

taken from it in the reorganization of the Federal health agencies.

Further, Dr. Marston has hardly been able to clutter his desk in a job for which he has expressed enthusiasm and for which he seemed well qualified.

Wilbur J. Cohen, secretary of Health, Education and Welfare, asked to explain the logic of Dr. Marston's sudden shift, said, "If everything I did were governed by logic . . ." and ended with a noncommittal answer.

But Cohen praised Dr. Marston's achievements and abilities and said he was, if not the only man in the country, then the only one HEW could find with the qualifications and the willingness to take on what President Johnson has termed a "staggering job."

**Nobody in Government** outside the White House and the top echelon at HEW appears to know what happened to the seven or eight so-called finalists, or if indeed they were that final. There is educated speculation that the logic involved in the choice of Dr. Marston may have been the logic of compromise.

Dr. Marston is a proven administrator. The very reasons for his unlikelihood for the post suggest that he was the favorite of no power group.

Health philanthropist Mary Lasker, for instance, has been attempting for some time to have Dr. Michael E. de Baakey, the heart surgeon, named to succeed Dr. Shannon. Opposition to this choice within HEW may have led to the selection of Dr. Marston, whom everyone would be able to accept without losing face.

Dr. Shannon is known to have wanted to name his own successor from within the research establishment, which might not have chosen Dr. Marston, but can accept him for his university background. Dr. Marston came to NIH in 1966 from the posts of vice chancellor of the University of Mississippi, dean of the School of Medicine, and director of the university's medical center.

Initially there was some fear among scientists on the Bethesda, Md., campus of NIH that the appointment presaged a change in the attitude toward basic research which Dr. Shannon nurtured. This is a point on which budget-wary scientists are skittish. The institutes appear this year to be sharing the fiscal fate of basic science generally, having suffered their first budget reduction on Capitol Hill in a decade (SN: 7/6, p. 8).

Further, there is some Congressional dissatisfaction with the institutes' management and independence of higher bureaucratic echelons. This has led to pressure to rein in NIH and make it in fact as well as name an integral part of HEW. Some see Dr. Marston's appointment as in part serving this purpose, and many feared there might be bureau-

cratic insistence on payoffs instead of basic research.

Dr. Marston quickly sought to quiet such fears.

"Working only on things you know will pay off cannot really be called research," he says. Just as great paintings cannot be analyzed according to the artist's economy in using paint, "you have to analyze creative research from the standpoint that its purpose is to look for rare new ideas on the edge of mystery. There is a requirement for research, a climate of creativity, that is different than for service."

Nevertheless, he says, "I have never worked with a scientist who would have been disappointed if what he had discovered turned out to be useful." He points out that the tradition in this country has been to develop institutions that blend research, education and service. In biomedical research especially there is no easy way to draw lines between test-tube experiments, animal experiments, experiments with human subjects, and actual applications.

His reassurances have succeeded in calming the fears of research enthusiasts, at least on the NIH campus. Scientists there show a change from wait-and-see to wholehearted approval of the appointment.

**The recent reorganizations** of the department's health activities added an educational dimension to NIH and a responsibility for the provision of health manpower. As a former academician Dr. Marston should be equipped to develop close cooperation between NIH and the universities.

Other aspects of the reorganization, notably virtual dismemberment of the Public Health Service of which NIH was part, were considered only a partial victory for the independence-minded Dr. Shannon, who would have liked NIH to be as unhampered of overlying bureaucracy as possible.

Dr. Marston believes that his new charge now has enough independence to function effectively. He says what was needed before was organizational access to the political arena, without intervening layers of career civil servants. Now the NIH director reports to the surgeon general, who reports to the assistant secretary for health and scientific affairs, who reports to the secretary, who deals with the White House and Congress.

Dr. Shannon, required to go through several layers before even reaching the surgeon general, whom he regarded as service-oriented anyway, cut all the corners and dealt directly with powerful friends on Capitol Hill.

This was regarded as the stimulator of the Congressional largesse that year after year bestowed on the institutes even more than Shannon officially could ask for.

## COMMUNICATIONS

### Order in the spectrum

The battle over Federal machinery for allocating radio frequencies among users dates back essentially to 1951, when the Truman Administration issued a report which called for a major overhaul.

Since then the Federal Communications Commission, the Director of Telecommunications Management of the Office of Emergency Planning, broadcast executives, engineers, radio astronomers and others have been increasingly critical of both the funds and the machinery to do the job.

The problem could be attacked by reallocating the spectrum more efficiently, or by pushing technology to expand the available channels.

At stake is some \$17 billion worth of industrial and commercial access to the radio frequency spectrum. And any proposal that comes down for reallocation of the limited available wavelengths is bound to meet, as many have, more resistance than proposals for the expansion of technology.

Research and technological expansion are a keystone of the report on the spectrum just issued by a joint committee of the Institute of Electrical and Electronic Engineers and the Electronic Industries Association.

It may also be a main pillar of another report—of a Presidential Task Force on Communications Management—expected to be issued momentarily. At least the same levels of expertise are going into both reports, and Federal communications officials have already indicated their approval of the IEEE/EIA effort.

"**The report supports** everything I've ever said on the subject," comments Federal Communications Commissioner Robert T. Bartley. "I hope it helps Congress see the need."

The six-pound document, based on a four-year joint study by more than 200 specialists in the use of the radio spectrum, recommends a centralized, well-planned engineering approach to spectrum management.

It cites numerous instances of saturation of the radio spectrum:

- Police work in urban areas is hampered because of lack of available radio channels. During emergencies such as riots the police need additional channels which can be kept clear of routine traffic.

- Applications of radio in business have skyrocketed. In some cities, 30 or more different users share the same channel.

