In the sciences, it was not until the late 1950's that Ohio State began to expand its federally supported research programs at a rate comparable to that in most other Big Ten universities. Research projects administered by the university research foundation rose in total value from about $4 million a year in 1957 to over $10 million in 1963.

Various explanations are put forward for the lag, ranging from an indigenous reluctance to accept federal funds to a simple lack of lab space caused by a lapse in new construction during the Depression years and an unwillingness on the part of the legislature, after the war, to put money into research facilities and researchers' salaries while demands were so heavy for new housing and classrooms for undergraduates and salaries for teachers. It might be noted that an antenna research center was located at Ohio State during World War II. Antenna research had rather limited postwar implications for the institution, while at other universities, notably M.I.T., Caltech, and Chicago, wartime work gave great momentum to later research.

Observers say that a significant change at Ohio State came in the early 1950's when a successful drive was mounted to expand and modernize teaching, clinical, and research facilities at the medical school and medical center on the Columbus campus. The success of this movement is seen as providing a model for later action in behalf of graduate education and research in the university at large.

As has been noted, much of the money in the new state bond issue will go to strengthen scientific and technical education around the state. And while state legislators may grumble, for example, about some professors' getting higher salaries than the governor, the atmosphere has altered, as is indicated by the legislature's appropriating $144,000 in the last session specifically for the hiring of six "Nobel level" professors.

There is some irony in the fact that Ohio seems to be embracing the scientific-complex doctrine at a time when there are signs of a slackening in the defense spending which has largely financed the formation of the scientific complexes. An estimated $1.8 billion will be cut this year from funds for military procurement and research and development. And Defense Department officials have been saying in recent weeks that cuts of about $1 billion a year from the $50 billion a year defense budget are contemplated for the next 5 years. The paring of the budget can be attributed to completion of the planned buildup in both the nation's nuclear arsenal and its conventional warfare capacity, plus Defense Secretary McNamara's economy drive. Neither government officials nor industry forecasters feel that either the civilian space program or the military space program will expand enough in the years immediately ahead to take up the slack produced by the defense budget cuts.

Any significant deterioration in the international situation, or a Goldwater win in November which resulted in major changes in defense or space policy, could, of course, change the prognosis.

The bottom is obviously not going to drop out of the defense business, but the expansion of the past decade, particularly in the high technology sectors of the defense and space industries, appears, as the jargon has it, to have topped out. And this competitive field will doubtless grow more competitive.

Ohio is in a position different from that of California, where remarkable growth has been fostered by the boom in the airframe, missile, and electronics industries fueled with federal funds. Ohio is a major industrial state which has profited in the past and still profits from military contracts but which has a more highly diversified and a much more consumer-oriented industry.

This is not to say that Ohio now necessarily has the laugh on the states where defense business plays a bigger role. Ohio's economic fate is tied more directly to the general economy, and the state has been more vulnerable to the ups and downs of recession and recovery. Several counties in the southeastern part of the state are in poor enough shape economically to be included in the distressed area of Appalachia. And the full consequences of automation have not yet been felt in Ohio's factory towns.

But Ohio has the useful experience and habit of selling to many customers, not just one. The state seems to be adopting a new attitude about educating and using scientists, engineers, and technicians. And with its natural advantages of location and resources, Ohio should be able to trim its sails to meet the new economic weather that seems to be brewing.—JOHN WALSH

Barry Goldwater on Space: GOP Candidate Wants Military, Not Civilians, To Run Space Program

Question: Senator, how do you feel about the program of sending a man to the moon?

Senator Goldwater: Well, if I could pick the man, I would be all for it.

This exchange, during one of Senator Goldwater's whistle-stop appearances in the New Hampshire primary last February, may typify the level of humor to be anticipated in the coming campaign but it considerably underestimates what the impact of Goldwater's election on the space program might be. Far from merely replacing Grissom and Young with Nelson Rockefeller and LBJ in the Gemini capsule, Goldwater would make some fundamental changes in the nature and direction of space and defense policy.

Since Goldwater advocates turning all manned space research over to the military, it is not surprising that his views on this subject find more favor with the Air Force than with the civilian space agency. While there is a good deal of sympathy for Goldwater's views within the Republican Party, it is not reflected in this year's campaign strategy. The platform adopted in San Francisco earlier this month criticizes the Democrats for undertaking a "needlessly expensive crash program" and pledges the Republicans to the difficult if not contradictory goals of "replanning . . . the present . . . program to provide for a more orderly, yet aggressively pursued, step by step development." But the Senator's convictions extend far beyond the platform ambiguities accepted by his colleagues. He agrees with Republicans that the moon program ought to be slowed down, but he has in mind a definition of the term *replanning* considerably broader than that implied in the platform.

Taking as his motto the prophecy of Werner von Braun, the German rocket specialist who has been working for the U.S. since the close of World War II—"I am convinced that it is man's destiny to enter space and that he who controls the open space around us is in a position to control the earth"—Goldwater has repeatedly called for a space program directed by the military for military purposes. Repetition in political speeches may signal a paucity of interests as well as an intensity of conviction, and it is rarely wise to take politicians literally. Nonetheless, Gold-

water seems truer to his convictions than most, and there is reason to think that, if elected, he would try to implement the changes for which he has so long agitated.

