

PHYSICAL SCIENCES

Dietrick E. Thomsen reports from the meeting in San Francisco of the American Astronomical Society

Color changes on a scale of centuries

Astronomy is perhaps the oldest of sciences. It tends also to be the most historical. It is even hyper or super historical. Many of its processes occur on time scales that are many times the length of ordinary human event spans. Yet in astronomy, history is not only an attempt to discover what really happened and how it affected the development of the science. It can also be a means of throwing light on current investigations.

One example, presented by Kenneth Brecher of Boston University, concerns apparent changes of the color of prominent stars over historical time. The evolution of ordinary stars ("main sequence" is the technical term) proceeds so slowly by human standards that any observers since protohumans swung down from the trees should have seen the same colors as we do.

There are, however, instances of recorded changes in the color of prominent stars over time, Sirius, now white, was seen as red 2,000 years ago. The Chinese document *Shih Chi* from about 100 B.C. records a white or yellow color for Betelgeuse (Alpha Orionis), according to two Chinese astronomers, Lou Jin Xi and Wang Jian Min, who sent this information to Brecher.

We see Betelgeuse as red and so did Ptolemy in his *Almagest* written about A.D. 150. The star would not have evolved that much in about 250 years. But there is a shell of gas and dust moving away from Betelgeuse visible now. Suppose, Brecher says, this shell was ejected from the star about 2,700 years ago as its distance and speed might indicate. That could have heated Betelgeuse's photosphere temporarily so as to make it look white to the observers of the *Shih Chi*. It would have gone back to red by Ptolemy's time. There are other instances of such quick color changes, and appropriate interpretation could yield interesting ideas about short-term stellar activity.

Where Cas A came from

Cassiopeia A is one of the strongest radio sources in the sky. It looks like a supernova remnant, and study of the motions of the matter in it leads to a conclusion that the supernova exploded about A.D. 1667, but there seemed to be no contemporary observation of the supernova or of the star that exploded. Now W. Ashworth of the University of Missouri at Kansas City proposes that the famous seventeenth century astronomer John Flamsteed saw it. There is a sixth magnitude star in about the right position in the 1725 edition of Flamsteed's catalog. Later editors of Flamsteed's catalog erased it, calling it spurious. A supernova would have disappeared from view in the intervening time. Ashworth suggests, therefore, the date of Cas A explosion might be adjusted to 1680, the date of Flamsteed's observation.

Plus ça change, plus c'est la même chose

Finally an instance that may be more heartening for Hans Küng than for modern astronomers. In the 17th century the Roman Inquisition wished to censor Copernicus's book *De Revolutionibus* so that it would teach the heliocentric solar system as hypothesis rather than fact. Owen Gingrich of the Harvard Smithsonian Center for Astrophysics has found from extant copies that the Inquisition was only about 60 percent effective in changing the wording. The change went quite badly in Spain and Portugal where the Inquisition was supposed to be strong.

The issue here, which concerns the difference between fact and hypothesis and between revelational and scientific methods of seeking actuality, is an important philosophical one. What the Holy Office would say about heliocentricity today is not on record. But the 17th century attitude is alive and well in California, where these same distinctions are being used to censor the presentation of evolution in biology texts.

BIOMEDICINE

Brain peptide packs a wallop

One of the more provocative brain proteins to exhibit psychological-behavioral effects is a derivative of two pituitary hormones. The peptide, called MSH/ACTH 4-10, has been found to improve visual retention, reduce anxiety and help concentration in healthy subjects; to improve task comprehension and workshop performance in the mentally retarded, and to improve visual memory in elderly, senile patients (SN: 11/25/78, p. 374). Now its ability to help older persons with mild memory problems has been documented by Allen E. Willner and Charles J. Rabiner of Long Island Jewish-Hillside Medical Center in New Hyde Park, N.Y.

In 1977 and 1978, Willner and Rabiner tested a synthetic MSH/ACTH 4-10 on 40 patients between 60 and 75 years of age who suffered mild memory troubles. Half the patients received the peptide, half the placebo; later in the study, those getting the peptide were given the placebo, and those getting a placebo got the peptide. Results of this double-blind, crossover study have shown that the peptide helped the patients with deep-level processing of memory.

Willner and Rabiner undertook another study in 1977 to see whether a more potent analog of the peptide might bring about memory improvement in such patients. Results of this study, which ended in early 1979, are due in about two months.

Diabetes due to abnormal insulin

A definitive explanation for at least one form of diabetes is reported in the Jan. 17 *NEW ENGLAND JOURNAL OF MEDICINE* by Arthur H. Rubenstein of the University of Chicago School of Medicine and his colleagues. It involves a structurally abnormal insulin with reduced activity.

Actually, the possibility that some diabetes is due to an architecturally abnormal insulin has been suspected for some years, but never proved. Rubenstein and his team report on a patient with maturity-onset diabetes whose condition could not be blamed on defective insulin cell receptors or on autoimmunity to insulin or insulin receptors. Yet the patient's insulin had defective receptor-binding ability, so the researchers suspected that his insulin might have some structural abnormality. Because the patient needed a pancreatic operation, the researchers were able to obtain enough of his insulin to test their hypothesis. They found that the insulin contained one amino acid abnormality in the region where it binds with receptors. They suspect that the abnormality was inherited.

Another bacterial pneumonia

In 1976, a mysterious pneumonia-like illness swept through the American Legion convention in Philadelphia and was named Legionnaires' disease. In 1977, a newly discovered bacterium was found to be responsible for the disease and was dubbed *Legionella pneumophila*. After that, Legionnaires' disease was diagnosed in other victims and *L. pneumophila* was tracked to other locations than the Legionnaires' convention.

Now another bacterial pneumonia has been found. It's called Pittsburgh pneumonia. Last year, researchers reported the isolation of a bacterial agent from the lung tissue of two kidney transplant patients with acute pneumonia that appeared to be different from *L. pneumophila*. The researchers turned the agent over to G. Ann Hébert and colleagues at the Center for Disease Control in Atlanta in hopes that they could identify it. Hébert and co-workers have now identified the agent, they report in the January *ANNALS OF INTERNAL MEDICINE*. It is genetically distinct from *L. pneumophila*, but closely related to two rickettsia-like bacteria isolated several decades ago.