

location? Michaelson and Raftery now report that it is.

They have shown that the purified receptor macromolecule contains not just the specific acetylcholine binding site, but also the molecular elements necessary for ion translocation in order to depolarize the muscle cell membrane and lead to muscle contraction.

First they isolated the acetylcholine binding molecule, which is composed of several polypeptides. They combined the molecule with lipids from the muscle cell membrane. The combined molecule and lipids acted like a model membrane, with the acetylcholine receptor end of the molecule oriented outside the membrane. They put sodi-

um chloride and acetylcholine in the presence of the model membrane. The receptor molecule in the membrane recognized acetylcholine, and upon recognition, sodium ions passed through the membrane.

"This represents," the biologists declare, "the first clear demonstration that an acetylcholine-binding protein contains all of the molecular machinery necessary for membrane depolarization."

The investigators will now try to identify the molecular features of the acetylcholine receptor that induce sodium ions to pass through the membrane and to trigger membrane depolarization. □

A second steady weather satellite

The second step toward a unified, worldwide, day-and-night weather satellite network is now scheduled for Jan. 30, with the launching of SMS-B, the second Synchronous Meteorological Satellite. By the end of this decade, with luck and international cooperation, there should be a chain of five such weather-watchers, spaced approximately equidistant over the equator, each hovering over a fixed spot on the surface.

The key word is "hovering." Most weather satellites move in their orbits relative to the earth, so that if they spot a developing feature such as a hurricane, they must wait until they come around again to see how it is progressing. A synchronous satellite simply sits in its assigned position and stares as the weather evolves beneath it.

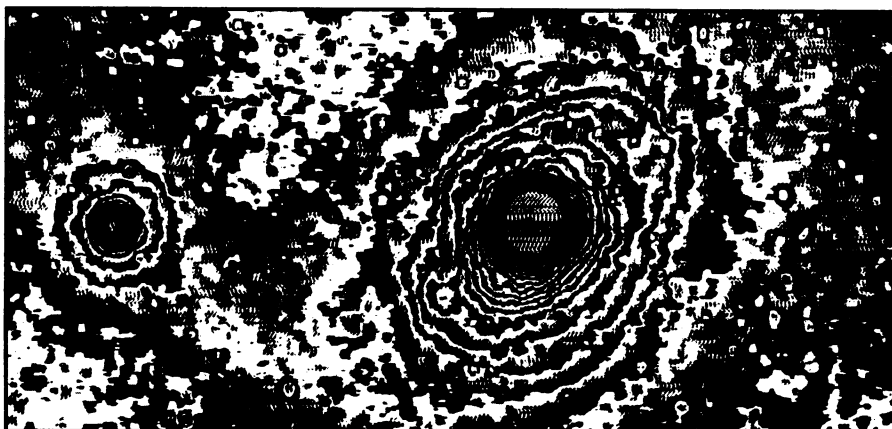
This is why so much attention has been paid to the synchronous Applications Technology Satellite, ATS-3, even though weather-watching is but one of its many roles. Even the daily satellite photo provided to television news programs comes not from the TOS, TIROS, Nimbus or other "official" weather satellites, but from ATS-3.

Recently, however, this was changed. The National Oceanic and Atmospheric Administration began providing these photos from a synchronous, full-time weather-watcher: SMS-1, the first step in a global weather network. Besides providing daytime images four times sharper than those from ATS-3, it has the additional advantage of infrared vision, so that it can keep up its vigil by night as well.

When the network is complete, it should include two satellites from the United States, followed beginning as early as 1977 by one from the Soviet Union, one from Japan and one from the continental collective known as the European Space Research Organization. The second U.S. link is scheduled for Jan. 30—but it may end up being only the first.

SMS-1, although its photography won resounding praise during the huge GATE experiment in the tropical Atlantic last summer, is having its problems. In the first place, it's not quite synchronous—it moves slightly in its orbit. Intended to hover at 75 degrees west longitude, or about the same meridian as New York City, it ended up due to launch vehicle problems at 72 degrees and in a slightly elliptical orbit that lets it wander a bit. Flight controllers are trying to get the orbit "tuned up," but now there is a more ominous difficulty: transmission difficulties, suggesting that the prodigal

Redshifts, galaxies and bridges



Isodensitometer image shows connection between NGC 7603 and its companion.

