FROM NORWAY

## Seismic Station

Plans by the United States Advanced Research Projects Agency (ARPA) for a seismic station in southern Norway have run into Swedish criticism.

The ARPA station would be similar to the giant Montana Large Aperture Seismic Array (LASA) station (SN: 12/26/66), though smaller, consisting of 10 subarrays each with 21 seismometers and covering an area some 200 kilometers in diameter.

**The problem** is that there are at least two other seismic projects planned in Scandinavia, including Finland. The Swedes want to set up a medium-sized station with 16 seismometers, while there is a Nordic project for a station in Finland.

Prof. Markus Bath of Uppsala University, a Scandinavian expert in the field, has asserted that, first, the multiplicity of projects is a waste of money (American, fortunately, he adds), and, secondly, that Norway is the worst area in Scandinavia to site a seismic station, partly because of proximity to the Atlantic and partly because of the complex configuration of the terrain. Research in Scandinavia has shown, says Bath, that Sweden is a better site, while Finland is clearly best.

Dr. Harry Sonnemann, assistant director of ARPA, recently in Norway, claims that the station in Norway is necessary to complement the Montana station. It will cover the same area, so that results can be compared. He believes the wave noise problem in Norway can be overcome.

Sonnemann, who returned to Washington this month, says there are any number of suitable areas in the world for the location of such a test station. Any area that would overlap the Montana array's detection area would enable seismologists to verify the readings gained in Montana. "The rest of the worldwide seismic net is not sensitive enough for this job," says Sonnemann.

**The reason** Scandanavia was picked, however, was that it is also an area in which significant competence in seismology already exists.

The U.S. Department of Defense is prepared to spend some $8 million to $10 million on the new experimental array. It is unable to move, however, without still-pending approval of the Government of Norway.

The array will provide coverage, hopefully sensitive enough to discriminate between natural seismic events and underground nuclear explosions, in a range between 3,300 and 10,000 kilometers, says Sonnemann. He does not rule out, however, the possibility raised by Prof. Bath that readings could be made as close in as 1,000 kilometers, which would sweep in Soviet atomic tests at Novaya Zemyla. *H. J. Barnes*

FROM ENGLAND

## British Favor 300-Bev

Although the British government has still not openly declared its support for the proposed 300-Bev proton synchrotron that European physicists wish to construct, it appears to favor the project. Only two years ago its attitude was distinctly cool.

The French on the other hand have come out definitely in favor.

**Britain's attitude has** undoubtedly been influenced by her current efforts to join the European Economic Community. A powerful argument has been the contribution she could make towards a technological bastion against U.S. industry. For this reason the decision to contribute towards the £150 million ($420 million) the machine will cost (spread over 10 years) is likely to be taken at cabinet level.

At the same time there will be a strong political bid to have the machine built in Britain. From over 100 possible sites originally investigated the list has been whittled to nine, with one British entry, at Mundford, 55 kilometers from Cambridge and 130 km. from London. This list will probably be reduced to three by the end of the year, with the final decision taken by the CERN Council early next year.

**One change** that seems inevitable if Britain is to become the host is in tax concessions. The British Treasury now makes none of the concessions that allow international organizations like CERN, UNO, WHO and FAO to enjoy tax-free privileges in their host nation. As a consequence, Britain is at present host only to the International Maritime Consulting Organization (smallest of the international bodies), and to the Dragon high-temperature gas reactor project (to which she contributes the lion's share). As the CERN Report on Sites for the big machine remarks (SN : 7/8), "one is referring to an accelerator ten times larger than the largest existing AG (Alternating Gradient) machine in the world . . . a very difficult project near the limit of what is technically possible."

This is underscored by preliminary plans, roughed out by Dr. D. B. Thomas of Britain's Rutherford Laboratory, for a bubble chamber of revolutionary concept for the machine. Some 25 meters in diameter and seven meters deep, it would hold 225 tons of liquid hydrogen. A superconducting magnet, Thomas proposes, would surround this chamber, providing a field strength of 70 kilogauss.

**Fine laser beams** crossing the chamber would provide the reference lines on subsequent photographs, while a linear induction motor is suggested to operate the piston compressing the liquid hydrogen.

The cost of this ensemble of advanced technology has not yet been estimated but a similar chamber with only a tenth the volume of liquid hydrogen is £8-9 million—$22 to $25 million. *David Fishlock*

FROM ENGLAND

## Instruments: Lab to Shop

A family of instruments that operate in the submillimeter region of the electromagnetic spectrum is under development at Britain's National Physical Laboratory at Teddington near London. The frequencies can be regarded either as very short microwaves or longwave infrared: 0.1 to 1 mm in wavelength.

This work is directed by Dr. Alastair Gebbie, who heads NPL's advanced instrumentation unit. Dr. Gebbie, a spectroscopist, is a fervent enthusiast for the industrial application of techniques and apparatus developed for scientific needs. And his laboratory, now directed by the Ministry of Technology, is getting "all the encouragement we need to soil our hands."

One submillimeter instrument measures the dimensions of white-hot steel billets to within a few thousandths of an inch. The hot steel, a perfect reflector of this radiation, is arranged as one mirror of an interferometer. The second mirror, remote from the steel, carries a micrometer. Although the interference pattern is not visible its principal maximum is easily detected.

**The same technique,** using wideband radiation, is being applied to in-process gauging—of metal in a lathe, for example. The radiation is used as invisible calipers to continuously measure the metal's diameter without interfering with the cutting process. Water-based cutting fluids present a problem since water strongly absorbs this wavelength, but the fluid can be kept clear of the region being measured by an air jet. The long wavelength, unlike optical frequencies, is unaffected by vibration.

A third application of submillimetric waves under development is its use in far-infrared spectroscopy to analyze molecules containing heavy metal atoms, specifically uranium hexafluo-

(*see p. 141*)