

chemical bases for these differences were elucidated for three of the adult forms.

Using isotopes, discovery was made of the steps by which nature produces rubber in the growing plant, an advance toward producing the equivalent of natural rubber.

A new laboratory was dedicated having apparatus for radiocarbon dating by a new gaseous method that is more accurate and covers a longer time scale.

A gap was filled in the electromagnetic spectrum by the generation of millimeter waves, about six-thousandths of an inch long, which fall between the microwaves that carry television programs and the shortest waves of infrared radiation.

A twin birth was announced for the world of the atom when it was found that the relatively heavy hyperon and the lighter K particle appear together when a proton smashes into a negative pi meson.

Discovery was made that atomic particles passing near an atom's nucleus set up waves on the nucleus' surface and these bulges travel around the nucleus at definite speeds.

Two out of three attempts to confirm the findings on which Einstein based his theory of general relativity failed.

International agreement was reached on new names for the fundamental particles of matter and a system set up for naming those yet to be discovered.

The sun was discovered to be the source of a very small percentage of cosmic rays bombarding the earth.

The Nobel Prize in chemistry for 1954 was awarded to Dr. Linus Pauling of California Institute of Technology for his work on the chemical bond and on the nuclear forces that hold all matter together.

The Nobel Prize in physics for 1954 was awarded jointly to German-born Max Born and Walter Bothe of Heidelberg, West Germany, for fundamental research in quantum mechanics and for discoveries resulting from coincidence counting, respectively.

MEDICAL SCIENCES

Death Rate From Cancer Double Among Smokers

More than double the death rate from cancer and nearly double the death rate from coronary artery disease was found among heavy, pack-a-day or more cigarette smokers compared to non-smokers in a two and a half year statistical study of 187,766 men aged 50 to 70.

The Tobacco Industry Research Committee was formed to finance research on the relation of tobacco smoking to health.

Chewing tobacco and snuff were reported associated with cancers of the mouth.

A million and a half U. S. grade school children took part in mass trials of a vaccine against poliomyelitis; evaluation of the test is due for announcement in 1955.

Experts failed to find beneficial effects of mass inoculations with gamma globulin on spread or severity of polio.

A chemical that can step up the anti-nerve gas action of atropine two and one-quarter times was discovered in pentamethonium, short for pentamethylene bistrimethyl ammonium dibromide, relative of one of the newer drugs for lowering high blood pressure, hexamethonium.

Parrot fever and ornithosis can be kept from spreading to humans by treating bird-breeding stocks with the antibiotics chlortetracycline or tetracycline.

A ban on routine use of oxygen for premature babies was advised to prevent blinding retrolental fibroplasia.

The year's new drugs for controlling high blood pressure were: pentapyrrolidinium, alseroxylon, andromedotoxin, Su-3088, or dimethylaminoethyl tetrachloroisindolene bismethochloride, and a combination of apresoline and serpasil.

Running hot or cold water into a balloon in the stomach was reported as a simple, safe method for quickly changing body temperature

that is adaptable to treatment of fever or freezing conditions, as well as for operations on heart and great blood vessels.

Running ice water or ice-cold salt water into the chest cavity was reported as simple and safe method of refrigerating patients for operations on heart.

A blood-pressure-reducing rauwolfia drug, called serpasil, was reported helpful in calming excited mental patients and potentially capable of improving their mental condition.

Chlorpromazine was reported effective in quieting disturbed mental patients, stopping intractable hiccups and augmenting the effect of narcotic drugs in relieving pain in cancer and other conditions.

Chemical analysis of opium ash was found a means of detecting the geographic origin of opium and a consequent aid in opium traffic control.

For saving victims of barbiturate overdosage, a mixture of beta beta methyl ethyl glutarimide, or NP 13 for short, with 2-4 diamino-5-phenyl thiazole was developed.

The human heart's "equipment" for a lifetime of beating without prolonged rest was discovered to consist of extremely small fibers, called sarcosomes, within the heart muscle filaments.