For cosmologists contemplating the expanding universe, the redshifts in the spectra of the light from distant objects remain the major data. The argument is that the redshifts are Doppler shifts, the result solely of difference in motion between our galaxy and the distant one. If they are not, a lot of cosmological calculating goes down the drain. There is an argument, and the latest contribution is an attack on an attack on the Doppler shift concept.

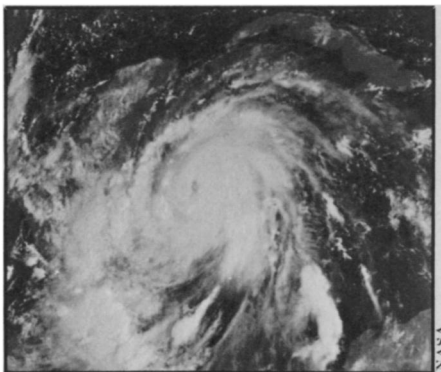
In an expanding universe every galaxy will appear to be receding from every other galaxy. The farther any galaxy is from any other, the redder will its light appear to observers in the other. So the redshifts are used to determine the distance of the objects and various things about the shape of the universe and the curvature of space.

Astronomers who suggest that other mechanisms may be contributing to the total redshift, and the redshifts should therefore not be so trustingly accepted as distance indicators, look for instances of links between galaxies of discordant redshifts. Some time ago Halton C. Arp of the Hale Observatories presented evidence for bridges between the galaxy NGC 7603 and a

smaller companion and between NGC 4319 and Markarian 205.

Now a second look has been taken at those two instances (with a third possibility added, the group called Seyfert's sextet) by Merle F. Walker of the Lick Observatory, C. D. Pike of the University of St. Andrews in Scotland and J. D. McGee of Imperial College, London. They used an electronographic image converter, in which the incoming light is converted to electrons which are then imaged on a cathode screen or emulsion by electromagnetic fields, because this method is more efficient at showing faint objects than direct photographs. Their report is in the *ASTROPHYSICAL JOURNAL* (Vol. 194, p. L125).

They find no evidence for bridges in the case of NGC 4319 or Seyfert's sextet. A bridge does appear between NGC 7603 and its companion, but Walker, Pike and McGee are not sure that this too is not a projection effect, a case of the smaller galaxy lying in front of a spiral arm of the larger one. There is no evidence for a physical interaction between the arm and the small galaxy. On the whole the three observers are skeptical of bridges between galaxies of discordant redshift. □



SMS-1 monitored 1974's Hurricane Fifi.

probe may not be long for this world.

If SMS-1 is still working over the Atlantic on Jan. 30, the second satellite will be aimed at 120 degrees west longitude, where it can cover the Pacific Ocean (its original target was 135 degrees west) but still be within moving distance of the Atlantic in case its predecessor fails. If SMS-1 has already died by launch time, SMS-B will be sent to 95 degrees west, where it can provide more centralized coverage of North America while still keeping a close eye on the hurricane breeding grounds of the Atlantic.

In June, a third satellite is to be launched, depending on the condition of the other two. NOAA expects SMS-1 to be ineffective by then, so the newcomer will probably take up the Atlantic job, while SMS-B is shifted to its originally planned 135-degree position southeast of Hawaii.

Besides taking pictures, the new probes are equipped to gather data from thousands of seismic, hydrologic and other sensors on the ground—making them a new breed of weather-watchers indeed. □

Passing of the AEC

After 27 years and 18 days, the Atomic Energy Commission passed into oblivion at midnight last Sunday, its research and development capacity passing to a new Energy Research and Development Administration (ERDA) and its regulatory function to the Nuclear Regulatory Commission (NRC). Born out of the postwar struggle to put atomic energy under civilian control, the AEC died amidst an acrimonious debate over its safety procedures and charges that it had oversold the usefulness and environmental desirability of its product. By separating regulatory and promotional functions and incorporating development of other forms of energy into the new administration, these dilemmas were theoretically by-passed, and within a year ERDA and the Department of Defense must submit joint recommendations on whether all weapons development should also be separated. □

Radio astronomers trace curve of space

Einstein introduced the idea of curved space into modern physics. Einstein convinced all reputable cosmologists of the rightness of the idea. The observational question is: Which way is the universe curved and how much? Einstein's theory allows any number of both open and closed curvatures, including as one option the flat (Euclidean) space that seemed self-evident to Einstein's predecessors in the days before general relativity.