- Automobile telephone service is limited to relatively few people since channels are limited.

- Major airports are already over-taxed in handling traffic at busy periods because of lack of channels. Only one two-way conversation can be held at a time on one channel.

- Signaling applications, as distinct from message communications, are limited for lack of frequencies. These include automatic electric power outage reporting, emergency call boxes for highway accident and breakdown and numerous remote control applications, such as circuit breakers, cranes, locomotives and hazardous industrial processes.

In addition to current pressures for additional uses of the spectrum, the IEEE-EIA report points out that new communications techniques will soon be clamoring for spectrum space. Systems for improved highway safety, for instance, will include automatic guidance and control, in-car visual and audible hazard warnings, highway sign control, and computerized traffic flow control, all requiring radio communications.

According to the report, "High density urban living, increased mobility of people, and our natural desire to keep in touch have brought us to the point where there are unsatisfied demands, conflicts and constraints in further utilization of the electromagnetic spectrum."

Says Richard P. Gifford, chairman of the study committee and general manager of General Electric's Communications Products Division in Lynchburg, Va.: "Through the application of spectrum engineering, the economic and social yields from the electromagnetic spectrum (estimated at \$17 billion a year) can be quadrupled over the next 20 years by increasing the use of the spectrum."

**The report**, titled "Spectrum Engineering—The Key to Progress," avoids such political considerations as what type of Government organization or body is needed to do the required job of spectrum management. Instead, the report deals primarily with how the radio spectrum is now being utilized and with the technical aspects of maximizing the effective use of the spectrum.

It recommends increased research to find ways to better utilize those parts of the electromagnetic spectrum that are now largely unused—the ultra high and very low frequencies. The report also indicates a need for increasing our knowledge of man-made radio noise and side effects.

The report calls for the establishment of a central information clearing house on ways in which the spectrum is or can be used, and recommends the formation of a pilot project which would put its frequency selection concept into experimental operation in a trial region.

## Shutdown at Jodrell Bank

Modifications are expected to start next summer on the 250-foot radio-telescope at England's Jodrell Bank. They have been planned for several years.

The modifications, which will take not more than nine months, come after 11 years of virtually continuous operation of the University of Manchester's Mark I antenna. Nearly a million dollars has been allocated by the Science Research Council to cover the cost of repairs and engineering changes.

Besides relieving the stresses on the tracks and towers, engineering modifica-

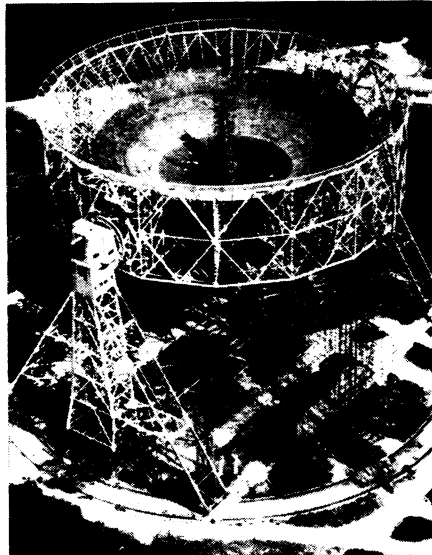
tions are planned to improve the performance of the telescope at shorter wavelengths, particularly the 21 centimeter range, important in determining the distribution of hydrogen in the universe.

Fatigue cracks that appeared in 1967 in the towers carrying the 800-ton bowl have already been repaired; some of the modifications are aimed at preventing new trouble by taking up some of the weight.

During the nine months the 250-foot is down for modifications, many of its programs will be carried on by other Jodrell Bank instruments, especially the Mark II and Mark III radio telescopes, each 125 feet in diameter. Although the international interferometry program to determine the size of quasars will definitely be continued, Sir Bernard Lovell, director of the experimental station, says, exactly which other programs will have to be curtailed has not yet been decided.

"We still have a year before shutdown to decide that," he says.

Dr. Lovell says he hopes some of the foundation work for an additional railway track will be started this fall, but that this should not interfere with the telescope's operation. The two 180-foot cone-shaped towers supporting the 250-foot dish at present roll on a track 350 feet in diameter. The new track will be 76 feet in diameter, and the steel structures on it will relieve about 100 tons of the existing weight.



*Jodrell Bank as it neared completion*

## FOOD IRRADIATION

### Throwing out the bacon with the ham

Two years ago the Food and Drug Administration gave its blessings to the Army's use of radiation to preserve canned bacon. The Army and the Air Force then fed irradiated bacon to troops at 12 military bases twice during December 1966.

Dr. James L. Goddard, then FDA commissioner, ate some irradiated bacon at Oak Ridge in February 1967, and later in the year ate it again in the office of the then Secretary of Health, Education and Welfare John W. Gardner. Dr. Goddard liked it.

Now ham has queered the bacon. This April FDA told the Army that the data provided in its petition for the high-dose gamma processing of canned ham, which had been under evaluation for over a year, did not establish the ham's safety. The petition was contained in 31 loose-leaf notebooks holding some 10,000 pages of data.

As a consequence of the FDA de-

cision, the Army has announced that it will stop serving irradiated bacon. The FDA has let it be known that it plans to rescind the permission it issued earlier on irradiated bacon.

The turndown of the ham precipitated hearings by the Joint Committee on Atomic Energy on the entire subject of irradiated foods. The committee wants to know, among other things, why the FDA had earlier approved irradiated bacon and now rejects the irradiated ham.

Dr. Daniel Banes, associate commissioner for science of the FDA, explains the shift in attitude as the result of better data. "We apply our best judgment based on the facts available to us at any given time," he says. "We always bear in mind that we may have to change our conclusions in the light of later information."

The later information is the data supplied with the petition on ham which