transferred to another P.I. and the balance of 0.33 grams still in possession of the P.I. There were no details as to how, for what, or when the 97.683 grams were consumed. There was also nothing to indicate why the P.I. chose to keep 0.33 grams of the sample in his possession for over nine years."

Other cited examples include cases where documentation was inconsistent, changed over time, or failed to properly indicate such problems as samples that never reached their intended recipients. Even the total cited weight of the whole moonrock collection has changed in various accounts, the report alleges, ranging from 384,900 grams (listed in a 1974 Lunar Sample Security Report as the weight "reported by astronauts from the lunar surface") to as little as 381,792 grams (from the Curator's records as of Nov. 13, 1978).

In a response to the report, NASA officials at JSC maintain that many of the cited uncertainties in fact stemmed from inventory and documentation procedures that were used early in the lunar sample program but which were substantially improved in 1972. Individual weighing tolerances, says the JSC response, add up to an overall uncertainty of only plus or minus 26 grams, "as well as an estimated possible total error from initial inventory and early processing of ±490 grams." Changes (due to various factors) in the total estimated sample weight, says JSC, have only made a difference of 0.07 percent from 1974 to 1978.

A letter written by the Southwest Region's director to NASA's newly installed Inspector General since the report came out, however, makes a stronger claim: that the samples whose status, as of the report, was in "the uncertain category" amounted to at least 11,279 grams (about 25 pounds), or 24.6 percent of the portion of the moonrock collection that, according to the letter, has ever been released for distribution.

NASA is now preparing additional response to the audit report's charges, as requested by Sen. William Proxmire (D-Wis.), chairman of the Senate Appropriations Subcommittee that funds the agency. But that is not necessarily going to be the end of the matter. The report covers numerous subjects besides the whereabouts of the moonrocks themselves, ranging from possible conflicts of interest within the panel that selects the sample investigators to free-spending junkets by the contractor employee who manages the curatorial facility. In addition, the report's author has claimed in a letter to Proxmire that previous audits were suppressed by a NASA official, and that "in the past few years both the Regional Director and I were severely harassed about findings put into reports," to the point where the report's author opted for early retirement. It is a thorny matter, with strong language in documents from both sides, and a hearing could conceivably result. For NASA, meanwhile, it's budget time. □

Nobel Prizes: Emphasis on applications

Medicine

Cormack *Hounsfield*

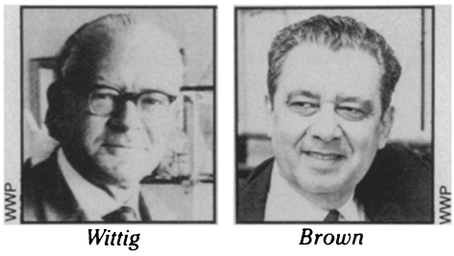
Two researchers who have never met shared the Nobel Prize in Medicine for their work in computer-assisted tomography, a two-dimensional X-ray technique that allows physicians to visualize specific slices of the anatomy in great detail.

Allan M. Cormack of Tufts University in Medford, Mass., and Godfrey N. Hounsfield, an electronics engineer at the British company EMI, received the award for their contributions to what has been described as the biggest advance in medical technology since the invention of the X-ray machine.

The Nobel Committee said that Cormack was the first to "analyze from a theoretical standpoint the conditions for accurate X-ray pictures of entire biological systems." Hounsfield, the Committee said, "made the major contribution to introducing computer tomography into medicine by constructing the first practical system applied to general health care."

The award is unusual in that neither recipient has a doctoral degree in medicine or in any field of science.

Chemistry



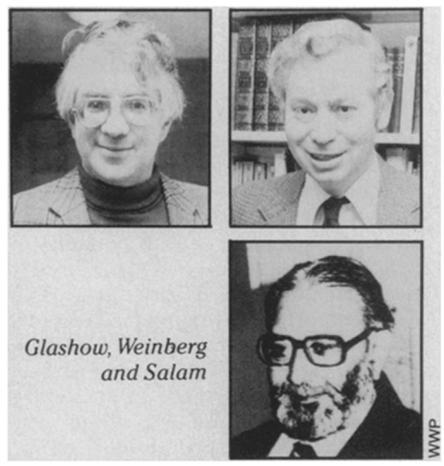
Wittig *Brown*

New vistas in the synthesis of organic chemicals were recognized in the choice for the 1979 Nobel Prize in Chemistry. Herbert C. Brown, now at Purdue University, and Georg Wittig, professor-emeritus at the University of Heidelberg in West Germany, shared the prize for work that has facilitated large-scale manufacture of biologically active materials and that has opened an area of research expected to take another generation of chemists to fully explore.