One possible measuring stick is the apparent sizes of celestial objects. The apparent sizes of objects of the same intrinsic size will vary according to the distance of each one. The manner of the variation is dependent on the curvature of space and will be different for different curvatures.

Attempts to use this method with visible galaxies have not been successful because galaxies vary too much in intrinsic size. In the Dec. 20/27 NATURE Antony Hewish, A. C. S. Redhead and P. J. Duffett-Smith of Cambridge University's Mullard Radio Astronomy Observatory present an attempt using radio sources. Not whole

radio sources, which offer the same problems as galaxies, but small scintillating components of radio sources that are about one second of arc across and seem to be more regular in their size. The apparent sizes of these scintillating components can be measured by a method called interplanetary scintillation, which involves observing the change in their scintillation as they are viewed through different amounts of interplanetary plasma.

The results so far are rather inconclusive, but they are bad news for flat-space believers. They seem consistent with deceleration parameters between one-half and two. If one takes Einstein's cosmological assumptions (others are possible, leading to more complex relationships), that would mean a positively curved, closed contracting universe.

"It is clearly desirable to obtain information on a larger sample of sources," the three observers conclude, "but it is already evident that the angular sizes of scintillating components in radio sources are hard to explain by Euclidean geometry." □

Oak Ridgers explode over name change

There's plenty of energy at Oak Ridge, Tenn., these days, sparked by a surprise name change in the Oak Ridge National Laboratory. Nobody's cheering. In fact, 2,000 of the laboratory's scientists and employees have bombarded Congress with telephone calls, telegrams and petitions protesting the change of the name to Holifield National Laboratory for former Rep. Chet Holifield (D-Calif.). Holifield, who retired this year, was a charter member of the Joint Committee on Atomic Energy, and became its chairman in 1961.

Local antagonism in Oak Ridge is, according to the town's newspaper, the worst public outcry against Congressional action in the community's history. Protesters claim the change is unnecessarily drastic, damaging the long-standing international reputation of the laboratory. They suggest instead naming the center's administration building, presently called "Building 4500," the Holifield Building, or using a hyphenated name (Oak Ridge-Holifield National Laboratory). Others suggest naming the Clinch River (Tenn.) Breeder Reactor, presently incomplete and unnamed, after Holifield. Oak Ridge citizens say the Oak Ridge plant is too historic, that the name itself is unambiguous with the separation of uranium in constructing the atomic bomb. □

A petition carrying almost 40 pages of names acknowledges Holifield's 30 years of service to the development of atomic energy for peacetime use but says "the laboratory should not lose the identification it has so proudly maintained for years."

Sen. Howard H. Baker Jr. and Rep. John Duncan (R-Tenn.) have introduced separate legislation against the change, saying, "there are more appropriate means of recognizing Rep. Holifield than by changing the name of the foundation," but a revote probably will take weeks. The bill slipped through Congress just before the Christmas recess, and was signed into law by President Ford Jan. 3.

Reversals of similar surprise name changes at Cape Canaveral and at the Jet Propulsion Laboratory in Pasadena should give Oak Ridge protesters heart. When JPL personnel protested the change of JPL's name to the H. Allen Smith Jet Propulsion Laboratory, Smith, a California Congressman, sent a bill to Congress requesting his name be dropped from the laboratory's official name. But because the Atomic Energy Commission disbanded last week, the Oak Ridge laboratory will be reprinting its stationery with the new Energy Research and Development Administration letterhead, and will logically, change the Oak Ridge insignia at the same time. □