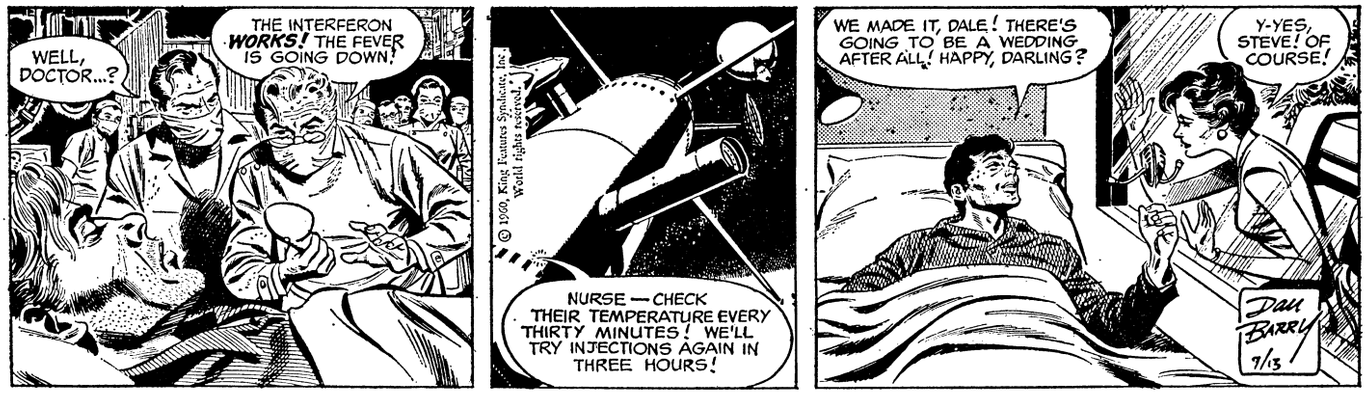

King Features

The third test compound was double-stranded RNA from reovirus type 3, which commonly infects man with respiratory and intestinal disorders. Unlike whole reo-3 virus, reo-3 RNA caused no infection but did induce interferon and virus resistance in animals.

Dr. Hilleman and his colleagues will report their findings in three papers beginning in the August issue of the PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.

Other scientists, including Nobelist John F. Enders of Harvard University and Dr. Robert M. Friedman of NIH, feel it is premature to say that only double-stranded RNA is effective, but agree that the finding that double-strandedness appears to always work is extremely important. "Interferon has a big future in studies of how cells work—how things get turned on and off," Dr. Friedman says.

Vaccinia, or smallpox virus, which has been considered a double-stranded DNA or deoxyribonucleic acid particle without any RNA at all, has been cited as an example of a non-RNA inducer, but Dr. Hilleman reports there has been some slight, though not established, evidence that vaccinia may contain RNA after all. "If this is true, we'll have to revise a lot of past thinking about vaccinia," he says.

The second essential requirement—that the double-stranded RNA must be free of its protein coat—in part accounts for the fact that interferon induced artificially works more quickly in attacking viruses than that induced naturally. It takes about five hours, for example, for viral RNA to shed its protein covering and begin inducing interferon. Dr. Hilleman's RNA, however, already free of its protein casing, did the job in a mouse in about one hour.

The inducers studied in Dr. Hilleman's laboratory, particularly the helenine, Dr. Enders says, offer a potentially inexpensive raw material for use in clinical trials and eventually by the public.

Of 20 mice treated with the helenine RNA, 18 or 90 percent survived normally lethal doses of pneumonia virus. All 30 controls died. Similarly, 86 percent of 21 mice protected with synthetic RNA survived lethal doses of pneumonia virus and all 17 control mice were killed.

Although scientists may now consider double-stranded RNA a key component of interferon induction, there still is much to learn about how it really works at the cellular level.

In the meantime, the promise of a drug that gives people wide-range immunity to viruses suggests that the whole nature of treatment and study of many garden variety ailments will be drastically changed. If the body could be made to keep a constant supply of interferon on hand, mankind could be spared much misery.