A blister and burn pain chemical was discovered in blood plasma.

Positron annihilation and a coincidence-counting system were used to develop a method for early detection of brain tumors with radioactive arsenic.

Patients whose eyesight is threatened by tears or holes in the retina can be helped by treatment with intense light, it was reported.

An anti-tuberculosis vaccine from powdered dead germs and a double drug combination, isoniazid with pyrazinamide, for eradicating the germs from the body were announced.

Glutamine and asparagine were tried with promising results in a new attack on epilepsy based on the discovery that failure to keep enough glutamic acid in the brain cells is most important of the three biochemical defects causing epilepsy.

Blood plasma expander from *Bacillus subtilis* was reported ten times more effective than serum albumin for attracting water into blood stream and, therefore, promising for treating burn-shocked patients.

The earliest human twin embryos ever seen, 17 days old from time of conception, were discovered and identified as identical twins formed inside a single blastocyst.

Unusual births included head-joined Siamese twins and a two-headed, four-armed baby.

A woman with Rh negative blood whose mother had Rh positive blood is likely to develop some tolerance to Rh positive blood, it was reported.

Cross circulation, in which patient and donor are linked artery to artery and vein to vein with pumps to control the blood transfer, was developed and used 21 times for operations on the temporarily blood-free heart.

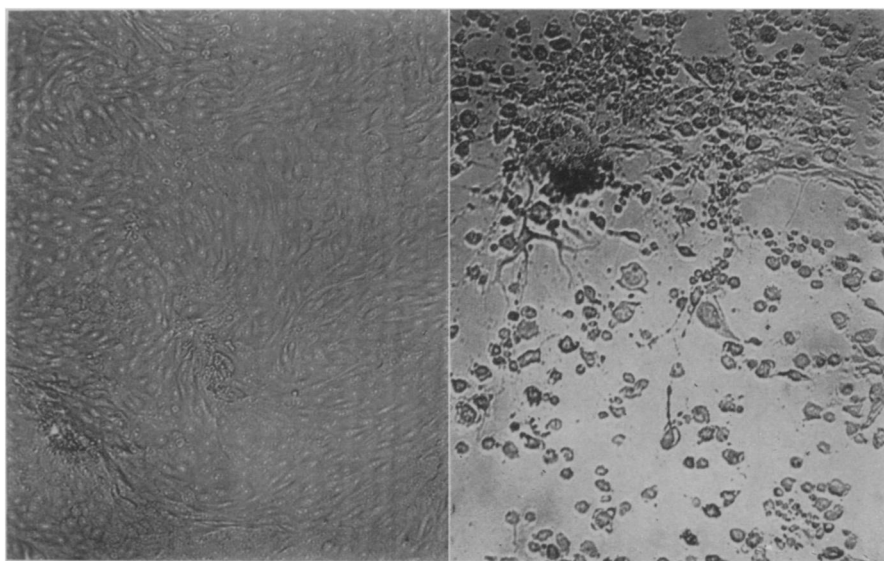
A single diet was designed for nourishing all forms of life, from man to bacteria, viruses and plants.

Tips of lung arteries were found to act as "catch-traps," holding masses of sludged blood cells.

A remodeled sulfa drug, called Diamox, already known to be a good diuretic, was reported helpful in the serious eye disease, glaucoma, and chronic emphysema of lungs.

The successful transplantation of an unerupted wisdom tooth to replace a lost first permanent molar was reported in more than 100 cases.

Success in grafting frozen male sex glands



POLIO DAMAGE—On the left are shown live cells from monkey kidneys clinging to the walls of a test tube. The picture on the right was taken 48 hours after live polio virus had been added. The virus attacks the cells, drawing on them for nutrition. The cells become enlarged and misshapen, and finally burst and disappear, releasing more virus to attack other cells. Dr. H. Fieldsteel of the Pitman-Moore Co., Indianapolis, took these photographs.