News and Comment

Moon Race: Russian Disavowal of Lunar-Landing Plans Poses New Problem for Space Program

How can you feel inspired to keep up with the Joneses if the Joneses lie down and call it quits? This is a good piece of the problem that now afflicts the space effort since Premier Khrushchev, this past weekend, said he was dropping out of the moon race and wished the United States *bon voyage*.

Administration leaders promptly replied that the Khrushchev announcement was irrelevant to their plans, which is no doubt true at this point in the costly and controversial space game; but what the cagey Soviet Chairman had to say is by no means irrelevant to the domestic political reality in which the space program must exist. For throughout the short but lively history of the Kennedy moon program, the principal prod to which Congress has responded has been the fear that the Russians would get there first. Now that they say they are dropping out of the race, why should we hurry? The answer offered by the administration is that our space effort has been formulated in terms of what's good for the United States, and that, with or without the Russians, we should move quickly. NASA, in fact, has been fighting budgetary cuts this year with the contention that it is cheaper to go fast than slow, that stretching out the program would actually add to the total cost. This may be the case, but many congressmen, drawing on personal experience that ranges from do-it-yourself book-case construction to the Air Force missile program, are yet to be convinced that speed is an aid to economy.

In terms of evaluating the significance of Khrushchev's declaration, the critical question of course is, Can we believe him? It has been noted by NASA supporters that the Soviets secretly carried out massive preparation for the resumption of nuclear testing in 1961, and, they submit, prudence calls for recognizing the possibility that someday Khrushchev may deposit a Cosmonaut on the moon, and say, "I fooled you." The difficulty here is that NASA administrator James Webb has repeatedly told Congress that he "knows" we're going to win the moon race because the Soviets are yet to show a sign of possessing anything like the gigantic Saturn rocket that we are developing for the moon voyage. Of course, they can guard their intentions, but with the Soviet Union ringed by American radar, it is virtually impossible for them to send anything like a Saturn aloft without producing telltale signs. No such sign has yet appeared, Webb and other space officials have insisted in defense of their contention that massive expenditures will assure us first place, despite the Soviets' early lead. However, with Congress in a mood to save money, Khrushchev publicly abjuring a race, and NASA's earlier statements clearly supporting the Premier's position, it seems quite likely that Congress is going to cut meat as well as fat.—D. S. GREENBERG

Science and the Small College: To Compete With the Universities Colleges Decide To Hang Together

Yellow Springs, Ohio—Midwesterners were enjoying the fine, warm fall weather but worrying a little about an unseasonable dryness turning the woods to tinder last week as faculty members from the dozen colleges of the Great Lakes Colleges Association (GLCA) met on the campus of Antioch College to discuss another kind of drought which seems to be threatening science in the liberal arts colleges.

The GLCA, which is now in its second full year of operation, has member colleges in three states—Antioch, Denison, Kenyon, Oberlin, Ohio Wesleyan, and Wooster in Ohio; Albion, Hope, and Kalamazoo in Michigan, and DePauw, Earlham, and Wabash in Indiana. Representatives of the science and mathematics departments of these 12 diverse and independent-minded colleges were meeting to explore not only how their colleges can cooperate to improve science education but, as more than one delegate put it, "if we can cooperate."

One mark of the meeting was the participants' determination to be ruthlessly realistic in exploring what is generally conceded to be the competitive disadvantage of the small college vis-à-vis the big university in the era of big science. The Antioch talks were based on the following rather grim assumptions. (i) The number of science majors in small colleges has not risen in proportion to the general increase in enrollment; (ii) graduates of liberal arts colleges have greater difficulty in gaining admission to leading graduate schools and doing well there than good students with more specialized backgrounds; (iii) liberal arts colleges are finding it increasingly difficult to hire and retain able and well-trained young faculty members because of inferior facilities, poorer prospects of winning research support, and the absence of colleagues working in their specialties; (iv) professors in small colleges in many cases have failed to adapt their courses and methods to new conditions brought about by improvements in science and math curricula and teaching in the high schools.

As a consequence, the small colleges are finding it difficult to attract the ablest high school graduates interested in science. Such students are lured by the reputations of larger institutions boasting impressive facilities and faculty who have made a mark in research.

If the Antioch gathering had some of the signs of a mutual anxiety society, it should be noted that the colleges involved, though certainly not a homogeneous lot, stand in the upper ranks of small colleges in respect to reputation and affluence.

Some, at least, of its members would be included in almost anybody's list of the top 25 small colleges in the country, and two—Oberlin and Wabash—have been listed in the top 30 institutions, large and small, in point of endowment per student. In addition, conversation at the meetings indicated that, in fact, these particular schools are drawing more rather than fewer science majors these days, are carrying

on active research programs supported by both private and federal funds, and, in the case of most of the member colleges, have ambitious development plans which include substantially more for science. It is the "non-prestige" small colleges—and there are some 1200 institutions of higher learning with fewer than 1000 students in the land—which suffer the deficiencies in their purer forms.

