**PLASTIC BOMBS IN PARIS KEEP POLICE MEDICS ON RUN**

See Page 2


# Medical Tribune

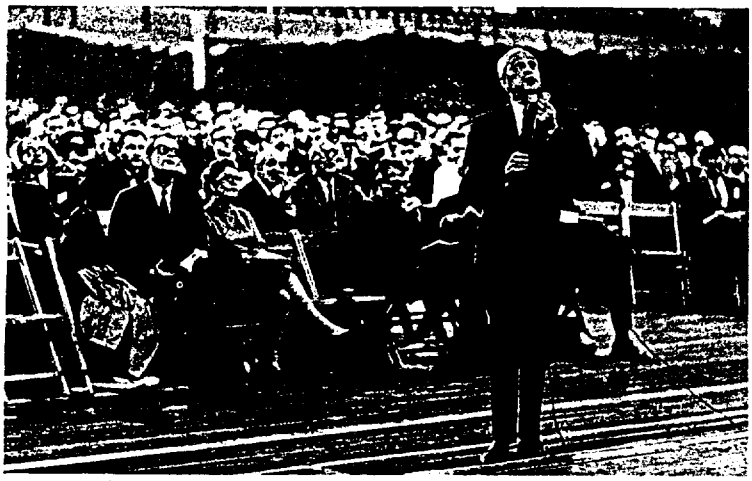
Vol. 3, No. 13

*world news of medicine and its practice—fast, accurate, complete*

Monday, March 26, 1962




## Experts Challenge, Support Nucleic Acid 'Code' Concepts



*Medical Tribune Photo—Roy Stevens*

**Nobel Laureate** Dr. Severo Ochoa, New York University, leads session at symposium on neoplasms marking Columbia University, Francis Delafield Hospital anniversaries.

*Medical Tribune—World Wide Report*

NEW YORK—Current concepts concerning the chemical code of inheritance, and the role of nucleic acids in directing the manufacture of proteins from specific amino acid sequences, were challenged—and as vigorously defended—at a symposium here. The symposium, "Basic Problems in Neoplastic Disease," was sponsored by Columbia University College of Physicians and Surgeons.

Dr. Erwin Chargaff, Columbia Professor of Biochemistry, cited with considerable skepticism the prevailing view that genetic instructions controlling the arrangement of amino acids along the protein molecule are encoded in the structure of DNA in the cell nucleus and transmitted by an RNA "messenger" to the ribosomes where protein is synthesized.

SYMPOSIUM ON NEOPLASTIC DISEASES
*Nucleic Acids and Protein Synthesis.*
*Genetic Coding of Amino Acids.*
*Studies of Neoplastic Transformation.*

The postulation that such a chain of biologic information universally exists and

*Continued on page 21*

*Continued from page 1*

is transmitted in this manner through the "entire realm of life" cannot be assumed to be true on the basis of present experimental evidence, Dr. Chargaff said. He expressed doubt that principles derived primarily from studies of lower forms of life such as phages and viruses could be properly supplied to higher forms "about which astonishingly little is now known."

The nucleic acids "now seem to play the role played by the philosopher's stone in the alchemy of the Middle Ages," Dr. Chargaff observed, "and I am not sure they can carry it alone."

### "A Fairy Tale Picture"

► In comment, Dr. Severo Ochoa, New York University Professor of Biochemistry, one of the principal investigators who have been working on deciphering the genetic code, noted his agreement with Dr. Chargaff that "modern genetics, enzymology, and molecular biology have indeed painted a fairy tale picture of the events under discussion. However, I do not share his skepticism as to the accuracy of this picture."

It was the work of Dr. Ochoa and colleagues at New York University, proceeding along similar lines as investigators at the National Institutes of Health, that led some months ago to their determination of the nucleic acid coding for the amino acid phenylalanine and subsequently to codes for all 20 amino acids.

In these studies, a synthetic RNA template made with the enzyme polynucleotide phosphorylase and composed entirely of uracil bases produced a protein consisting only of phenylalanine. Later, small amounts of other nucleic acid bases were added to the synthetic RNA, the resultant protein was compared with the original protein produced, and code letters were assigned to the other amino acids.

In support of the coding system as worked out thus far, Dr. Ochoa cited studies of tobacco mosaic virus in which mutation induced by treatment with $HNO_2$ produced changes in amino acid components. The changes correlated "very well" with the code letter assignments, Dr. Ochoa said.

In his report Dr. Chargaff emphasized apparent discrepancies between the known chemical composition of certain proteins and the postulated coding system. For example, in the case of bovine ribonuclease and salmine, he calculated the components of messenger RNA that "should have coded" for these proteins and found a "very bizarre" pattern.

### Two Messenger Chains Needed

Moreover, a "main unsolved problem," according to Dr. Chargaff, is that "if there really is a messenger RNA which is supposed to reflect the composition of DNA, one must assume the existence of two chains of messenger RNA since DNA is a double-stranded molecule." Yet current theory holds that only one strand of RNA codes for protein, Dr. Chargaff noted.

► At another symposium session, Dr. Renato Dulbecco, of the California Institute of Technology, advanced his hypothesis, based on studies of virus-induced tumors, that the process of neoplastic transformation involves different mechanisms depending on whether the virus contains principally RNA or DNA.

Studies with Rous sarcoma, produced by an RNA virus, indicate that the continuously replicating virus produces changes in the cell surface and antigenic structure that are characteristic findings in neoplastic cells.

In the case of polyoma, containing a DNA virus, the virus affects the nucleus and the mitotic system rather than synthetic processes within the cell. Evidence indicates that the virus either attaches to the genes within the cell or itself induces a mutation, Dr. Dulbecco said.