location? Michaelson and Raftery now report that it is.

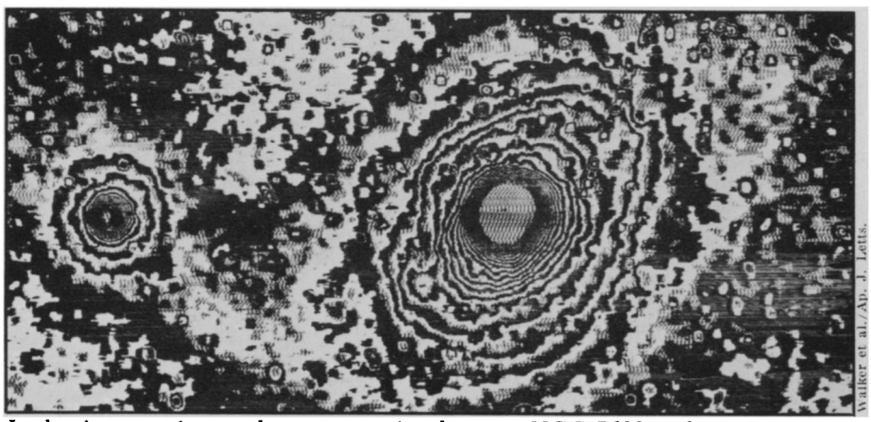
They have shown that the purified receptor macromolecule contains not just the specific acetylcholine binding site, but also the molecular elements necessary for ion translocation in order to depolarize the muscle cell membrane and lead to muscle contraction.

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 sodium 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. □

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. □

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