

## Science in the Mountains: NRAO Astronomers to Leave for City

Politicians debating where to locate scientific facilities would do well to consider the case of the National Radio Astronomy Observatory (NRAO), whose scientific staff is about to move from the village of Green Bank, West Virginia, where the observatory is located, to a branch office on the campus of the University of Virginia in Charlottesville. The move is by no means a repudiation of the site, which was selected on its merits by a group of scientists in 1956, and whose physical aptness for radio astronomy has never been questioned. But it is a commentary on the ability of university-bred scientists and engineers to flourish in an isolated community of farmers and lumbermen whose interest in books is confined largely to the Bible.

Green Bank is an unincorporated town with a population of about 250 near the Virginia-West Virginia border. Its nearest neighbor is Arbovale, a village of similar size. To the immediate area, the observatory has brought the families of about 90 employees, for, while some of its recruiting (of clerical, maintenance, and technical help) was done nearby, roughly half of the staff of about 180, including nearly all the top scientific, technical, and administrative personnel, came from other areas. The nearest approximation to an urban center is the county seat at Marlinton, 30 miles away, which has a population of about 1500. Fifty miles away is Elkins, a town of about 8000. Charlottesville, Virginia (29,000), is 100 miles away, and Charleston, West Virginia (86,000), about 170 miles. Washington, D.C., is more than 200 miles away.

Even the distances do not reveal the whole story, for the terrain is mountainous and the roads are difficult. The trip to Washington takes 5 or 6

hours; to Charlottesville, about 2½. In the nonmuddy seasons, light planes can land at a primitive airstrip adjacent to the observatory, and a few commercial airlines service another Virginia town some 1½ hours' drive from Green Bank. But the nearest major airport is in Charlottesville. The observatory itself, which is supported by the National Science Foundation and managed by Associated Universities Inc. (which also runs Brookhaven National Laboratory), occupies about 2700 acres of an area known as Deer Creek Valley. It is enclosed by several tiers of mountains, some rising to 4000 feet.

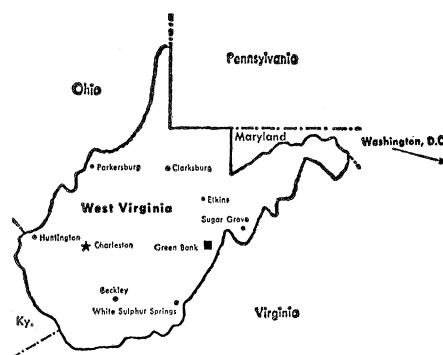
Integrating a small, intellectually oriented community of scientists and engineers into the nonintellectual circles of Green Bank was, inevitably, difficult. Perhaps one of the earliest irritants was the question of the site itself. In that section of the country, coves and valleys contain about the only arable land, and, while most of the observatory acreage was acquired by purchase, some farms had finally to be condemned—a procedure which is rarely unaccompanied by bitterness. Villagers are said also to have felt resentment over what they took, in the early days of the project, to be the feeling of the newcomers that rural farmers were of a different (and probably lower) order of beast than radio astronomers—an impression reportedly furthered by newspaper articles and casual talk suggesting that the scientists were somehow bringing civilization to the wilderness. Even after nearly a decade of proximity, an elementary fearfulness about the observatory appears to remain: as recently as last summer, a group of Pocahontas County farmers reported to their congressman their suspicion that the drought they

had been experiencing was the result of cloud-seeding by the NRAO. "Every time a thunder cloud appears over Cheat Mt.," the letter said, "the plane can be heard flying in that area. . . . Remarks have been made by some that lead us to believe that something is being done to suit just a privileged few." (The charge was unfounded.)

But if there have been difficulties, there has also been a good deal of cooperation. State and local officials were helpful in the early days in developing legislation known as the Radio Astronomy Zoning Act, which affords Green Bank a fair measure of protection against local unlicensed sources of radio interference. Storekeepers welcomed the increased trade. Among the children of the two communities, if not among the adults, there are reportedly spontaneous and unaffected relationships. What is driving the scientific staff to Charlottesville is not tensions in the community, but the scientists' reluctance to pay the personal and professional price that rural isolation, however great many of its charms, entails.

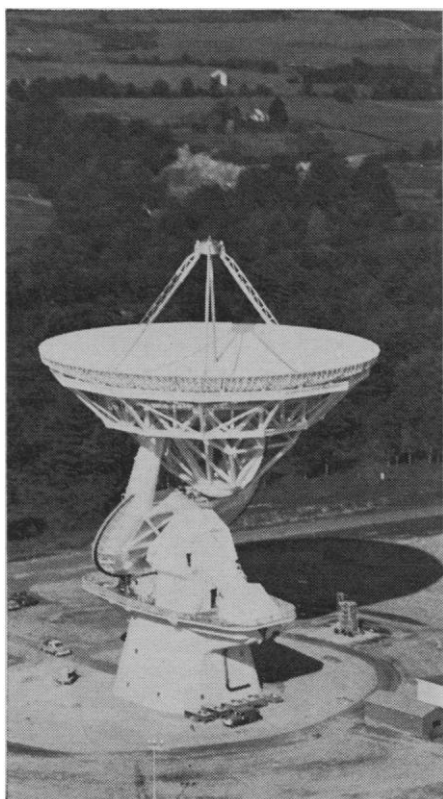
### A Personal Price

It is difficult to generalize about the personal reaction of individual staff members, for no two people have identical opinions. Some of the scientists love the countryside, one of the least despoiled territories in the East, while others are indifferent to its attractions or hostile toward its hardships. Some found their neighbors agreeable, while other described the natives as apathetic or standoffish. "The truth is each group privately thinks the other is barbaric," commented one engineer. "It's the difference between cocktail parties and moonshine orgies."