The most recent statement of the Senator's views on the space program appeared in the June issue of *Science and Mechanics*, a nontechnical digest customarily devoted to less political topics. (The August issue, for example, features the following articles: "New rifle shoots steel darts"; "You don't have to stay bald!"; "Can your dog read your mind?"; "Looking for a job?"; "Machines that make super muscles"; and "Return of the small screen.") Goldwater suffers from a peculiar liability in that, when his remarks are paraphrased, it almost always sounds as if the person doing the paraphrasing is exaggerating, fabricating, or being invidious. We therefore quote from his recent article, which is entitled "A realistic space program for America."

1) *The moon race.* "The idea that we can cooperate with the Russians to do the job quicker and cheaper and at the same time gain their goodwill is too ludicrous for comment. We are spending entirely too much money on the manned moon program when a carefully plotted program using unmanned lunar landing equipment could steadily build up a body of scientific knowledge about the lunar environment that would increase the safety factor for astronauts much later. . . ."

2) *The military role in space.* "All manned space research should be directed by the military, with national security and control of the access to space as primary goals. The threat from space now and in the foreseeable future is from spatial regions within a thousand miles of Earth and not from lunar distances. Routine daily surveillance of these regions must be established. . . . An immediate initial step of any effective military space program must be a manned station in near orbit about the Earth. . . ."

3) *The nuclear test-ban treaty.* "This treaty is a concession to the Kremlin and thereby gives both political and psychological strength to Khrushchev. He has more than won his demand for a ban on nuclear testing without on-the-spot inspection to safeguard against cheating. Actually there are four basic advantages Khrushchev has achieved through the treaty. Each is reason enough for the treaty to be reconsidered. . . .

". . . Underground nuclear testing . . . provides the Soviet Union with an opportunity to fill a gap in its own nuclear capabilities. . . .

"The development of possible new countermeasure techniques is stymied by the treaty. . . .

"We cannot develop nuclear weapons systems for the control of enemy access to space. . . .

"The Soviets could clandestinely test in the atmosphere, in space, and under water by way of Red China. . . ."

4) *Space and the treaty.* "The argument for the treaty is, of course, that if we cannot test in space, neither can the Soviets. But a possible answer to such an argument is: We have to catch them before we know they're doing it. Although our detection and tracking equipment is tremendously effective, space is unutterably vast. . . . The nation that controls its access, if hostile, could control the world. Control of the world is a stated purpose of the Communists. Control of space in the military sense requires long lead times involving painstaking tests, research and development. When the time comes, we may have effective space systems to deliver nuclear weapons—but not the weapons. The Soviets might have both."

—E.L.

Announcements

Iowa State University will begin a graduate program in **psychology** this fall, leading to the Ph.D. degree with specialization in experimental, quantitative, industrial, counseling, or educational psychology. Emphasis will be on research training, with opportunities for supervised work in the application of psychology in industry and education. Some fellowships and assistantships are available. Additional information may be obtained from W. L. Layton, head of the psychology department, Iowa State University, Ames.

Meeting Notes

Papers are invited for the third symposium on **remote sensing of environment**, scheduled at the University of Michigan, Ann Arbor, 14–16 October. The topics to be included will cover applications for remote sensing, design considerations for sensors and carrying vehicles, and data analysis programs and techniques. Deadline for receipt of abstracts: *1 September.* (D. C. Parker, University of Michigan, P.O. Box 618, Ann Arbor)

The call for papers has been issued for the 1965 **aerospace** conference, next 20–24 June, in Houston, Texas. The meeting will be sponsored by the Institute of Electrical and Electronics Engineers, and will stress aerospace electrical and electronic equipment and systems. Four copies of a 250-word abstract are required. Deadline: *30 September.* (T. B. Owen, Douglas Aircraft Co., Inc., 300 Ocean Park Blvd., Dept. A2-260, Santa Monica, California)

The French section of the Health Physics Society is planning an international symposium on the **dosimetry of irradiations from external sources**, 23–27 November, in Paris. The meeting will consider methods and apparatus for measuring irradiation in man from such sources. The official languages of the symposium will be English, French, and German. (M. Gras, 5 rue Armand Gauthier, Paris 18)

The 24th congress of the International Psycho-Analytical Association will be held in Amsterdam, Netherlands, 25–30 July 1965. The emphasis of the meeting will be on **clinical psychoanalysis**, particularly on technical problems in the psychoanalysis of the obsessional neurosis. Papers may be submitted dealing with theoretical or clinical aspects. A statement of intent, and three copies of a 200-word abstract, preferably in English, are required. Deadline: *15 September*; for completed papers, in the language of the authors' choice: *12 November.* (R. P. Knight, Austin Riggs Center, Stockbridge, Massachusetts)

A symposium on **diffusion in oceans and fresh waters** is scheduled 26–28 August at Columbia's Lamont Geological Observatory, Palisades, New York. It will include papers on diffusion theories, reports of experiments, and special sessions on large-scale oceanic diffusion determined by radiochemical methods. (T. Ichiye, Oceanography Department, Lamont Geological Observatory, Palisades, New York)

A symposium on **marine geochemistry** will be sponsored by the University of Rhode Island, Kingston, 29–30 October. Papers will stress radioisotopes, stable isotope studies, and trace