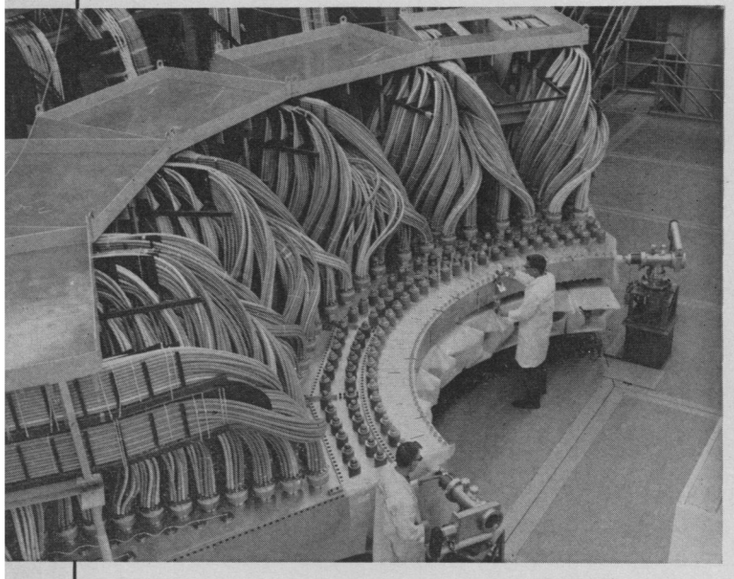
27 December

Energy Production from Nuclear Fusion

A group of four experts in controlled fusion research, headed by Roy W. Gould (assistant director for Controlled Thermonuclear Research, Division of Research, U.S. Atomic Energy Commission) will present a survey of the present status and future prospects for fusion power. Joining Dr. Gould in the symposium entitled "Energy Production from Nuclear Fusion" will be Harold Furth (Princeton Plasma Physics Laboratory), Fred Ribe (Los Alamos Scientific Laboratory), and Harold Forsen (University of Wisconsin).



The Scyllac device. Shown here is the first operational portion. A 5-meter sector of the compression coil (foreground) is connected to the main capacitor bank (not shown) by miles of high-voltage cables. The final Scyllac configuration will be a 15-meter torus, designed to produce a 20,000,000°K plasma and contain it for 250 microseconds. [Los Alamos Scientific Laboratory]

The long-term goal of controlled fusion research is the development of a source of energy, both compatible with the environment and capable of supplying the world's foreseeable needs for energy. The fusion process promises a source whose primary fuel is deuterium, the heavy isotope of hydrogen, and whose ash is the inert gas helium. There is an ample reserve of deuterium in the world's waters—one percent of it burned with only 10 percent efficiency would provide energy for 7 billion people for over three million years at a per capita consumption twice today's U.S. level.

A general introduction to fusion by Dr. Gould will precede reports on recent progress and future directions in the approaches to controlled fusion presently under investigation in the laboratories, and on developments in the growing area of fusion reactor technology. Dr. Furth will report on steady magnetic confinement research; Dr. Ribe on pulsed magnetic confinement research and on the prospect for laser fusion in which no magnetic field is needed; and Dr. Forsen will discuss reactor technology.

ROY W. GOULD
U.S. Atomic Energy Commission, Washington, D.C.

27–28 December

Astronomy from a Space Platform

An unusual symposium on "Astronomy from a Space Platform" will be held 27–28 December 1971 during the AAAS annual meeting. This symposium is special not merely because of its subject matter, which ranges from tiny photon detectors to giant telescope modules and from astronomical studies of our planetary neighbors to studies of the most distant galaxies and quasars, but because of its objectives and organization.

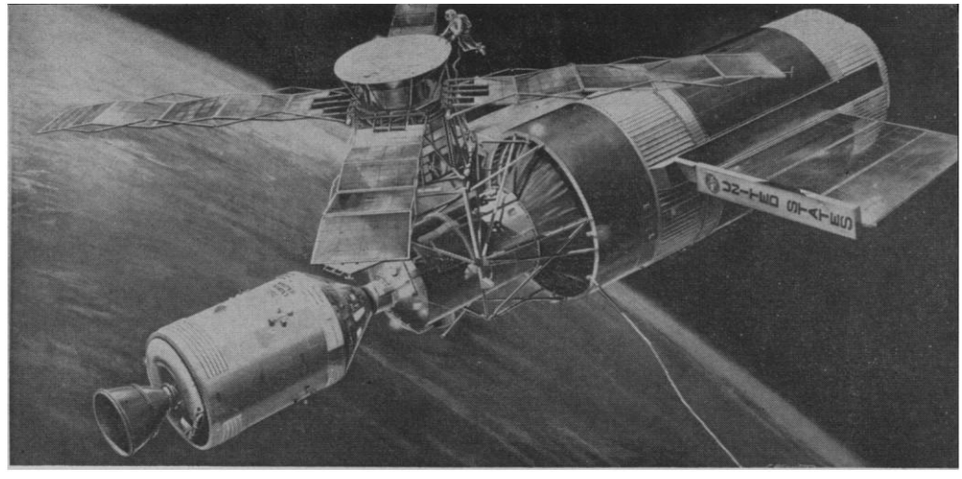
Normally, scientists in a discipline tend to talk mostly to one another. However, for this symposium an attempt has been made to mix and encourage interaction among the groups actively interested and concerned with the future of astronomy. Thus, even within a given morning or afternoon session, one will find talks by one or more leading astronomers, space mission program planners, electronics specialists, optical designers, and operations researchers. Hopefully, this forced interaction will tend to break down the normal barriers between the different disciplines.

