

## BIOLOGY

# Produce Mutant Bacteria

► SCIENTISTS played a practical joke on nature and were rewarded in turn by a practical joke with rather gruesome implications.

A team of Columbia University scientists slipped a group of bacteria a counterfeit gene substance in lieu of their natural material. The bacteria responded by accepting the substitute chemical and then proceeded to produce a form of life that gave rise to generation after generation of monsters "physically and chemically unlike any known cells."

Some of the monsters even persist and give rise to new monsters long after the counterfeit gene substance has disappeared and been replaced by the natural material again.

These experiments, supported by the American Cancer Society, were reported to the American Institute of Biological Sciences meeting at Stanford University, Palo Alto, Calif., by Drs. Stephen Zamenhof, Rosalie De Giovanni and Sheldon Greer.

Organisms known as the sewage bacteria, described as living "harmoniously with man in his intestine," were fed the chemical 5-bromouracil. The chemical was selected to fool the bacteria into believing it was the amino acid thymine, a part of their natural diet.

The bacteria were fooled, and to such an

extent that they gave rise to a whole new world of "monsters"—some smaller than the parent, some almost 100 times larger than the parent and some that did not even look like the parent.

But the "taken in" bacteria did not stop there. They developed their own personalities—unstable mutant forms with a chemistry that could protect them from poisons having the power to kill their non-bogus parents.

These "monsters" in turn produced more monsters, some for as many as 180 consecutive generations.

Three or more of every 100 cells mutated. Normally, only one in one billion of these bacteria shows up as a mutation.

The scientists then realized they had created a race of monsters with the unique ability of remaining quiet for generations and then suddenly exploding with the force of cancer cells.

This might mean, Dr. Zamenhof said, that a normal cell injured many generations ago could conceivably be passed on from father to son all along the line and then one day go wild.

It might also mean that these so-called unstable mutants have the ability to acquire an armor that protects them against anti-cancer drugs.

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*LONG-DISTANCE UHF — Cornell Aeronautical Laboratory's 28-foot antenna and receiver are probing the problems of long-distance transmission of ultra-high-frequency signals over the horizon.*

## SURGERY

## Brain Surgeons' Shampoo Rivals Permanent Wave

► A BRAIN surgeon described a hairsetting technique, that easily rivals any permanent wave, designed to save both the hair and the "face" of his female patients.

The medical hair-dressing has been tried on 20 patients to date without a single infection, Dr. Jonathan M. Williams of the George Washington University School of Medicine, Washington, D. C., told the International College of Surgeons meeting in Chicago.

He explained that women patients become distressed when they learn their hair must be cut for a brain operation and so he devised the technique to overcome the "psychological problem."

The first step in the technique is to have the patient shampoo her hair and scalp at least five times if possible, with a specially prepared surgical detergent. The patient is also told to use the same bobby pins, rubber bands and comb for the care of her hair during the shampooing.

"On the day of the operation," Dr. Williams said, "the patient is brought to the operating room, taking her own comb along. Another antiseptic solution, made in a watery mixture and colorless, is used.

"The surgeon uses the patient's comb to make a part in the hair exactly where he wants to make his incision. Sometimes this is curved—even horseshoe shaped."

Then the hair is firmly held in position by a wave setting compound applied from an aerosol bomb. After the incision is closed it is sewn together with contrasting colors of thread so the doctor can find it later. Dr. Williams noted that "patients say this is a wonderful shampoo."

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## PSYCHOLOGY

# "Brainwashing" Uses 3 D's

► COMMUNIST success in "brainwashing" of prisoners, extracting "confessions" from them and making them accept communist propaganda, need not be attributed to any mysterious powers or diabolic drugs, a team of two psychologists and one psychiatrist reported to the American Psychological Association meeting in New York.

The Communists base their success on clever use of DDD. The three D's stand for debility, dependency and dread. Through hunger and disease, the prisoner is made physically weak. He is dependent on the captor for food, sleep and life itself. He is in constant dread of torture or death.

Through various defenses, a prisoner may postpone the development of DDD for a long time, perhaps indefinitely, but if DDD is extreme and if the prisoner lives, he probably cannot resist indefinitely. His compliance is a natural consequence of ordinary principles of human behavior.

In a way, "brainwashing" through DDD depends upon the application of the psychologist's technique of conditioning. But this by no means indicates that Communist captors were amateur or professional psychologists. Animal trainers and sideshow barkers are often very competent in manipulating human behavior, but this does not mean that they are psychologists.

Success of DDD in breaking down the defenses of prisoners was due largely to the

fact that it was not constant, but intermittent, thus preventing the prisoners from being permanently depressed and hopeless.

The captors used relief of DDD as a reward to induce and reinforce desired behavior. Relief of hunger, fatigue, isolation or pain, even temporarily, serves to teach the prisoner to do what the captor wants him to do. Paradoxically, interrogation, harangues, threats and contumely may serve as rewards to the prisoner because in extreme suffering and isolation and weakness any contact with a fellow man is a relief.

There are many ways to build up before capture a soldier's resistance to the effects of DDD. Two mentioned by the scientists are to keep him in good physical health and vigor and to reduce his level of initial or chronic anxiety. The health of a prisoner can readily be broken by a captor. A soldier can also be trained to be generally non-anxious and so less susceptible to the third D, dread. But the fear component of DDD is not like neurotic anxiety or neurotic fears, and it may not be wise to extinguish such realistic fear in a prisoner. It may be what keeps him alive.

The scientists reporting the study were Drs. I. E. Farber of the State University of Iowa, Harry F. Harlow of the University of Wisconsin and Louis Jolyon West of the University of Oklahoma School of Medicine.

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