PERCEPTION

A Path in the Jungle

Some people furnish their homes in clean, stark lines; others go for clutter. Some like bright light; others dim. Some see detail in a picture; others see the whole.

There is no doubt that an individual's perceptual style exerts a powerful influence on his personality and life style. The problem in psychology has been to figure out just how different people do see the world.

The study of perception is usually a can of worms. Personal reports from those being tested may or may not be honest. Behavioral studies in the laboratory are often confused by extraneous influences, such as the temperature of the room or the scientist's personality.

Recently, however, researchers at Harvard University and the National Institute of Mental Health have begun to find a way into this perceptual jungle.

Harvard's Dr. Asenath Petrie set the course a few years ago when she discovered that perceptually, normal people fall into three equal categories: roughly a third exaggerate intense stimulation, a third block it and the rest are in the middle.

The exaggerators, whom Dr. Petrie called "augmenters," cannot stand pain, while the blockers, called "reducers," can.

Building on this base, Drs. Julian Silverman and Monte Bucksbaum, at NIMH, theorized that blockers were actually people with hypersensitive nervous systems. Their blocking at the higher levels of stimulation was a means of protecting themselves from sensory input they could not stand.

There were several reasons for believing this was the case, says Dr. Bucksbaum. For one thing, schizophrenic patients seemed to be reducing or blocking sensations. The easily distracted, nonparanoid schizophrenic is one who is very sensitive to marginal, minor stimulation, yet will let a cigarette burn into his fingers without the slightest reaction.

When tested, these schizophrenics turned out to be reducers, but more extreme than most normal people, with the exception of some women and persons under the influence of LSD.

Another clue came from the fact that the reducers couldn't take isolation and sensory deprivation. They seemed to have a need for continuous stimulation.

The NIMH team, however, wanted to find a neurophysiological basis for their theory directly in the brain's electrical activity.

Using a computer, they have located and amplified the brain's response to light flashes, and the pattern which emerges fits neatly into the hypersensitive-blocking theory.

The so-called reducers clearly react strongly to a dim night light, but block somewhat at a bright 150-watt light, while the opposite is true for augmenters.

Sexual differences between men and women have also appeared. "We can't say one sex is more sensitive than the other," says Dr. Bucksbaum, "but we

do know men and women view the world differently."

Men, for example show a more coherent perceptual pattern, with fewer extremes, than women. The differences between hypersensitive and less sensitive men are not great. But women differ widely.

Those who block intense stimulation do so in an extreme way, much like the schizophrenic. Presumably their nervous systems are unusually sensitive, although they are psychiatrically normal. At the other extreme are the relatively insensitive women, who will exaggerate an intense sensation more than any man.

On the whole, women seem to show both a greater range of perceptual styles and more variability from day to day, says Dr. Bucksbaum.

What does it all mean? What kind of people are reducers and augmenters and how do they react to an emergency?

Those questions have yet to be answered. For now, says Dr. Bucksbaum, "here's a way to read someone's mind" —an objective measure of perceptual style that can be used anywhere regardless of culture and despite mental disturbance.

The test should be of value diagnostically, Dr. Bucksbaum points out. People with Addison's disease, for instance, become hypersensitive to sensations. Women with Turner's syndrome—a missing female chromosome —look like women, act like women, yet are sterile. Their perceptual style, says Dr. Bucksbaum, in some ways resembles a man's.

CONTINENTAL DRIFT

Strong New Evidence

Evidence favoring the theory of continental drift continues to grow at a fast pace, becoming more convincing almost every month (SN: 4/29).

The most recent support for the idea that the continents are the drifting offspring of a primeval land mass comes in three reports in the Aug. 4 SCIENCE. The data are from both the Atlantic and Pacific.

Dating of rocks from South America and Africa shows an almost identical geological age boundary between regions in Ghana and a counterpart in northern Brazil. The radioactive datings are reported by Dr. Patrick M. Hurley and his co-workers at Massachusetts Institute of Technology, in cooperation with geologists at the University of São Paulo in Brazil.