Despite the relative strength of the GLCA colleges, however, the delegates appeared to suffer a shock of recognition when one of the speakers, George E. Pake, a physicist with a big-university background who is now provost at Washington University, St. Louis, gave them a comparative view of science faculty at small and large institutions.

Concentrating on the field of physics, in which he said the contrasts are the most extreme, Pake said that in small colleges salaries are lower, teaching assignments are heavier, less time is available for research, libraries are inadequate, and fewer technicians and secretaries are at hand to help the investigator. In most cases there are no graduate students around, and a scientist is alone in his specialty.

Pake undergirded his remarks with statistics gathered in the course of a study by the American Institute of Physics' committee on physics faculty in colleges. Some 689 institutions were listed as offering an undergraduate major in physics in the 1961–62 school year. Of these, 573 did not offer the Ph.D. degree in physics. The AIP committee visited 26 schools which did not offer doctoral programs.

The study showed, for example, that teaching loads were considerably higher in institutions which stopped short of the physics Ph.D. The average teaching load for the smaller schools was 14 "contact hours" a week, while in the universities which offered doctorates it was 6 hours. The average salary gap was $6000 a year, with university faculty on the long end of the differential.

Pake's figures nevertheless show that, in the early 1960's, some 60 percent of all those completing undergraduate degrees in physics came from institutions which do not offer the Ph.D. and 40 percent came from those that do. The percentages are almost exactly reversed, however, in statistics showing that some 61 percent of graduate students working toward doctorates in physics did their undergraduate work at Ph.D.-granting universities, while the rest came from places where only the bachelor's degree or the master's was offered. As Pake observed, "It is clear that undergraduate students majoring in physics at universities account for a disproportionate number of students going on to the Ph.D."

Pake quoted figures from the graduate department of a leading university which showed that the acceptance rate from students from top universities, other universities, and leading colleges was about 1 in 2 or 1 in 3 applicants, but that only about 1 in 10 applicants from non-prestige small colleges was accepted.

The rate of failure for graduate students in this same department was about 15 percent for students from Ph.D.-granting institutions, 27 percent for those from prestige colleges, and a soaring 70 percent for students from other colleges.

An atmosphere is obviously developing in which bright high school students who might be interested in doing graduate work in physics, for example, are being counseled away from small colleges, and young physicists completing their Ph.D.'s are being warned against teaching in small colleges because it is "professional suicide." Small colleges thus can be said to be getting it coming and going.

This whole analysis of the small-college predicament, of course, is based on standards of "Ph.D. productivity," and reveals what is probably the principal dilemma of the small college, particularly of the science faculty.

On one hand, the delegates at Antioch seemed genuinely committed to the values of the liberal arts college, values descended from the classical ideal of the full development of the individual, of education that is broad rather than narrow. On the other hand, the delegates were judging themselves and their colleges by their success or failure in preparing students to compete with products of highly specialized training for admission to major graduate and professional schools.

As one of the faculty members attending the Antioch meeting put it, "the temptation is to turn out a specialist, a man operating in a very narrow field at a very high level." It should be remembered as well that science faculty members of the good small colleges are themselves products of the university system and are inclined, as one speaker put it, "to create students in [their] own image."

Faced with the competition from the big universities with the big names on the faculties, the big machines in the labs, and (in many cases) lower tuition and costs, the small colleges have been seeking forms of mutual assitance to meet the challenge.

The forms of association vary widely. The Claremont group of five colleges in California provide independent undergraduate programs and a cooperative graduate school. In Massachusetts, Amherst, Mt. Holyoke, Smith, and the University of Massachusetts permit exchanges of students for special work and are collaborating on programs in the graduate area. The University of Nebraska acts in a sort of mother-hen capacity to small colleges in the state, and at Oak Ridge, Tennessee, the national laboratory is a center for nuclear studies for a group of Southern colleges and universities. The Kentucky Independent College Foundation is representative of a mutual improvement association devoted primarily to fund raising.

The Council for the Advancement of Small Colleges (CASC), located in Washington, is a national organization of small colleges—average enrollment, 450—devoted to cooperation to solve the special problems of the very small college in such matters as accreditation, finances, student and faculty recruitment, and curriculum.

The Great Lakes Association bears a family resemblance to the somewhat older Associated Colleges of the Midwest, a grouping of ten smaller institutions in Illinois, Iowa, Minnesota, and Wisconsin which grew on the foundations of an athletic conference and more extensive cooperative experience in other realms than the GLCA started with.

The ACM's most noteworthy mutual effort in science education is its Argonne semester program, which evolved out of an original faculty proposal that the ACM buy itself a cyclotron. Blair Stewart, president of the ACM, recounts that a cyclotron proved too expensive an item, but that in pursuing the matter, an arrangement between the association and the Argonne National Laboratory, which is operated by the University of Chicago, evolved.

Under the plan, three ACM faculty members at a time spend 15 months at Argonne, devoting half their time to

research and half to teaching ACM students in seminars at the lab. Member colleges now send about 30 students a year in two shifts to work at Argonne.