Brown's research has centered on the chemistry of boron, the element that sits next to carbon in the periodic table. Early in his career Brown, with H. I. Schlesinger, discovered compounds containing only boron and hydrogen, and later Brown discovered important uses for those reactive chemicals. In synthesis of a variety of organic compounds, for instance, he used the boron-hydrogen molecules to temporarily link complex organic molecules until the desired chemical bonds were formed. Boron compounds and related chemical agents are now used in manufacture of cortisone and other drugs as well as in a new class of pesticides. Brown also has investigated steric strain, a force dictated by the spatial arrangement of atoms in a molecule. Synthetic chemists had always considered the strain a hindrance, but Brown demonstrated that it can actually assist some reactions. Brown holds many patents important to synthetic chemistry and is currently a consultant to Exxon.

Wittig is the developer of a widely used step in chemical synthesis known as the "Wittig Reaction." It allows chemists to create almost any olefin—a straight chain hydrocarbon containing a double bond—with the double bond in a desired location. One practical application of this reaction is the synthesis of vitamin A. Wittig also has used phosphorus-containing compounds as a link for synthesizing a variety of complex molecules.

Physics



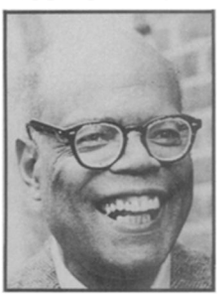
The award of the 1979 Nobel Prize for Physics could easily serve as a commentary on the growing unity of physics. It is given for a major step toward the unification of physics into a single theory embodied in the work of the recipients, Steven Weinberg and Sheldon Glashow (who won the 1950 Westinghouse Science Talent Search contest) of Harvard University and Abdus Salam of the International Center for Theoretical Physics at Trieste. In a way it also reflects the rather clear experimental showing in favor of the theory and the

virtual unanimity and easy speed with which physicists accepted those results.

A unified field theory, a formulation that would include all classes of force and therefore all the doings of physics, in a single framework, is an old dream. Physics distinguishes, or distinguished, four classes of force or interaction between material bodies: the gravitational, the electromagnetic, the weak and the strong. Until recently these forces have resisted attempts to unite them. The approach chosen by Weinberg, Salam and Glashow is to unite first the electromagnetic and the weak interactions, which have promising mathematical and physical similarities, and then go on to the other two if possible.

They elaborated a partially unified field theory that looked attractive as a theory but predicted weak-interaction processes, the so-called neutral current processes, that had never been seen experimentally. Many experimentalists doubted that neutral current processes existed, but in the past few years precise experimentation has found them. Since last summer physicists have more and more spoken of a single "electroweak" interaction instead of the former two (SN: 7/8/78, p. 20).

Economics



Lewis

Schultz

Theodore Schultz and Arthur Lewis share this year's prize for their development of economic theories and models to explain complex interrelationships between the economic-growth potential of developing countries and their investments in people and agriculture. The award is timely, following on the heels of a year-long series of meetings (SN: 8/25/79, p. 131) to explore how developing nations might harness science and technology — particularly agriculture — to speed their entry into the developed world.

Schultz, professor emeritus at the University of Chicago, is known for emphasizing the role of research in providing high-yielding crops to improve a developing nation's economy.

Lewis pioneered in the creation of models to explain agriculture's role in a developing nation's economy and in detailing the trade of raw materials between developing and developed countries. Now a political economist at Princeton's Woodrow Wilson school, Lewis joined the Princeton faculty in 1973, the same year he was knighted by Queen Elizabeth. □

Alcohol brain damage: Circle the wagons

For years it has been reported that chronic alcoholism can cause brain damage in at least some alcoholics. Numerous studies have suggested that alcoholics — perhaps up to 50 percent — who have been drinking heavily for years may develop some cerebral disorder by the time they reach their 40s. Some recent evidence, however, indicates that such alcohol-related brain damage may at least partially reverse itself once the drinker stops using alcohol. One study reported that parts of destroyed brain cells actually appear to grow back after the alcoholic is on the wagon (SN: 6/10/78, p. 373).