West of the geological boundary in both Ghana and Brazil, rock specimens dated about two billion years old. East of the boundary on both continents, the rocks are only 500 million years old. The datings support the theory that Africa and South America were once joined together.

When Africa and South America are fitted together, Dr. Hurley and his co-workers find, the sharply defined boundary between the two age provinces in West Africa strikes directly toward the corresponding age boundary in northeastern Brazil.

Dr. Hurley's co-workers are Drs. J. R. Rand, H. W. Fairbairn and W. H. Pinson Jr. of MIT, and Drs. F. F. M. de Almeida, G. C. Melcher, U. G. Cordani, K. Kawashita and P. Vandores of the University of São Paulo.

Controversy over the existence of continental drift is now some 40 years old, major problems being how the shifting started and what might cause it to continue.

The theory most widely accepted is that the ocean floors act like soup in a vast kettle, slowly churning over as soup does when heated in a pot; the time scale, however, is in hundreds of thousands of years. The heat source for the earth's churning is believed to be either its molten interior or radioactivity.

This would mean the sea floors in both the Atlantic and Pacific Oceans are gradually spreading. The Eastern Pacific has been spreading at the rate of about two inches a year for the last two million years, four scientists from Columbia University's Lamont Geological Observatory, Palisades, N.Y., have found.

They analyzed more than 50 cores taken from the ocean floor near the East Pacific Rise. The cores contained fossil material dating back some 12 million years.

The scientists found that sediments near the crest of the rise were either thin or lacking, and none contained material more than one million years old. Cores taken farther away from the crest, however, contained much thicker deposits of sediments consisting of much older material, gradually growing older with the distance from the crest.

"This pattern of increasing age and increasing sediment thickness away from the axis of the rise is in agreement with that predicted for the spreading of the ocean floor," they conclude. The studies were made by John Ewing, Lloyd H. Burckle, Tsunemasa Saito and Robert Leyden.

Additional evidence that the Pacific floor is spreading is reported by Dr. W. R. Riedel of Scripps Institution of Oceanography, University of California at San Diego. Dr. Riedel suggests that the sea floor is spreading at the rate of about three inches a year, on the basis of the distribution of radiolaria microfossils.

CANCER RESEARCH

Hormones and Heart Attacks

A seven-year follow-up of men treated with female hormones to combat prostate cancer indicates that the treatment may cause heart attacks. But the 1966 Nobel Prize winner who originated the therapy does not agree.

Dr. Charles B. Huggins of the University of Chicago says that the number of heart attacks among his patients was not abnormal, and that he disagrees with the implications of a study reported in the Aug. 7 issue of the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

Dr. John C. Bailar III, head of the demography section of the National Cancer Institute biometry branch, says in reply that his study, which calls attention to the danger of heart attacks, "in no way contradicts what Dr. Huggins has done."

Dr. Huggins has found no significant number of heart attacks among his patients following estrogen treatment. Dr. Bailar on the other hand, points out that the Veterans Administration Cooperative Urological Research Group had followed up 2,300 patients over a long period, many more than Dr. Huggins has.

"We have revised dose schedules and are carefully following cardiovascular conditions to see whether or not there are an excess number of deaths among those receiving hormone treatment," Dr. Bailar says.

"Estrogen therapy may increase the risk of early death in all but the most advanced cases of prostatic cancer," he declares.

"Most of the patients are very old men," he points out. "Prostate cancer is a very slow disease, and you will not realize the dangers of hormone treatment unless you study the cardiovascular problems common to the age group."

The VA study indicates that prostate victims without the hormone and castration treatment used by Dr. Higgins have fewer heart attacks or strokes than those who have estrogen doses.

"Most urologists think our results cannot be true," Dr. Bailar says. "They realize that many of their patients with prostatic cancer will die of something else while on estrogens. But the great majority of these patients are over 60 and this is expected."

The harmful side effects of estrogen therapy have been clear for more than 30 years, Dr. Bailar says, warning physicians that they should carefully weigh the benefits of hormone treatment against the hazards.