond 6 (November 1968) were unmanned tests of circumlunar spacecraft of the Soyuz class that used the Proton launchers, and were obviously intended to lead up to a manned flyby and return mission. After the Apollo 8 circumlunar flight of Borman, Lovell, and Anders in December 1968, this Soviet manned circumlunar program was apparently abandoned; the last two missions, Zond 7 and 8, were flown unmanned in August 1969 and October 1970, yielding results of only minor significance.

The Luna 15 spacecraft was launched by a Proton booster and went into lunar orbit three days before Apollo 11. Although the mission failed, it was clearly a sample-return mission like the later successful Luna 16, and was hastily flown in an effort to detract from the dramatic success of the Apollo program. Vladimirov correctly analyzes this second type of "Apollo spoiler" mission, but he fails to appreciate the importance of the new space launcher. After all, this new Proton launcher soft-landed 1880 kilograms (Luna 16) on the moon, compared with 100 kilograms (Luna 9) for the standard launcher. Even this was far short of that required for a manned landing.

Vladimirov writes of Korolyov's early life and his years in prison, as well as of his rise to fame in the space age as the leader of the most successful Soviet rocket design team. Many of the incidents he relates have not been told before, certainly not by the official biographers. Vladimirov feels that it was most unfair to defer recognition of Korolyov and his achievements until after his death. This kind of secretiveness is indeed a curious practice, since the living leaders of the Soviet aircraft design teams are well known to the world.

Vladimirov is convinced that the effectiveness of Soviet space research is on the decline, and he enumerates four main defects:

> The first is the continual and invariably harmful interference in scientific affairs on the part of political leaders with no understanding of science; the second is the necessity under which scientists work to try and fit all their scientific conclusions—no matter what their branch of science—into the prevailing ideological framework of Marxism-Leninism; the third is the unbelievable conservatism and sluggishness inherent in the country's economic structure which results in a general fear of everything novel or of taking responsibility for possible failure; the fourth is the all-pervading secrecy.

The portrait of scientific research in the Soviet Union is most interesting, although I should have liked to read something about the Soviet attitudes toward their planetary programs, which, as with most of the unmanned missions, are not mentioned.

At first blush it would appear that Vladimirov's statements regarding the unique and dynamic role played by the genius Korolyov in the Soviet space program exaggerate a bit; however, the large number of major failures in the program since Korolyov's death—most recently Salyut 2—lend credence to his argument.

Despite many limitations, this book is important to all who are interested in the Soviet space program, the persons involved, and their motives. It constitutes a valuable and in some ways unique source of information about the Soviet side of the Space Race—one of the principal technological and political themes of the 1960's.

MERTON E. DAVIES
Physical Sciences Department,
Rand Corporation,
Santa Monica, California

Supply Equations

The Energy Crisis. LAWRENCE ROCKS and RICHARD P. RUNYON. Crown, New York, 1972. xviii, 190 pp., illus. Cloth, $5.95; paper, $2.95.

This is a good summary of the current alarm over alleged energy and mineral shortages. The thesis is simple: exponential growth depleting fixed resources equals catastrophe. Probably nothing in it was not said a hundred years ago by W. S. Jevons in *The Coal Question* (1865). Yet known coal resources today are larger by one or two orders of magnitude than they were then. The energy resource in shortest supply, crude oil, was being depleted in 1938 at a higher percentage of proved reserves than in 1972; also iron ore, aluminum, and copper. Prices of "nonrenewable" minerals have tended more to decline in this century than to rise. Obviously something is wrong with the theory. I suggest two defects, each fatal. First, reserves are only the ready shelf inventory of a mineral industry, only a small fraction of a much larger amount known to be in existence, which in turn is only a portion of the unknown and basically unknowable amount in the earth's crust. Second, the idea of exponential growth in the