

chemistry, Cornell University, "it would be more than an order of magnitude better than anything done so far."

The rumor gained currency with a report that the Cambridge Molecular Biology Laboratory under the direction of Nobelist Max Perutz had achieved a "breakthrough in virology . . . with creation of a very high resolution electron density map of the tobacco mosaic virus."

The report—which achieved the stature of print—quotes the laboratory as saying that individual molecules (not atoms) within the virus can be seen on the map, and says the achievement will give biologists their best understanding yet of the mechanism of viral self-assembly.

"Complete rubbish," says Dr. Perutz. "Complete rubbish. I can't imagine where the information came from."

Dr. Perutz explains that he himself is working with the structure of the red blood pigment hemoglobin and is about to publish some results. He says, however, that a colleague at his laboratory, Dr. Aaron Klug, is working with tobacco mosaic virus—among several other viruses.

Dr. Klug is working on the three-dimensional visualization of such structures as virus particles, using techniques for manipulating photographs taken with the electron microscope. Dr. Perutz says the visualization techniques being worked out by Dr. Klug have great potential value for the study of structures, but so far they have not been used to reap practical results.

"The pictures taken so far are very pretty," Dr. Perutz says. "But they show no more than was already known."

#### LAST LAP

### Gravity waves evidence

The long search for gravitational waves (SN: 4/27, p. 408), which scientists have believed for 50 years should exist but never were able to find, may be in the final lap.

The latest report on detection of events possibly caused by gravitational waves, from Dr. Joseph Weber of the University of Maryland, moves somewhat closer to definite commitment. Others using the same experimental information would probably have been even more definite.

Gravity waves would be a gravitational analogue to the electromagnetic waves, such as radio, light and X-rays.

Dr. Weber's cautious report reverses the language of the one he made in March 1967. Then he said:

"The possibility that some gravitational signals may have been observed cannot completely be ruled out."

His judgment now is that his instru-

ments, which operated 24 hours a day for several years, respond about once a month "to a common external excitation which may be gravitational radiation." Observations of other events made in the two months since he submitted his report to the June 3 PHYSICAL REVIEW LETTERS have not changed Dr. Weber's mind.

However, he will not make a stronger statement at least until the results of other tests now underway are available.

If these results are negative, then Dr. Weber and his co-workers, or others in the field, may be able to pinpoint the cause of the events so far recorded by his instruments.

One experiment in progress is a search over other frequencies and bandwidths than those already detected, including the pulsar frequencies ranging from 40 to 1400 megahertz. Another is the separation of the two detectors over a distance of 700 miles between Argonne, Ill., and College Park, instead of the slightly more than one mile used so far on the Maryland campus.

The existence of gravitational waves is predicted by Einstein's theory of general relativity. Any mass that is accelerated should generate gravity waves.

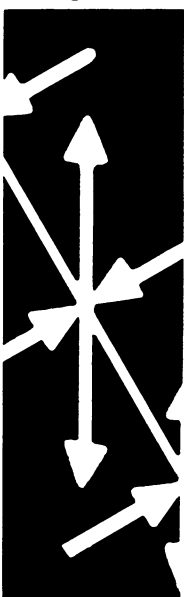
Dr. Weber's instruments to detect gravity waves are based on the small effect they are predicted to have on a relatively large mass.

The ideal detector for gravitational waves would have several instruments such as Dr. Weber uses spread out over miles in the form of a cross. In that way, the source of any gravitational wave could be detected since there should be a time delay between receipt at any antenna compared to the next in line.

Dr. Weber has taken a step in this direction by separating his two instruments by 700 miles.

Rotating binary stars or, perhaps, other galaxies like the Milky Way but far beyond it, or the center of the Milky Way itself, are likely sources for gravitational radiation.

The absorption cross section of a gravitational wave detector is proportional to its mass, the largest that can now be instrumented being the earth, though there are plans to plant such an instrument on the moon. Observation of coincidences would indicate gravitational radiation.



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