CYTOLOGY

Chromosome Structure Details Described by Russian

Moscow and American Scientists, Working Separately, Come to Conclusions That Agree in Essentials

INTIMATE details of the internal structure of chromosomes, the tiny but mighty bits of nucleus-protoplasm that determine the course of heredity, are described by Dr. Nicolai Koltzoff of the Institute of Experimental Biology, Moscow (*Science, Oct.* 5.)

Dr. Koltzoff has undoubtedly seen some of the same things that have been studied in America by Dr. Calvin B. Bridges of the Carnegie Institution of Washington and described by him during his recent stay at the Institution's laboratories at Cold Spring Harbor, N. Y. (*See SNL, Sept.* 29, 1934.) Since each man worked independently of the other and used different biological material, there are minor differences in their accounts of what they have seen; but their essential agreements, both regarding things present in the chromosomes and in their interpretations of their significance, constitute strong mutual confirmation and support.

Based on Painter's Researches

Dr. Koltzoff started, as did Dr. Bridges, with the discovery of Prof. T. S. Painter of the University of Texas (*Science, Dec.* 22, 1933; *Genetics, vol.* 19 *pp.* 175-188, 448-469, 1934) that the location of certain dark "bands" on the "giant" chromosomes in the salivary gland cells of yeast-fly larvae corresponded closely to the locations of the genes, or physiological units that govern the transmission of hereditary traits. Dr. Koltzoff notes in his communication to *Science* that in all genetical laboratories throughout the world this phenomenon is now being studied.

He himself became interested in the possible reason for the chromosomes in these particular cells being so large—scores of times the size of ordinary chromosomes elsewhere in the insect's body. He noted also that in many other giant cells, the nuclei which contain the chromosomes were correspondingly enlarged, and that in some of these giant nuclei there were double, quadruple and even eight times the normal chromosome numbers.

When he made an exact examination of the "giant" chromosomes of insect larvae, he found each to consist of the equivalent of sixteen ordinary chromosomes: that is, each was made up of sixteen threads of chromosomal material, running parallel in a gradual spiral. On each thread were bead-like thickenings, which lay side by side, the larger ones together giving the appearance of transverse disks. This is essentially the same picture that Dr. Bridges had seen. Dr. Bridges had worked with chromosomes in yeast-fly larvae; Dr. Koltzoff in his present publication features the structure he found in chromosomes of the related insect *Chironomus*, familiarly known as "bloodworms."

"Genonemes" Name Proposed

For the parallel threads Dr. Koltzoff proposes the new name "genonemes," which means "gene-threads." For the thickenings he retains a term already in existence, "chromomeres." He states that in many cases "it is easy to count the number of small chromomeres not only in stained preparations but even in living cells of *Chironomus* and in photomicrographs of living cells."

Dr. Koltzoff inclines to the belief that the genes lie not in the heavy parts of the thread, the chromomeres, or the "bands" of Prof. Painter, but in the thin places of the thread, or genoneme. But this, he adds, is only a hypothesis, based on some of his previous work.

Science News Letter, October 13, 1934

PHYSICS

Liquid Films Form Delicate Designs

THE delicate tree-like, fern-resembling formations shown on opposite page are not the familiar frost designs on window panes. They are formed in liquid films between two plates of glass which are slowly separated. As the distance between plates widens air rushes in and produces the black portions of the figures. The varied and beautiful designs are the work of Toshimasa Tsutsui, Japanese scientist of Tokyo.

