GENERAL SCIENCE

Stars Feed on Explosions

The British Association for the Advancement of Science at Dublin heard reports ranging from how stars are born to the causes of lung cancer.

➤ HYDROGEN BOMB explosions in the stars furnish the material for the birth of new stars, Dr. T. G. Cowling, professor of applied mathematics at Leeds University, told the British Association for the Advancement of Science meeting in Dublin.

Such nuclear blasts occur in both novae and supernovae, Dr. Cowling reported. In supernovae, the whole star explodes. Supernovae are not only the brilliant ending of one star, but spew into space the heavy elements built up in their cores. This material, mixed with the hydrogen between the stars, is then available to build new stars.

Dr. Cowling reported on the present ideas of where stars obtain their energy and how they evolve. Stellar energy comes mostly from the helium-building process, which also is one source of the hydrogen bomb's fiery heart.

There are two possible helium-building processes that can take place at stellar temperatures. One is the so-called carbon-nitrogen cycle in which three protons add to a carbon nucleus, turning it into an isotope of nitrogen. The addition of another proton then causes a fission, or splitting, giving back the original carbon nucleus and also providing a helium nucleus.

The second method, known as the proton-proton process, is a direct one in which a deuteron, or nucleus of heavy hydrogen, is formed by the collision of two protons. Capture of a third proton gives a helium nucleus of atomic weight three. Two of these then combine in a very fast reaction to give a normal helium nucleus and two protons.

The sun and all smaller stars generate most of their energy by the proton-proton process, Dr. Cowling said. If the sun were initially composed entirely of hydrogen, helium-building could keep it radiating at its present rate for more than 100 billion years before all its hydrogen was consumed. Estimated age of the solar system is about five billion years.

Bright stars must therefore be much younger than the sun or their energy supply would be exhausted, Dr. Cowling said. They must be still younger if they have not shown signs of evolution.

As the bright stars burn up their fuel, they swell up to become giants. It is believed only giant stars burst into supernovae.

Aid for Have-Nots

➤ THE MOST effective way to raise the standard of living for underdeveloped countries outside the Soviet orbit would be gifts or long-term loans of 1,000 million pounds ($2,800,000,000) annually for a decade or two, Prof. P. M. S. Blackett, Nobelist in physics, has proposed.

Stressing in his presidential address before the British Association for the Advancement of Science that the gap between the "have-nots" and the "haves" is widening, Prof. Blackett declared unless there is some drastic action nations like India will be worse off relatively a decade from now. This will be because of the rise in the Western nations of gross income of about three percent a year, or two percent, even allowing for one percent population increase.

The proposed financing of 1,000,000,000 Asians, Africans and South Americans from the 400,000,000 rich Westerners would amount to less than a levy of one percent on the income of the Western donors, Prof. Blackett observed. It would be additional to commercial and government short-term lending.

Reviewing the rise of technology and the industrial revolution, the British physicist concluded that the undeveloped countries need to be given a financial "assisted take-off," to use an aeronautical metaphor, to achieve sustained economic growth. Their need of technical advice from the West has been overestimated, he finds.

To utilize the proposed financial aid, there must be a strong and intelligently directed internal drive for social betterment in the underdeveloped country, he declared.

The Nobelist concluded the traditionally major address of the British science year with a paraphrase of Sir Humphry Davy's comment on Britain's social state at the very start of the industrial revolution:

The uneven division of power and wealth, the wide differences of health and comfort among the nations of mankind, are the sources of discord in the modern world, its major challenge and, unrelieved, its moral doom.

Lung Cancer Complex

➤ THE WHOLE question of lung cancer and its alarming increase during the last half century is "very complex and is unlikely to admit of any simple solution," Dr. J. W. Cook, vice-chancellor, Exeter University, told the scientists in the presidential address of the chemical section.

While Dr. Cook is convinced the balance of evidence is strongly in favor of the view that carcinogenic chemical agents are primarily concerned, he does not lay the difficulty wholly at the door of cigarette smoking. In the present state of our knowledge, he said, it is very difficult to arrange the sources of chemical agents in any undoubted order of importance. Atmospheric pollution may be blamed and some researches, cited by Dr. Cook, connected the presence of benzpyrene, also contained in tobacco smoke, with the possible effect of other smokes, exhaust fumes, etc., in causing cancer.

The worker out of harmony with his job is costly to himself and the community, Dr. H. G. Maule, lecturer in public health at the London School of Hygiene, told the scientists in his presidential address before the psychology section.

Between a third and a quarter of all sickness causing industrial absence can be attributed to psychological rather than physical cause. We may suspect, he said, that some of the labor disputes also have their deeper roots in psychological strains.

Another authority quoted by Dr. Maule estimates the cost of people changing jobs in England is around 700,000,000 pounds, or $1,960,000,000, annually.

Science News Letter, September 14, 1957

CHEMISTRY

Develop Hard Glass for High Temperature Uses

➤ AN ULTRA-HARD glass for high temperature applications has been developed. Already being used in production of laboratory and scientific equipment, the new glass has a softening point of 1,508 degrees Fahrenheit or 820 degrees centigrade, almost as high as the melting point of silver and appreciably higher than the melting point of aluminum. Glass-measuring equipment will remain accurate over wide temperature ranges because of a very low coefficient of expansion.

The glass, designated KG-33, was developed by Kimble Glass Company, Toledo, Ohio, a subsidiary of Owens-Illinois Glass Company.

Science News Letter, September 14, 1957

BLOWING HARD GLASS — Intricate laboratory ware, such as this automatic burette, can be produced which will remain accurate over a wide temperature range. Kimax glass-measuring equipment, developed by Kimble Glass Company, is said to be completely interworkable with other hard glass apparatus having the same linear coefficient of expansion.