Now, a study of 82 former alcoholics and 40 non-alcoholics in the San Diego area reports that men in their late 30s who had been heavy drinkers for about six years are neuropsychologically "normal" even after just three weeks of abstinence. "Ours may be the first detailed study of alcoholics to give them a 'clean bill of health,' neuropsychologically speaking," say researchers Igor Grant and Robert Reed of the San Diego Veterans Administration Hospital and Kenneth Adams of Henry Ford Hospital in Detroit.

The investigators compared alcoholics detoxified three weeks earlier with 39 who had been abstinent for 18 months and 40 non-alcoholics who only drank occasionally. "There were no differences between the alcoholic groups and the comparison group that could not be attributed to normal aging," they report in the October American Journal of Psychiatry.

Each of the volunteer subjects was screened to rule out histories of previous brain damage, serious psychiatric disorder or drug abuse. They then underwent an extensive battery of neuropsychological tests covering a wide range of verbal, motor and intelligence functioning.

The results show that only about one in four men of the two alcoholic groups could be classified as "mildly or moderately impaired." And while this figure is somewhat higher than the 17.5 percent incidence among non-alcoholics, "the proportions of impaired men in each group did not differ significantly," say the researchers.

The findings are "surprising," they say, not only because the alcoholics had been "very heavy drinkers," but because several previous studies of ex-alcoholics had reported some impairment in nonverbal and perceptual functioning. However, Grant says the discrepancies might be traced to his sample's slightly younger age, higher level of intelligence and education or better nutritional habits.

An additional five years of alcohol consumption (beyond 40 years of age) might be critical in developing permanent neurological problems, Grant suggests. But even in these cases, he says, alcohol may not be the only direct cause of such problems.

"Alcohol may not be the only factor involved," Grant told Science News. First, certain individuals may be predisposed — genetically or otherwise — to developing brain deficiencies, and alcohol may or may not contribute to this process at a certain age. "We uncovered more neuropsychological abnormalities in the older [over 40] group, says Grant, "but these deficits were related to getting older in *all* groups, not to differences in alcohol experience between groups."

He also speculates that alcohol may actually "accelerate" the aging process, or that other factors, such as poor nutrition, could be factors — although there was no evidence to support the latter contention in the study. Accidents might also contribute — "Alcoholics get bonked on the head a lot," Grant says.

But overall, Grant and his colleagues found that among their subjects — who ranged up to 46 years of age — "after three weeks of abstinence alcoholics can become essentially normal neuropsychologically ... our findings suggest grounds for cautious optimism that even very heavy alcohol use is not related to neuropsychological impairment in the alcoholic who is in his or her late 30s." He is contemplating a follow up of the group into their 40s. □

L.A.: The city never sleeps

Although much has been learned about the diagnosis and treatment of sleep disorders, comparatively little is known about their prevalence among the general population. With this in mind, researchers from Pennsylvania State University's Sleep Research and Treatment Center in Hershey, Pa., surveyed 1,006 "representative" families in the Los Angeles area.

The study, conducted as part of the 1973 Los Angeles Metropolitan Area Survey, reveals that more than half the adult population suffered at the time or previously from some type of sleep disorder. Among 52 percent (38 percent had current complaints), the researchers found a 42.5 percent prevalence of insomnia, 11.2 percent of nightmares, 7.1 percent of excessive sleep, 5.3 percent of sleeptalking and 2.5 percent of sleepwalking; certain people reported more than one disturbance.

The results "demonstrate that sleep disorders are quite prevalent in the general population, that they often persist for many years and that they are often associated with general health problems, particularly mental health difficulties," say the researchers, headed by center director Anthony Kales. The sample ranged in age from 18 to 80 years and covered a wide range of socioeconomic levels. Insomnia was found to be more prevalent among older, lower income individuals. □