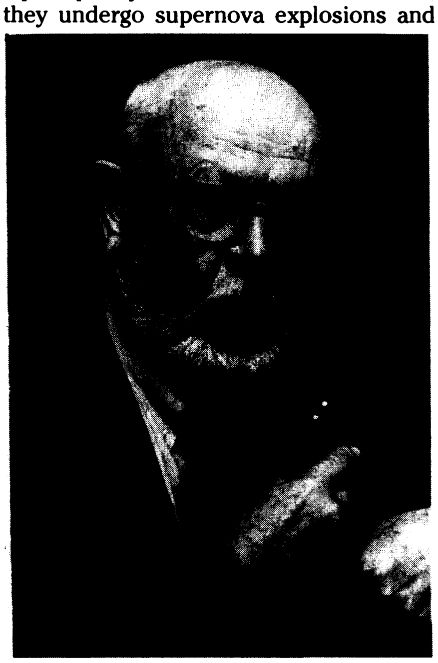
Star works receive physics Nobel

Subrahmanyan Chandrasekhar of the University of Chicago, one of this year's winners of the Nobel Prize in Physics, was quoted as saying that his work tends to become appreciated some time after it is done. In recent years the committee that awards the prize has veered between honoring well-seasoned work and work that was hot off the anvil, so to speak—such as the awards to Sheldon Glashow, Steven Weinberg and Abdus Salam for unified field theory or to Samuel C.C. Ting and Burton Richter for discovery of the psi particle.

The work honored in this year's prize is well seasoned indeed. Chandrasekhar's work on stellar collapse goes back more than 50 years. The work of William A. Fowler of the California Institute of Technology, the other physics winner, on nuclear processes in stars goes back 26 years and more. In the intervening time both contributions have been woven into the fabric of stellar astrophysics like the basic grammatical processes of a language. The famous 1957 paper (by Burbidge, Burbidge, Fowler and Hoyle) in which the main principles of Fowler's thought on stellar manufacture of chemical elements are expressed, is often referred to simply by the initials, BBFH. Every stellar astrophysicist knows which paper is meant.

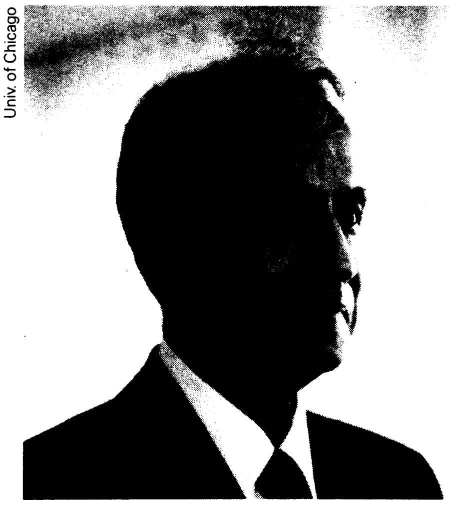
Sometimes, when the committee splits the prize, the pairings or conjunctions seem a bit farfetched. In this case, although the two recipients have not worked together, the relation between their two achievements is close and complementary. Chandrasekhar's work on the collapse of old stars led to the derivation of the Chandrasekhar limit, 1.4 times the mass of the sun. Below that limit stars collapse quietly to white dwarfs. Above it, they undergo supernova explosions and

Wide World Photos



William A. Fowler

Univ. of Chicago



Subrahmanyan Chandrasekhar

leave behind neutron stars or black holes. As sometimes happens in astronomy, after the prediction of white dwarfs, observers went out and looked, and by now they have catalogued a large number of them.

It is in the supernova that the two men's work comes particularly together. Without stars the universe would not have chemical elements heavier than lithium. What Fowler showed was how stars, during their lifetimes and in their supernova death pangs, can produce all the chemical elements we know in the abundances we see.

A native of Lahore, India (now in Pakistan), Chandrasekhar was educated at Cambridge University in England and has been at Chicago since 1946. Fowler was born in Pittsburgh and educated at Ohio State University and Caltech.

—*D.E. Thomsen*

Inorganic chemist wins Nobel Prize

He might have written novels, but instead he studied electrons. "I had intended to be an English major," said the winner of the 1983 Nobel Prize in Chemistry, Henry Taube. But the Canadian-born Stanford University chemistry professor added, "I was so innocent and inexperienced I didn't know how to register. I had a friend who was in chemistry, and he showed me."

The prize committee recognized Taube, 67, last week for his pioneering work in inorganic chemistry and cited his work on the mechanism of electron transfer reactions, especially in metal complexes. "He posed the question, 'How does the electron get from one place to another?' and answered it," said Joseph Earley, a former post-doctoral student of Taube's and presently a professor of chemistry at Georgetown University in Washington, D.C.

Taube contributed to the understanding of both substitution and oxidation-reduction (redox) reactions. He noted that the rates at which substitution reactions occur vary enormously, by factors of a billion or more in very closely related metals, and depend upon electronic configuration. This knowledge allowed him to design experiments that showed, rather than implied, that in some redox reactions electrons do not jump from one complex to another but are transferred by an atom bridge.

Stanford Univ.

Henry Taube

"He bridged the gap between descriptive inorganic chemistry, which is all those reactions one has to memorize in high school and college, with the basic principles of thermodynamics and kinetics," says another former Taube student.

Taube says that the prize was in recognition of his field and not just himself. His colleagues agree that the prize was awarded for his lifelong contributions and not just one experiment. But according to James Collman, also a professor of chemistry at Stanford, "Taube built an edifice, which *is* the field."

—*J.C. Amatniek*

How to enlighten computer logic

Lasers, light-emitting diodes and glass fibers that efficiently transmit their light, have roused the expectation that optical circuitry will someday compete with electronic circuitry in many applications. Light beams moving through fibers will thus do the things that currents of electrons moving through wires or semiconductors now do. All-optical communications circuits are on the verge of existence. All-optical computers will have to wait awhile, but at last week's meeting of the Optical Society of America in New Orleans, researchers from Bell Laboratories and the University of Arizona reported experiments with optical switching devices that could find application in both communications and logic circuits.

These devices use optically bistable devices, that is, they employ materials that change their refractive index under a proper stimulus. Such devices can be used