Much has been said about the merits and efficiencies of earth-based research in astronomy versus space-based astronomical observations. Both are needed. This symposium will offer a unique opportunity to examine the advantages versus the limitations of space astronomy platforms, and will help arrive at a balanced national astronomy program.

A third concern is for the future of astronomical research programs. There has been growing apathy and questioning by the public of any research program that does not seem immediately relevant to earth society problems. A coherent, long-range program in astronomy, including data from space platforms, is important not merely for the inevitable spinoff of high technology to more applied fields, but because astronomy is basically an integral part of the culture of mankind to be developed just as art, music, and literature. Astronomy and related geophysical sciences will help man understand his solar system, his earth home, and his evolutionary future.

How will the symposium accomplish these goals?

The first morning session will concentrate on planetary and solar astronomy. Carl Sagan (Cornell University) and Frank Orrall (University of Hawaii) will discuss the planetary and solar astronomy objectives, respectively. Gordon Newkirk (University of Colorado) will discuss the necessary solar instrumentation to accomplish these objectives. NASA Skylab program director William Schneider will present the plans for solar astronomy experiments aboard Skylab, and George Ludwig



Skylab space station, including its astronomical telescope mount. [Martin Marietta Corporation]

(NASA, Goddard) will analyze the trade-off between earth-based and space-based data processing in astronomy missions.

In the afternoon, the focus will shift to stellar and galactic astronomy, which will be reviewed by George W. Preston (Hale Observatories) and Arthur D. Code (University of Wisconsin), respectively. Carl L. Kober (Martin Marietta Corporation), a scientist directly involved in Skylab development, will discuss future manned orbital observatory modules, and Peter Simmons (Grumman) will describe future unmanned astronomical vehicles. William F. Hoffmann (Institute for Space Studies, NASA), will examine the next generation of infrared space astronomical instruments and a number of unexpected astronomical discoveries that have been made in the infrared region, while I. Shapiro (M.I.T.) will indicate the potential of very long baseline interferometry for gaining new stellar and galactic data.

Furthering the ecumenical spirit of the symposium, Tuesday morning will feature an examination of new astronomy areas and very large space telescopes. Kenneth I. Greisen (Cornell University) will discuss the astronomy of unusual objects such as pulsars, quasars, and radio galaxies, while Laurence E. Peterson (University of California, San Diego) will describe the High Energy Astronomical Observatory (HEAO), and Herbert Gursky (American Science and Engineering) will review x-ray astronomy, its results and its instruments. Robert Danielson (Princeton University) will describe the increased performance expected from the large astronomical space telescope, while the possibility of directly gathering cosmic ray particles on a space platform as a tool in astrophysical studies will be explored by Andrew Buffington (University of California, Berkeley).

A Tuesday afternoon session on advanced applications and new developments in space astronomical instruments will feature: "Synthetic aperture optics," R. H. Miller (University of Chicago); "Electronic imaging devices," G. Carruthers (Naval Research Laboratory); and "Automation in astronomy," E. J. Wampler (Lick Observatory). Other talks emphasizing new engineering concepts are "Active optics" by Herbert Wischnia (Perkin-Elmer Corporation) and "Technology of space astronomical instruments" by Murk Bottema (Ball Brothers Research Corporation).

A panel, with diverse backgrounds, will review the symposium on Tuesday afternoon and discuss the "Strategies for space-based astronomy." Panel members include Fred Whipple (Harvard College Observatory), Karl Henize (NASA astronaut/astronomer), Arthur Code, and John Naugle (NASA associate administrator). Walter Sullivan (science editor of the *New York Times*) will critique the symposium with comments on the impact of the proposed space astronomy program on our society.

This unusual program has caused a good deal of interest among scientists in several AAAS divisions and promises to be a highlight of the meeting.

GEORGE W. MORGENTHALER
Martin Marietta Corporation, Denver, Colorado

27 December

400th Anniversary of Johannes Kepler's Birth

December 27, 1971, marks the 400th anniversary of Johannes Kepler's birth. He combined imaginative creativity with painstaking industry, metaphysical expectations with physical realism, astrology with astronomy, mystical geometry with numerical analysis, sincere humility with superior achievement—all as a homeless, restless pilgrim in a passionate search for the truth inherent in God's universal order.

Kepler's chief scientific achievement was undoubtedly his laws of planetary motions—just as valid today as at the time of their announcement in the early 17th century. At the same time, he contributed to mathematics and to physics. What was his relation to his contemporaries? to Copernicus? to Tycho Brahe? to Galileo? What role did he play as a scientist at court as the son of a supposed witch?

During 1971 various groups throughout the world are considering such aspects of this man called a "Sleepwalker" by Arthur Koestler. On his birthdate a small interdisciplinary conference will be held at the Franklin Institute in Philadelphia under sponsorship of the National Science Foundation. At its close there will be an open public lecture given by a distinguished historian of astronomy, Willy Hartner (University of Frankfurt).

The following day the chairman of the Advisory Committee, Peter van de Kamp (professor of astronomy at Swarthmore College), will give an address at a meeting of Section L (History and Philosophy of Science) on "Keplerian motions." It will be followed by an address by J. O. Fleckenstein (University of Munich, Munich, Germany) on "Kepler and neoplatonism." Reports will also be made on European celebrations this past summer and on the Philadelphia symposium itself. The Advisory Committee consists of I. M. Levitt (Franklin Institute), G. M. Clemence (Yale University), O. J. Gingerich (Harvard University), C. D. Hellman (Queens College), G. Holton (History of Science Society), A. V. Landolt (Section D, AAAS), E. Rosen (City College of New York), R. J. Seeger (Section L, AAAS), and C. D. Shane (American Astronomical Society).

RAYMOND J. SEEGER
Secretary, Section L (History and Philosophy of Science), AAAS