But apart from the lack of satisfactory social relations (which has meant that observatory personnel tend to do all their socializing with one another), members of the staff appear to feel almost unanimously that schools, medical care, and shopping and recreation facilities were not up to the standards they and their families would like to be able to take for granted.

Every family has a different list of primary irritants. For some, the problem is that the high school teaches no languages, and that the town had no library until observatory wives attempted to organize one. For others it was recreational facilities, and the NRAO staff, again, created a well-equipped sports area for their own use. For many, a major dissatisfaction appears to be the shopping. Recent inquiries produced the following avalanche of complaints: no bookstores within 100 miles, nor a suitable choice of clothing for growing families, nor appliances, nor fresh vegetables (the farmers grow their own and don't sell them), nor any of a range of items, from a particular kind of cracker to certain gourmet delicacies, conventionally obtainable at urban markets



New 140-foot radio telescope at the National Radio Astronomy Observatory.

5 NOVEMBER 1965

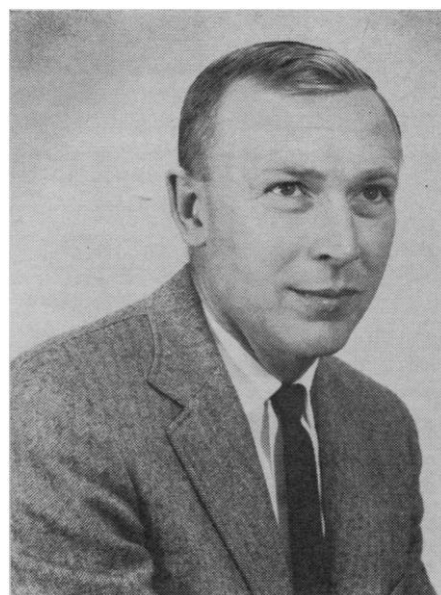
(though the local grocer has attempted to accommodate the varied tastes of his new customers).

A deeper concern is medical care. For certain periods the county has been without a physician, and the intervention of the observatory staff was required to obtain another one. The distance between an expectant mother and her delivery room (in Elkins or Charlottesville) is generally regarded as too great for comfort. The quality of medical care, as well as its availability, is frequently criticized. The complaints may or may not be factually precise—the desire to convey a vivid impression may sometimes produce exaggeration—but they do tell what values members of the observatory staff bring to their environment, and what they consider their environment to be like.

#### A Scientific Decision

Despite these difficulties, the decision to move to Charlottesville was made, not to end the personal trials of the staff, but to further the scientific productivity of the observatory. "It was essentially a scientific decision," said D. S. Heeschen, NRAO director, in a recent interview. The scientific problems posed by the isolation of the observatory appear to have been many-sided.

First was the problem of recruiting. The NRAO has been built up with great care and contains what are acknowledged to be the most sophisticated radio astronomy instruments in the country, including the 300-foot parabolic antenna completed a few years ago and a fully steerable 140-foot dish dedicated last month after a long and traumatic construction history. But even these instruments were not proving sufficient to lure researchers to Green Bank on a permanent basis. "There were two or three people we wanted who just wouldn't come," Heeschen said, "and one fellow who frankly came only in anticipation of the move to Charlottesville." The observatory's generosity in allotting time on the telescopes to visiting astronomers may have contributed to the recruiting difficulties by making it unnecessary for astronomers to settle nearby, and so may the fact that, in the last decade, substantial funding from several government agencies (NSF, NASA, and the Defense Department) has resulted



D. S. Heeschen

in the creation of excellent radio astronomy facilities at a number of institutions across the country. But the consensus remains that there is some work that can be done only at Green Bank—and Green Bank, which was planned as a national center, was scaring people away.

Another effect of isolation on the scientific staff was more subtle. "People began nesting," said one observer. "They weren't getting out quite as much as they should, traveling, talking to people. This is bad in any field." Several staff members spoke of their longing for a more diversified academic atmosphere. "We spend all our time talking to each other," one commented, "I'd like to talk to people who aren't radio astronomers, too." Another described the situation as having a "provincializing effect"—"both our work and our general intellectual life was beginning to suffer," he said. Eventually, the University of Virginia was chosen as the most favorable location for a scientific office, and building plans were made. The move will take place in the next few months. The link with the university will be physical rather than administrative; and the 30 or so top observatory personnel, and visiting astronomers as well, will commute from Charlottesville by car or plane during the periods in which their observing programs are being carried out on the telescopes. The major portion of the observatory's operating and technical staff will remain in Green Bank.