The Great Lakes Association, with its shorter history, seems to be following a pattern similar to ACM's. The GLCA is headed by Eldon Johnson, a political scientist and former president of the University of New Hampshire. He is one of the new breed of educational executives without campus—his office is at Detroit Metropolitan Airport, Stewart's is in Chicago—who, as one observer at Antioch said, "must lead with a carrot but no stick."

Major fruits of the union for science so far are an agreement with Florida State University for marine biology work by both faculty and students at the Alligator Harbor station near Tallahassee and a grant of $213,000 to the association from the Department of Health, Education, and Welfare for a 2-year program of research on self-instruction, including programmed learning. The project director is a psychologist at Hope College, and released time is to be arranged enabling researchers from other GLCA colleges to participate.

The conference at Antioch produced no startling recommendations, which in itself is not startling since the delegates were in many cases meeting one another for the first time.

The conferees did make two top-priority requests, however: (i) that a science coordinator be appointed to work with Johnson, and (ii) that an advisory board of five members representing different institutions be designated to consult with the GLCA directors on matters pertaining to science.

The delegates also gave high priority to exploring ways of giving faculty and students research opportunities in public or private research organizations, and to arranging exchanges of students and faculty between member colleges. A critical joint examination of science curricula was called for, and active recruiting of faculty in cooperation with other small colleges was urged.

While a spirit of good feeling and camaraderie prevailed at the meeting, here is no ignoring that there are difficulties in cooperation. The member colleges are, in some degree, competitors for students and faculty. Small colleges tend to cultivate a strong sense of institutional identity, and there was obviously a wariness felt by some of the delegates that a member college might have to sacrifice some of its sovereignty and style to the collective.

Then there is the question of money. The association is designed to be a "break-even proposition," but joint activities can be costly. It is significant that the conference at Antioch was sponsored by the National Institutes of Health, and it is expected that follow-up conferences may be financed by the National Science Foundation.

These agencies have demonstrated a solicitude for small colleges in such meetings before, and have made special efforts to encourage research through matching grants for equipment and support of institutes and individual research projects. But in comparison to the funds funneled into the big universities, the results have been Lilliputian.

In some colleges there is a stern reluctance to accept federal help and the external influence it is deemed to involve. These scruples are not surprising in colleges which are rooted in a venerable tradition and where faculty and students may still lead a vanishing version of the good life.

Leaving aside the economic trends which seem to be turning the stronger private colleges into schools for the children of an upper-income group, small colleges appear to be at a critical juncture. The emerging question is whether the college can continue to offer a true alternative to undergraduate education in a good university, particularly in the sciences. Many colleges and some inferior universities have never been in the race, and our pluralism in kind and quality may not be all bad. But it seems evident that only by strenuous and probably cooperative efforts can the small college avoid the backwater for the mainstream.

—JOHN WALSH

A View from the Bridge: Politics No Picnic on Banks of Pollution; Strong Federal Agency is Likely

The question in the current agitation about water pollution is simple: Who should compel the cities, towns, and industries which for years have been treating their rivers like toilets to begin the costly work of cleaning them up? The states, under whose benevolent jurisdiction the cozy do-nothing arrangements grew up that produced today's massive pollution, are not anxious to cede their rights to the federal government. The government has had the power to step in in extreme circumstances, or at the request of a state governor, for several years, however; and in a power struggle between the states and "the feds," it is easy to pick the winner. What the question comes down to, therefore, is: Which agency of the federal government should do the enforcing? The victor will do more than preside over a bureaucratic feast, for as different agencies have different clients, characteristics, and definitions of the water problem, the outcome will seriously affect the future of the country's water resources.

The Public Health Service is in charge at the moment, but its claim has been challenged by a cluster of conservationists who have just got through the Senate a proposal to create, within the Department of Health, Education, and Welfare, a special agency devoted exclusively to controlling pollution. Backing the PHS, at lengthy hearings held in June by a subcommittee of the Public Works committee, chaired by Senator Edmund Muskie (D–Me.), were, besides the medical profession, many state and local water pollution officials and representatives of the chemical and paper and pulp industries. Against the PHS were the major conservation associations, organized labor, and some influential members of Congress. Now, pollution abatement is a costly and cumbersome process, about as unpopular with state governments and industries as federal intervention itself: when the victims throw themselves with love on the mercy of their tormentors, it is a safe guess that the knife they feel in their backs has a rubber blade.

And so it has. The 1956 law left major enforcement responsibilities with the states, but authorized the PHS to step in either when pollution became a serious threat to public health, or in response to the request of a state governor. In 1961, because of Congressional displeasure with the PHS record, the responsibility for initiating action was transferred to the Secretary of Health, Education, and Welfare, but the PHS retained its operating functions.

On the whole, state governments did not make federal officials feel very welcome. State sensitivities are injured by allusions to their decreasing competence; and the construction of costly waste-treatment plants to abate pollution means higher munici-