

Congenital Indifference To Pain Very Rare

► **LIFE FOR** a "human pincushion" is far from being all velvet. In 1932, the earliest reported case of congenital indifference to pain was a 44-year-old man who later exploited his condition for public attention by allowing himself to be stuck with a large number of needles. Less than 50 cases of physical indifference to pain have been examined and reported since then.

The inability to feel pain is not all bliss, according to three New York physicians who have reported in the *American Journal of Roentgenology, Radium Therapy and Nuclear Medicine*, May, 1966, a case of congenital indifference which they followed for 15 years. With the aid of X-ray studies, Drs. Stanley S. Siegelman and Walter G. Heimann, both radiologists, and Dr. Martin C. Manin, from the department of orthopedic surgery, all of Montefiore Hospital and Medical Center in New York City, found the child they studied did not turn away from distress situations even though they were injuring him—merely because he could not register pain.

In all respects, except for the senses which register pain, the child was found to be normal. The child earned a rating of "bright, normal intelligence" on psychometric testing. Temperature, light touch, and position senses were intact. Yet his body showed many scars and bruises which his mother said were a result from his ability to "sustain burns and bruises without complaint."

While a person with congenital indifference to pain may perceive burns and penetration as such, there is "an absence of crying, discomfort or defensive reaction as if the individual were indifferent." The physicians further noted that the manifestations are usually detected in the first years of life. Younger children generally exhibit more signs of injury than an older person who is aware of the disorder and is apt to compensate through avoidance of injury.

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PHYSIOLOGY

Chemicals May Color Memories With Emotion

► **AN EMINENT** physiologist has suggested an hypothesis to explain how emotions color memories and imprint them deeply on the mind.

Dr. Seymour S. Kety, chief of the laboratory of clinical science at the National Institute of Mental Health, Bethesda, Md., bases his hypothesis on recent knowledge of important chemicals found in the brain, called amines or catecholamines.

Much evidence links these amines—serotonin, norepinephrine and dopa-

mine—to emotion. They can be depleted by tranquilizers and accentuated by antidepressants, producing accompanying changes in an individual's subjective mood. They have been found in high concentration in one portion of the brain, the limbic system, that is itself closely involved with emotions.

At the same time, part of the limbic system, the hippocampus, is, by all evidence, quite important in establishing new memories.

Perhaps, Dr. Kety said, some brain mechanism allows amines to take part in memory formation. Sudden release of one of the amines might, for instance, prod into action the physical machinery, probably protein production, that underlies memory. If proteins are the "solder" for memory, he said, then amines could be the agent that "sets the solder."

It is difficult to learn anything without involving emotion, Dr. Kety noted. Animals survive by remembering whether an experience was good or bad. Humans probably can learn without emotion, as in remembering nonsense syllables, but generally there is a rough correlation of emotional intensity with speed and permanence of learning.

To illustrate his hypothesis, reported at a James Arthur lecture in the American Museum of Natural History in New York, Dr. Kety drew a hypothetical nerve pathway leading from electric shock to pain to jump impulse.

This is a straight pathway, he said, but along the line, a nerve branches off to signal heart and glands into action. Perhaps a second nerve also branches off to release a bit of amine. This might then consolidate a memory of the pain.

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AGRICULTURE

Cottonseed Oil Used In Experimental Diets

► **A HIGH-CALORIE**, nourishing fat emulsion for patients who must be fed intravenously for long periods, is under development by U.S. Department of Agriculture scientists.

Capable of providing up to eight times as many calories as currently used carbohydrate solutions, the fat emulsion could help doctors and hospitals overcome a basic problem—preventing loss of weight by patients during prolonged periods of intravenous feeding.

Although the new product—made from cottonseed oil—has not been clinically evaluated, its experimental testing with laboratory animals has proved successful. This continuing research to improve intravenous feeding solutions is being conducted by USDA's Agricultural Research Service at its Southern Utilization Research Laboratory, New Orleans, La.

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IN SCIENCE

OCEANOGRAPHY

Set of 'Recipes' Made For Deep Pacific Ocean

► **A SET OF "RECIPES"** showing that the deep waters of the Pacific Ocean move upward at the rate of about half an inch a day was reported in London.

The recipes were developed by Dr. Walter H. Munk, associate director of the institute of geophysics and planetary physics, University of California, San Diego. They were devised to help understand such factors as temperature, salinity, radiocarbon 14 and oxygen.

The observed distributions of these factors in the interior Pacific give a "consistent picture," Dr. Munk stated in *Deep-Sea Research*. The picture is one indicating that "vertical upwelling and turbulent diffusion" are the main processes governing mixing of deep Pacific waters.

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METALLURGY

Sensor Spots Corrosion In Man-Made Body Parts

► **UNLESS MEDICAL** metallurgy keeps pace with advances in artificial body components, people some day might be faced with the same problem that plagued Nick Chopper, the Tin Woodman of Oz: rusting solid.

People with artificial metal parts in their bodies, such as plates or joints, face one problem that "normal" people do not: corrosion.

Infection or irritated tissue is likely to occur when a nearby part is corroding more than a hundred-thousandth of an inch per year. Such corrosion often results from the presence of human plasma or body fluid, which produces in metal an effect similar to that of warm, aerated seawater.

An instrument to measure this corrosion as it occurs, enabling doctors to predict the effective life of the implant, was described at the Third International Congress on Metallic Corrosion in Moscow.

Heart of the unit is its electrodes, which were originally designed as instrumentation for astronauts, reported Dr. Norbert D. Greene, director of Rensselaer Polytechnic Institute's corrosion research laboratory, Troy, N.Y. The relative strengths of a succession of completed circuits indicate the rate of corrosion.

Problems of brittleness, resistance to fatigue and light weight have all been solved. The remaining challenge is the problem of corrosion.