### A Hard Decision

The decision to move to Charlottesville was not made easily. For one thing, a number of people who have been associated with the development of the observatory from the beginning had a personal commitment to the idea that it could flourish as a self-contained institution. It was felt that, particularly during the development period, it was desirable for the scientific staff to be on hand, and it was also anticipated by some that the observatory would grow into a larger and more diversified operation than it has so far become. Whether this was a plausible theory has been a topic of recurrent debate since the NRAO was first proposed. Most astronomy observatories—which, like the NRAO, are necessarily located in out-of-the-way places—have arrangements similar to the one NRAO is establishing, with the observing facilities in a secluded spot and the scientific facilities in an urban center. Most are also affiliated with universities. The major exception to this pattern has been the University of California's Lick Observatory on Mount Hamilton, where the entire operation has been located on the mountain, and there, too, plans are now being made for the astronomers to leave the mountain and establish a scientific branch on the campus of the University of California at Santa Cruz. But at Green Bank the hope for a self-sustaining intellectual community with a constant interaction between the observing programs and the laboratory was very strong, and it has been abandoned only with reluctance.

In addition to requiring intellectual readjustments, the move to Charlottesville also poses some personal difficulties. The fact that some people are going and some are staying tends to create what one observer described as "first and second class citizens" which makes relations delicate among the observatory's staff. Some feel that the move has also confirmed the townspeople's suspicion that the scientists regard them as somehow unworthy, and that they may also fear loss of the extra money that the observatory brings in. (One paradox of the Green Bank situation is that, while it was chosen specifically for its isolation and quiet, its presence has tended to attract certain activities which to some degree impinge on its solitude. A scenic railway has been built nearby, campgrounds and other tourist attractions are being opened, and plans are afoot within the

government for developing a modest tourist center at the NRAO itself.) In all these situations, time and tact will probably supply the healing reassurances. But they will never erase the impression of the emigrants to Charlottesville that the best environment for science is not necessarily the best environment for scientists.

—ELINOR LANGER

### Congress: In Session of Heavy Legislative Output Legislators Paid New Attention to Environment

The 89th Congress had barely ended its first session 2 weeks ago when President Johnson made it clear that the recess will be only a breathing space, and he does not expect the second session to be a pleasant prelude to next fall's congressional campaign, as many roll-call-weary legislators had hoped it might be.

In this recently adjourned session Congress surpassed the legislative output of the preceding session and, in terms of quantity and innovation, rivaled FDR's "first 100 days."

The main legislative events were passage of medical care for the aged and a voting rights bill. Repeal of certain excise taxes was perhaps the chief piece of economic legislation.

Left over—as the President pointed out, striking a note of disappointment—were several items which originally had been given fairly high priority by the administration. Notable among these were repeal of section 14 (b) of the Taft-Hartley Act, which permits state laws banning the union shop; a rent subsidy provision to benefit low-income families; and an increase in the minimum wage. These are controversial measures, and the majority leadership and the administration cannot be congratulating themselves on having permitted them to be held over into an election year when partisan passions rise and labor and welfare legislation is traditionally harder to enact.

The session brought no striking legislative novelties directly affecting the scientific estate, although it was a remarkable year for education and for programs dealing with natural resources and the environment.

#### Education

The Elementary and Secondary School Act passed last spring (*Science*, 22 January) and the Higher Education

Act passed on the eve of adjournment (*Science*, 29 October) shatter precedents. The school bill for the first time makes federal funds available for use in nonpublic as well as public schools, thus breaching—perhaps "bypassing" is a better word—the obstacle of the church-state issue. A main feature of the Higher Education Act is the provision of federal funds for grants to needy students; this is the first time such funds have in effect been made available for scholarships.

A desire in Congress to counterbalance the effects of federal favoritism shown the sciences was at least in part responsible for passage of a bill creating a National Foundation on the Arts and Humanities (*Science*, 1 October). Some \$63 million is authorized during the fiscal year for aid to the visual and performing arts and for scholarships in the humanities.

#### Health

Under the stewardship of Representative John E. Fogarty (D-R.I.) and Senator Lister Hill (D-Ala.), federal funds for medical research made their customary annual advance. The most significant departure in health programs came with the approval of a 3-year, \$340-million program designed, as Fogarty said in an end-of-session report, "for establishment of regional medical programs designed to make the latest advances in diagnosis and treatment available to all heart, cancer and stroke patients throughout the country." These regional medical programs are the result of much-modified recommendations by a Presidential committee (*Science*, 15 October).

Medical libraries were also given a federal boost by approval of grants of \$105 million over 5 years to improve library services and facilities. The object is to encourage the establishment of regional medical libraries.

One of the least controversial bills of the session was the Drug Abuse Control Act of 1965, which amended existing drug regulations to greatly strengthen Food and Drug Administration controls over the distribution of depressant and stimulant drugs (*Science*, 27 August).

#### Resources and the Environment

Prompted, perhaps, by a water shortage in the Northeast and a growing public awareness of the place of pollutants in everyday life, the Congress was extraordinarily active in passing a