# CLUE TO CHEMISTRY OF HEREDITY FOUND

## American and Briton Report Solving Molecular Pattern of Vital Nucleic Acid

## TESTS BY X-RAY PLANNED

## Work Done in England, if It Is Confirmed, Should Make Biochemical History

Special to THE NEW YORK TIMES.

LONDON, June 12—A scientific partnership between an American and a British biochemist at the Cavendish Laboratory in Cambridge has led to the unraveling of the structural pattern of a substance as important to biologists as uranium is to nuclear physicists. The substance is nucleic acid, the vital constituent of cells, the carrier of inherited characters and the fluid that links organic life with inorganic matter.

The form of nucleic acid under investigation is called DNA (desoxyribonucleic acid) and has been known since 1869.

But what nobody understood before the Cavendish Laboratory men considered the problem was how the molecules were grooved into each other like the strands of a wire hawser so they were able to pull inherited characters over from one generation to another.

### Further Tests Slated

The two biochemists, James Dewey Watson, a former graduate student of the University of Chicago, and his British partner, Frances H. C. Crick, believe that in DNA they have at last found the clue to the chemistry of heredity. If further X-ray tests prove what has largely been demonstrated on paper, Drs. Watson and Crick will have made biochemical history.

Dr. Watson has now returned to the United States, where he intends to join Dr. Linus Pauling, of California, who has done most of the pioneer work on the problem.

[In Pasadena, Calif., Dr. Pauling said that the new Crick-Watson solution appeared to be somewhat better than the proposal for the structure of the nucleic acids worked out by Dr. Pauling and associates at the California Institute of Technology. The California solution was published in the February, 1953, issue of the Proceedings of the National Academy of Sciences.]

Dr. Crick may leave Britain, too, when he has done some more work on the problem. Right now, he said, it "simply smells right" and confirms research in many institutions, particularly the Rockefeller Foundation in the United States and at King's College in London.

The acid DNA, Dr. Crick explained is a "high polymer"—that is, its chemical components can be disentangled and rearranged in different ways.

DNA is the essential constituent of the miscroscopic life-threads called chromosomes that carry the genes of heredity like beads on a string.

In all life cells, including those of man, DNA is the substance that transmits inherited characters such as eye color, nose shape and certain types of blood and diseases. The transmission occurs at the vital moment of mitosis or cell division when a tangle of DNA containing chromosomes becomes thicker and the cell separates into two daughter cells.

### Forming of Molecular Chain

Although DNA has never been synthesized, Drs. Watson and Crick knew it was composed of horizontal hook-ups of bases (sugars and phosphates) piled one above the other in chain-like formations. The problem was to find out how these giant molecules could be fitted together so they could duplicate themselves exactly.

By a method of scientific doodling with hand-drawn models of the molecules, Drs. Watson and Crick worked out which molecules could be joined together with regard to the fact that some molecules were more rigid than others and had critical angles of attachment. Some months ago they decided that the only possible interrelation of the molecules was in the form of two chains arranged in a double helix — like a spiral staircase, with the upper chain resembling the staircase handrail and the lower resembling the outside edge of the stairs.

New evidence for double DNA chains in helical form now has been obtained from the King's College Biophysics Department in London, where a group of workers extracted crystalline DNA from the thymus gland of a calf and bombarded it with X-rays.

The resulting X-ray diffraction photographs showed a whirlpool of light and shade that could be analyzed as the components of a double helix.

Dr. Crick emphasized that years of work still must be applied to the helical carriers of life's characteristics. But a working model to aid in the genetical studies of the future now has been laid out in blueprint form by Drs. Watson and Crick—or so most biochemists here believe.

### Looks Good, Pauling Says

Reached by telephone in Pasadena, Dr. Pauling said last night that the Crick-Watson proposal for the structure of the nucleic acids "looks very good." Dr. Pauling has just returned from London where he talked with Dr. Crick and with Dr. Watson, who was formerly a student at California Institute of Technology.

Dr. Pauling said that he did not believe the problem of understanding "molecular genetics" had been finally solved, and that the shape of the molecules was a complicated matter. Both the California and the Crick-Watson explanations of the structure of the substances that control heredity are highly speculative, he remarked.