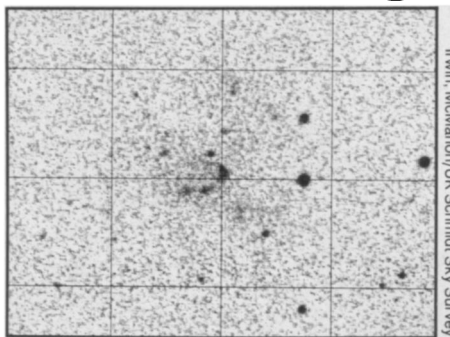


SCIENCE NEWS of the week

Starlight Shadows Protogalaxy Finding

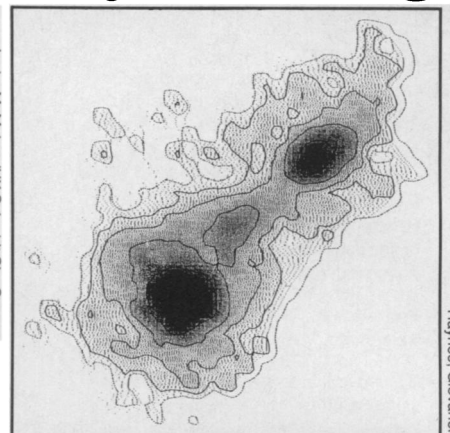
When is a hydrogen cloud a budding galaxy and when is it just gas? That's the astronomical question prompted by researchers with opposing views — and separate radio and optical observations — of a newly discovered celestial object that some believe represents a nearby, late-blooming galaxy.

The news broke last week when radio astronomers announced finding an isolated, apparently starless cloud of hydrogen gas, 10 times the Milky Way's diameter, about to give birth to a galaxy. That interpretation of the discovery excites astronomers because it challenges the accepted notion that all galaxies formed shortly after the Big Bang, some 10 to 15 billion years ago. In addition, the cloud's relative proximity, about 65 million light-years from Earth near the Virgo cluster, puts it "astronomically in our backyard,"



Radio map (right) of elliptical cloud near Virgo cluster shows two intense clumps of atomic hydrogen. Close-up of optical image (above) reveals faint starlight that coincides with one of the hydrogen clumps.

says co-discoverer Martha P. Haynes of Cornell University in Ithaca, N.Y. This



makes possible detailed observations using both optical and radio telescopes.

But previous optical images of the cloud region may give an entirely different interpretation of the object, say astronomers Mike Irwin and Richard McMahon of the University of Cambridge in England. Tipped off last summer that the sky region under study by Haynes and her co-worker might prove interesting to examine optically, Irwin and McMahon scanned photographic plates made in the 1970s and found a pocket of stars in the supposedly starless region. Moreover, the starlight coincided with one of the two clumps of dense hydrogen in the cloud's radio image detected by Haynes and Riccardo Giovanelli at the Arecibo Observatory in Puerto Rico. For Irwin, the finding clinches his belief that the cloud is not a budding galaxy or protogalaxy but just an unusually large gas envelope surrounding a slowly evolving, already-formed galaxy known as an irregular dwarf.

"They [Giovanelli and Haynes] jumped to a conclusion because they did not see an optical counterpart," says Irwin. "Our observation argues for a dwarf galaxy."

Giovanelli says a small pocket of starlight does not eliminate the cloud as a protogalaxy. Astronomers must make further optical measurements, he adds, to determine if the stars actually reside in the cloud and move with it. Optical observations cannot begin until late next month, when the cloud region returns to the twilight sky, McMahon notes.

"Nobody yet knows what this thing is," says Arthur M. Wolfe, an astronomer at the University of California, San Diego. "What's great about this object is it may be appearing now, nearby, as it did in the early universe," notes Wolfe. He adds that the cloud's large size argues against the theory that galaxies form when small shreds of matter collide. "It may not be a bunch of little guys, but big guys, that form galaxies." — R. Cowen

Marker predicts breast cancer recurrence

A mysterious protein whose function has for years eluded scientists — and whose very existence has remained doubtful to some — appears useful as a strong predictor of breast cancer recurrence.

The mystery substance, called haptoglobin-related protein (Hpr), becomes the most recent addition to a growing list of cellular and genetic markers that scientists can use to help predict the likelihood that a cancer has invisibly spread, or metastasized, to distant sites. Physicians and patients need such clues as they decide whether to augment surgical treatment with chemotherapy. Cancer researchers additionally hope such tests may shed light on the cellular mechanisms responsible for metastasis and lead to novel therapies.

Researchers caution they must investigate the new test further to confirm its apparent value. But when applied to preserved tissue specimens from 70 women diagnosed with breast cancer between 1977 and 1985, it proved a potent tool for predicting which of the women would go on to experience a cancer recurrence.

"Women with breast cancer who have this marker are almost fourfold more likely to recur than women who don't have the marker," says Gary R. Pasternack of the Johns Hopkins University School of Medicine in Baltimore, who with Francis P. Kuhajda and Steven Piantadosi performed the research.

Moreover, says Pasternack, "when you combine [the test] with progesterone receptor status, you gain even more predictive power." The absence of receptors for the hormone progesterone has remained

by itself only weakly associated with cancer recurrence. But in their retrospective analysis, the researchers found that 92 percent of women whose cancerous breast tissue tested both positive for Hpr and negative for progesterone receptors experienced a cancer recurrence. Only 20 percent of Hpr-negative women had a recurrence, irrespective of progesterone receptor status.

For years, scientists have remained baffled by the discovery of a human gene whose sequence suggests it codes for a variant form of haptoglobin, but whose protein product long went undiscovered. Normal haptoglobin circulates in the blood, where it mops up hemoglobin leaking from aging red blood cells so the body can recycle the iron in that oxygen-transporting compound. Kuhajda and co-workers finally isolated the variant haptoglobin, called haptoglobin-related protein, earlier this year and made antibodies to it. Their new work, published in the Sept. 7 NEW ENGLAND JOURNAL OF MEDICINE, shows that antibodies to Hpr bind preferentially to breast cancer cells with a propensity to metastasize.

The researchers caution that their antibodies may be binding to an Hpr-like protein rather than to Hpr itself. So while the test appears valuable as a diagnostic aid, it may not tell much about Hpr's true function.

Nonetheless, comments Lance A. Liotta, a metastasis researcher at the National Cancer Institute in Bethesda, Md., "we can see in the future there will be a number of these tests and they'll all be incorporated into a panel of markers" to predict metastasis. — R. Weiss