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E FIELDS

MEDICINE

African Malaria May Not Be Rare in U.S.

➤ A RELATIVELY rare African form of malaria may not be as rare in the United States as current reports indicate, according to scientists of the National Institute of Allergy and Infectious Diseases, Bethesda, Md.

Instead, the malariologists say, the nature of ovale malaria, generally a rather mild, self-terminating disease, and its varying effect on individual victims, plus a delay in some cases of one to four years between infection and primary attack, may result in the disease's dismissal as a cold, flu, or fever of unknown origin.

Drs. William Chin and Peter G. Contacos of NIAID reported in the American Journal of Tropical Medicine and Hygiene a case of ovale malaria acquired by Dr. Chin in West Africa which only became evident one to three years later.

The number of reported cases of ovale malaria is low—six in the United States in the past two years—when compared with the more than 1,000 Peace Corps volunteers returning in 1964 alone from areas of Africa where *P. ovale* is endemic. The scientists termed it "indeed remarkable" that no ovale malaria had been reported from this group, but concluded that all did not have the same exposure to the disease and that many of the possible cases might not yet have become apparent.

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TECHNOLOGY

'Pupillograph' to Aid Pupil Size Research

➤ A UNIQUE instrument for measuring and recording the variations in size of the pupil of a human eye was demonstrated for the first time by Bausch and Lomb, Rochester, N.Y.

The "pupillograph" promises a major contribution to the continuation and application of recent research indicating that the size of an individual's pupil at any particular moment is an objective, accurate guide to the degree of his interest or emotional involvement in a subject, his likes and dislikes, and also his thought processes.

Previous to these discoveries, made primarily by Dr. Eckhard H. Hess at the University of Chicago, it was thought pupil size indicated only the amount of light striking the eye, or the effect of drugs.

Current investigations now indicate that pupil size may be an excellent

measure of fatigue, and thus be of great value to industry. It may also reveal and provide a measure of emotional stress, a prospect of great interest in psychology and psychiatry.

Until now, however, both research into this phenomenon and practical use of the findings have been hampered by the difficulty of continuously measuring and recording pupil size.

"The pupillograph solves that problem," said Dr. Henry Knoll, head of Biophysics research and development at Bausch and Lomb, "since it accurately measures and automatically records the pupil size of both eyes, simultaneously and continuously."

The device operates by scanning the eye with an invisible spot of infrared light which is reflected except in the pupil area. This reflection pattern yields the pupil measurement which is electronically translated to graphic form on a continuous strip chart recorder.

Recent experimentation by Dr. Hess and his associates at the University of Chicago demonstrated that, with the amount of light being equal, the human pupil enlarges when attractive subjects are viewed and constricts in reaction to unpleasant subjects—both actions being wholly involuntary.

Many people who claim to like modern paintings displayed in the experiments, actually were betrayed by their pupillary reaction, which clearly showed their natural aversion to the art.

Even the senses of hearing, taste and smell have been proved to be linked to the pupil, because its variations in size disclose a person's involuntary reaction to all such stimuli.

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PSYCHOLOGY

Noise Increases Heart Rate by 10-20 Beats

➤ RESEARCH indicates that the heart rate decreases when a noise is turned off and increases when a noise is turned on.

But the heart may make no response to sound or light until the stimulus has been repeated about 20 times.

These findings were reported by Dr. Donald W. Shearn, associate professor of psychology at Colorado College in Colorado Springs.

Prof. Shearn reported that a "rabbit's heart rate decreases by 20 to 30 beats per minute when a noise is turned off.

"Noise-on will increase the heart rate by 10 to 15 beats per minute," the Colorado College psychologist said.

For the past year, working under a grant from the National Institutes of Health, he has been studying the effects of various stimuli on cardiovascular responses.

Some rabbits went through up to 450 trials of a single test, such as noise-on. Each stimulus lasted for one second, with two-minute intervals between stimuli.

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TECHNOLOGY

Runway Cables Catch Landing Aircraft

➤ AIR FORCE planes that otherwise might run right off the end of the runway during landings will soon be halted safely by a cable that automatically jumps out of the ground and snags them on the run.

An aircraft's wheels rolling across two switches buried in the runway, trigger signals to an electronic computer that judges the plane's speed, then fires an arresting cable upward from a slot in the runway, timed to emerge just ahead of the main landing gear struts.

Called the BAK-11 (Barrier Arresting Component), the system has already been successfully tested 110 times at Edwards Air Force Base in Calif. Eight types of planes have been used, including the B-58 supersonic bomber. Following the tests, the Air Force ordered 36 more BAK-11's, which were developed by Research, Inc., Minneapolis, Minn.

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SOCIOLOGY

Captains of Industry No Longer Start Rich

➤ CAPTAINS of industry, once the liberally educated sons of wealthy capitalists, have become the technically educated sons of middle class and poor families.

For every 10 corporate heads of America's leading companies, four have college training in a science or engineering and 33% have technical degrees. Only one out of the 10 come from a wealthy family.

Particularly in the past decade, U.S. business has taken on an increasingly technical cast, according to Jay M. Gould, author of the new book "The Technical Elite" (published by Augustus M. Kelley, New York, \$5).

Of high-salaried executives and professionals, more than half have a technical background or are working in some technical function, which means that the scientifically educated man is making up a higher and higher proportion of people in the top-income bracket (more than \$15,000 a year).

Dr. Gould noted that a recent Harvard University survey of 6,380 business managers revealed for the first time "the extraordinary degree of technical training characteristic of industrial management in the United States today."

Managers with technical degrees were twice as numerous as those with degrees in the humanities, social sciences, business or law.

Most important is the fact that technical education increases proportionately with youth. Of managers in their 30s, said Dr. Gould, more than half have such degrees.

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