proved its Siamese twin.

Now NIH encompasses the National Library of Medicine and the Bureau of Health Manpower. The combination, when it becomes fully effective, will be able to finance building and operation of a medical school from start to finish.

About 40 percent of the funds for biomedical education come from the Federal Government. The great majority of these funds will now be handled by the new NIH. The nation spends about $1.5 billion each year on biomedical research and education. Forty-seven percent of this goes to educational institutions.

ACS

Battles over genetic theory

It is typical of the American Chemical Society that the most significant controversy at its convention in San Francisco last week should have contributions from a botanist, a physicist, a molecular biologist and a physician. Chemists have to speak all kinds of scientific languages.

The subject, disarmingly presented under the patronage of the society's division of the history of chemistry, was the role of the chemical DNA in the process of heredity. At issue was the question of man's ability to control physical characteristics of his offspring. The issue is one of intensifying scientific controversy; the Federation of American Scientists expects to launch a major confrontation on it at the next meeting of The American Association for the Advancement of Science.

The great advances in molecular biology in the last 15 years, often described as the DNA revolution, come largely from the discovery by two geneticists, Drs. James D. Watson and Francis Crick, that the DNA molecule, thought to be the carrier of genetic information, has a rather simple shape—a pair of strands twined together in a helix, something like a spiral staircase.

From this model, it was found possible within a few years to describe how information is encoded in the DNA molecule by combinations of four different kinds of subunits called nucleotides. The basis for all characteristics of all living matter, it is claimed, is contained in the arrangement of nucleotides in the standard DNA molecule.

The location of genetic information in a specific molecule had led to wide speculation on the possibility of influencing heredity by chemically manipulating DNA. The more flamboyant proponents of this procedure have seen in DNA the means of controlling sex and physical characteristics, preventing allergy, obesity or arthritis and eliminating cancer and diabetes. Such genetic engineering has even been suggested as means of increasing intelligence and preventing mental illness. These predictions, Dr. Barry Commoner of Washington University in St. Louis complained to a packed ACS audience, are a cruel mockery of human hopes.

The fact is, says Dr. Commoner, who is chairman of the botany department at Washington University, DNA is not the exclusive means of determining how an offspring cell will develop. In the transfer of information to daughter cells, things can happen that alter or influence what information is received, he says, citing experiments carried out by himself and other investigators.

If the influence of DNA on inheritance is only partial, being affected by exterior conditions, then any attempt to control inheritance by chemical manipulation of DNA is likely to yield unexpected and uncontrollable results, says Dr. Commoner.

"An attempt to produce a genius," he warns, "is more likely to create a monster."

Dr. Commoner's warnings about overoptimistic applications of the genetic code theory were backed up by a physician, Dr. Samuel P. Bessman of the University of Maryland Medical School.

Dr. Bessman complained that, on the basis of sketchy evidence, and reasoning from genetic theory, it was erroneously concluded that the disease, phenylketonuria (PKU) could be avoided by special diet. Public enthusiasm for the idea was so great that some three dozen states passed laws specifying specific treatment, despite lack of evidence that it does any good (SN:8/19/67 p. 184).

Stanford University physicist Dr. Howard H. Pattee devoted himself to the area still presenting the most serious problems to biologists: How the information encoded on DNA is transferred to cell enzymes which then control the growth of new cells.

Dr. Pattee says the simple mechanistic models of enzyme operation can't explain the speed and reliability of information transfer. A complete explanation, he said, will have to take into account quantum mechanics—the fact that all matter, when it gets down to the submolecular level, does not just sit still, but has a wave motion that significantly affects its behavior.

All the controversy over the DNA revolution has unsettled and dismayed the practitioners of the biochemical art. And their dismay was heightened by the recent publication of Dr. Watson's controversial description of the discovery of the DNA structure, "The Double Helix" (SN: 3/2 p. 210).

Typical of some of the comments were those of Dr. Erwin Chargaff of Columbia University, a long-time investigator of DNA, who complained that following the double helix discovery, the study of DNA turned into a "vulgar dance around the golden helix," a movement that was "more a creed than a science, with initiation rites like the Masonic order in the 18th century but without the advantage of Mozart's music." Its practitioners, he said, were "short-order cooks described as geniuses."

F-111A AND F-111B

Crashes in Asia and U.S.

Combat flights of the $6.5 million-a-copy F-111's began March 25 with raids on supply and troop-staging areas in the panhandle section of southern North Vietnam.

Three days later, the first plane disappeared. It never returned to its base from a bombing run, and was listed as simply overdue. Two days after that, a second F-111 was lost when it crashed, reportedly in Thailand. The remaining four planes were grounded, and a tight security lid was clamped on the fates of the first two.

The North Vietnamese claim to have shot down both planes. The U.S. Air Force will say nothing about the first one, and claims that the second crashed because of an inflight emergency not caused by hostile fire.

The question that has risen to plague Air Force and Defense Department brass is whether the F-111 should have been in Southeast Asia at all.

The Air Force, of course, says yes, and the plane has been declared eminently airworthy by its pilots. But some critics believe the plane should not have been sent into combat until it is as impregnable as it can be made.

Senator Karl E. Mundt (R-S.D.) goes so far as to demand that the remaining four Harvest Reaper aircraft be brought home, and no more be sent, until they can be equipped with the ultra-sophisticated avionics package now planned for aircraft 160, more than 100 planes away on General Dynamics' production line.

While the Air Force's F-111A was in trouble in Thailand, the Navy's F-111B was shot down on Capitol Hill. When the Navy reduced its fiscal 1969 fund request from 30 of the overweight planes to eight in order to free money for study of an alternative super-fighter called the VFAX, the Senate Armed Services Committee pulled the plug altogether. The committee voted 11 to 2 not to give the F-111B any funds at all, apparently scuttling the Navy version.