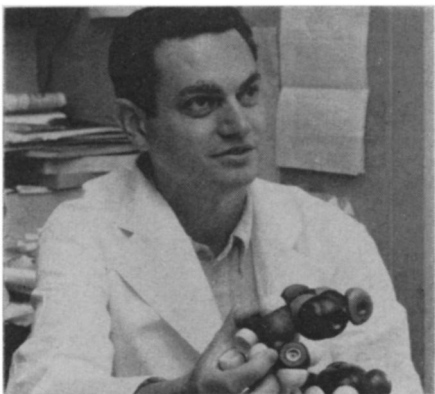


Geneticists rewarded

"It seems clear that most, if not all, forms of life on this planet use the same language. My guess is that cells will be programmed with synthetic messages within 25 years."

Thus a shy and modest man named Marshall Warren Nirenberg at once sums up the state of genetics and predicts its future, at the same time wondering if society will be able to keep pace. "When man becomes capable of instructing his own cells, he must refrain from doing so until he has suffi-



Nirenberg: cracking the code. ^{NIH}

cient wisdom to use his knowledge for the benefit of mankind."

The language of life is known because in 1961 Dr. Nirenberg, in experiments with the common intestinal bacterium *E. coli*, learned to read the coded messages that DNA (deoxyribonucleic acid) sends to RNA (ribonucleic acid)



Holley: deciphering the RNA.

which in turn prescribes the manufacture of new proteins.

Building on Dr. Nirenberg's work, done at the National Institutes of Health in Bethesda, Md., an Indian geneticist at the University of Wisconsin synthesized all 64 of the possible trinucleotides, or subunits of nucleic acid, and confirmed Dr. Nirenberg's reading of the genetic code. Dr. Har Gobind

Khorana confirmed that the genetic language is read in a linear and consecutive manner and that it is a triplet code.

Meanwhile, at Cornell University, Dr. Robert W. Holley successfully established the complete nucleotide sequence of a single nucleic acid—alanine-transfer RNA from yeast. Alanine is one of 20 amino acid components of proteins.

This week these three men share a \$70,000 Nobel Prize in Medicine. The combined fruits of their research are a model for future efforts to reveal the relation between the detailed structure of molecules and their biological functions.

The implications are endless. Dr. Nirenberg understates when he says it will be "useful in many fields." If scientists can understand how cells are made, if they can learn how to manipulate the genetic messages of DNA, they will be able to control or alter those messages with synthetic materials, possibly correcting the biochemical mistakes that make some cells cancerous and repairing hereditary damage. Genetic surgery on microorganisms is already a reality. It will be applied to man.

Sharing prizes is nothing new to Drs.

Nirenberg, Khorana and Holley, for whom the coveted Nobel Prize caps long strings of awards. A native of Urbana, Ill., Dr. Holley last year won the United States Steel Foundation Award for distinguished work in molecular biology, administered by the National Academy of Sciences. Dr. Nirenberg won it in 1962.

This week, Drs. Nirenberg and Khorana jointly received the \$25,000 Louisa Gross Horwitz Prize from Columbia University, and on the same day that the Nobel Prizes were announced, Dr. Nirenberg alone won the Franklin Medal from Philadelphia's Franklin Institute.

Dr. Nirenberg, 41, is a native New Yorker, who received his doctorate from the University of Michigan in 1957. "I just don't know what to say," he said on hearing the news from Stockholm. "I'm delighted, just delighted."

Forty-six-year-old Dr. Khorana, co-director of Wisconsin's Institute for Enzyme Research, studied at Punjab University and received his Ph.D. from the University of Liverpool, England, in 1948.

Dr. Holley, a professor at Cornell's College of Agriculture, is also a Cornell graduate, earning his doctorate in 1947.

SEX EDUCATION

Teacher problems crop up

Sex education is becoming more widely accepted in the U.S. Where polls have been taken, they show that parents want schools to treat the subject, and school boards are gingerly moving to fulfill the demand. About 100 new sex education programs have been started so far, according to some informed estimates.

But while the idea and the program gain acceptance, a crucial problem continues to face the proponents of sex education: lack of suitable teachers.

The problem grows more serious as the programs become more widespread. And the lack of preparedness to teach the subject is causing some advocates to have second thoughts about sex education.

In some cases permission to teach about sex is an opening for teachers to inflict their own problems with the subject on the students, says Dr. Gerald Sandson, a child psychiatrist at the National Institute of Mental Health. Dr. Sandson believes it is better for kids to get distorted information from their own age group than from authorities in the classroom. He was enthusiastic about sex education before last spring, when he met a group of 50 teachers and counselors attending a sex education workshop.

Many of them were riding rough-

shod over an area that children are grappling with, says Dr. Sandson. "Some had their own sexual axes to grind; others almost relished their new found sanction to pronounce four letter words.

"Few showed any knowledge of child dynamics or an appreciation that this was a subject they should approach with care," says Dr. Sandson. He is not sure this group is typical of most sex educators. Probably they represent "a vanguard which is most apt to be fringy." He notes, for example, that a second workshop sponsored by the National Association of Independent Schools seemed to draw more level-headed and sensitive people.

But he believes that if sex education is to be seriously undertaken, teachers must be trained for it in the schools of education and offered some means of working out their own problems.

Even teachers who don't have their own sexual problems are not necessarily prepared to handle the subject. According to anthropologist Dr. Margaret Mead, adults are not prepared to teach young people about sex.

"Today's adults did not grow up learning to talk about such things to children," says Dr. Mead. There are only a handful of people who can talk simply and clearly about sex before a