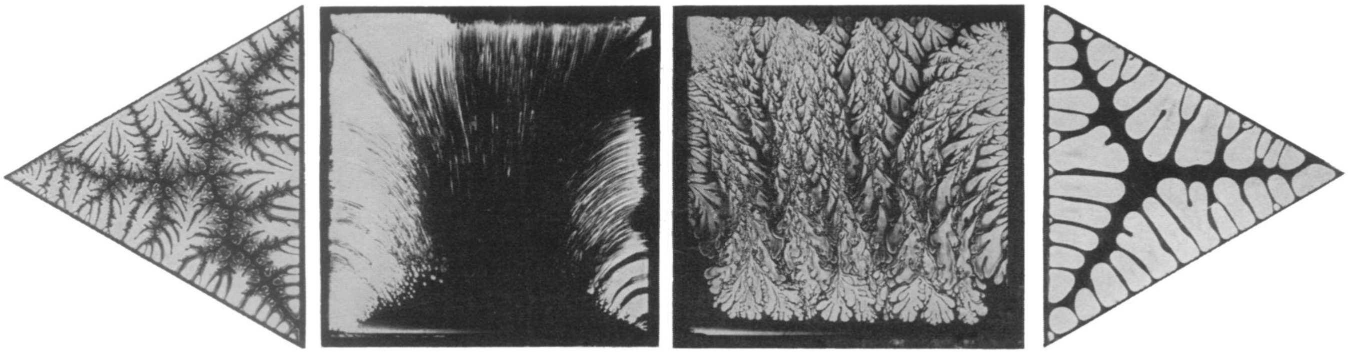
If the liquid used is an enamel with a cellulose base, permanent patterns may be obtained. Metal plates can then be used. After separation over slight distances the volatile material in the enamel is allowed to evaporate and the fern-like design is left on the plates.

The beautiful pictures bear striking resemblance to the photomicrographs of metals although the causes of the two phenomena are quite different.

Science News Letter, October 13, 1934

PAVLOV IN HIS LABORATORY

Dr. Ivan P. Pavlov, eighty-five years old but still a tive in research, is here shown demonstrating an experiment to his assistants. On the occasion of his birthday, Dr. Pavlov was honored by the Soviet Government with an annual pension of 20,000 rubles (about $17,600) and—what may make him happier—a fund of a million rubles ($880,000) has been made available for the enlargement of the physiological laboratories at Leningrad. In addition, five scholarships have been established in his honor.



JUST LIQUID FILMS, NOT FROST

Dendritic figures produced in liquid films between plates by Japanese scientist Toshimasa Tsutsui of Tokyo. Left to right: Design using celluloid enamel; one using glycerine; one using water as the liquid, and another one using celluloid enamel.

(See article on page 236)

PHYSICS-MEDICINE

Hospitals Should Use Radium For Atomic Physics Research

EVERY cancer hospital a "bee-hive" of atomic research was the picture suggested by Drs. Leo Szilard and T. A. Chalmers of the physics department of St. Bartholomew's Hospital, London. (*Nature,* Sept. 29.)

Most cancer hospitals, say the doctors, have sealed containers of radium which might be used for atomic studies at times when they are not needed for therapeutic purposes. There would be no loss, or expense, in such an auxiliary use of radium products for the materials are constantly breaking up and giving off their penetrating rays. Nothing man can do will stop or reduce this self-destruction.

When radium and its disintegration products are not being used medically the powerful radiation is lost, like the energy of a waterfall that is not being harnessed.

The St. Bartholomew scientists describe new experiments demonstrating that it is possible to slip the tiny radium containers inside packets of the light element beryllium and make the unit serve as a source of much-wanted neutrons. The gamma rays from the radium products create neutrons when they strike beryllium atoms.

Neutrons are the non-electrical units of matter as heavy as atoms of hydrogen. Their lack of electric charge means that they are able to pass easily through the electric field of ordinary atoms. Because they are so penetrating they are greatly desired for atomic collision experiments such as those producing artificial radioactive disintegration.

Current discussions at the International Union of Pure and Applied Physics in London indicate that the rays from these artificially produced radioactive substances may find uses in medicine.

Thus the suggestion of Drs. Szilard and Chalmers indicates that medicine can, perhaps, help itself by helping atomic research.

The suggestion of Drs. Szilard and Chalmers that radium vials from cancer hospitals might serve double duty for atomic research has already been applied in the United States. The neutron experiments of Drs. George B. Pegram and John R. Dunning at Columbia University were made possible by close cooperation with Dr. G. Failla, physicist of Memorial Hospital in New York City. Working at odd hours, late at night and on Sundays and holidays the containers of radium products from the hospital were rushed up to Columbia for atomic experiments. Memorial Hospital has one of the world's largest supplies of radium. The Columbia investigators were thus able to obtain a most powerful source of neutrons.

Science News Letter, October 13, 1934

▼ RADIO ▲

MAPPING FROM THE AIR

an address by

Prof. S. S. Steinberg

Department of Civil Engineering, University of Maryland

Wednesday, Oct. 17, at 4:30 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.