

FIGHTING DISEASE WITH HEAT AND COLD

BY MARGUERITE CLARK

THE normal temperature of the human body as registered by a thermometer held in the mouth is 98.6 degrees. When this temperature mounts to around 110 degrees and remains there for prolonged periods, death follows. When it falls below normal to an equally critical level, life is similarly endangered. Yet freakish temperature can be healing as well as harmful. Today it is not at all unusual for physicians deliberately to bring the human body heat into these two danger zones by *artificial means*. And to hold it there for specific lengths of time while they test the reactions of the body to intense heat and cold.

Pyretotherapy is the technical name for the mechanical production of high body temperature of 105-106 degrees to fight such diseases as chronic arthritis, chorea, paresis and gonorrhea; *Chrymotherapy*, that of artificial hibernation, or the cooling down of the body to as low as 75 degrees in the fight on cancer. In the wide extremes of Thermometer Therapy,

the scientists in charge are working with tangible and measurable forms of physical energy — heat and cold — which can be controlled and regulated to any desired degree.

Heat acts first as a stimulator of cell growth, but after it reaches a certain point, heat kills the cells by coagulating their albumen, just as heat cooks the white of an egg. Cold, which at first merely checks and slows down cell growth, in the end destroys certain forms of cell growth by crystallizing the internal water. But whether they are boiling a germ to death with artificial fever, or freezing a cell in the ice chamber, many doctors continue to emphasize the importance of these two critical levels of temperature in the treatment of disease. *Artificial Fever* has been used widely for the past two decades. *Frozen Sleep* is a late-comer, opening up a new kind of medical experiment within the last five years.

Fever Therapy was discovered first in 1917 by Julius Wagner-Jauregg, Austrian neurologist and psychiatrist, and winner of the

Nobel Prize in 1926 for this contribution to science. In the course of his work with syphilitic natives of Africa, Wagner-Jauregg observed that following attacks of ordinary malaria many natives suffering from syphilis of the brain (paresis), recovered entirely from the serious brain ailment. *Something in the malarial infection helped to kill the spirochete of syphilis.* The Austrian physician did not wait for all the parietic Africans to contract malaria. Instead, he *gave* them the disease by injecting the living malarial parasite into their blood streams. The natives endured high fever, severe chills, and other familiar symptoms of malaria. But when the fever subsided, at least half the patients were cured of paresis.

Wagner-Jauregg's discovery became the subject of considerable international investigation. While it was generally agreed that some element in malarial infection helped paresis, scientists were determined to track down and identify that essential part. When a patient took the malarial injection, the whole body was affected. They wanted to *localize the cure.* Was it caused by remittent fever alone? Was it some chemical substance liberated by the parasite? Was it due to the hemoglobin spilled into the blood

stream? As soon as research reports began to confirm the notion that the real cure came from the fever itself, experiments were started to discover how attacks of high temperature might be produced by mechanical means which had nothing to do with malaria.

Inoculation with a foreign protein — milk, proteose or typhoid vaccine, to name three — was one answer to the problem. But there was a catch to that process. While it brought on satisfactory fever reaction, the fever was not controllable. Once the foreign substance was injected into the blood stream, the degree of fever which followed had to be accepted. Later two powerful fever machines, promising correct temperature control, were introduced. The General Electric Company was the first to observe that short radio waves caused high temperature. A number of its men who worked with a high-power ultra-high-frequency radio transmitter seemed to be running fever. Research resulted in development of the Radiotherm, a machine for inducing artificial fever.

The Radiotherm creates high frequency waves running as much as 50,000,000 cycles per second. The patient rests between two large metal plates connected with a sim-

ple form of radio broadcaster. As wave after wave passes through the body tissues, the tissues themselves generate enough super-normal heat to kill infection. General Motors has developed the Hypertherm, a steam-cabinet fever machine, in which the patient is bathed in blasts of hot, moist air. As the steam surrounds his body, internal heat is created, and the body fights off its germs by its high temperature.

There is still considerable difference of opinion as to the comparative efficacy of the mechanical fever machines and the cruder malarial treatment of Wagner-Jauregg. Comparison of New York Psychiatric Hospital charts of 100 patients who had had the straight malarial injection for paresis and 100 who had had the "hot box" showed statistics on malaria slightly more encouraging than those from the mechanical heating arrangement. Lately a means has been suggested for controlling the undesirable effects on the whole system of the malarial injection. Successful use of a drug called thio-bismol has been reported to the American Medical Association by a group of Cleveland doctors. The bismuth compound has been found to interrupt fever and chills when they become too severe, without stopping the malaria altogether.

Fever therapy, while uncomfortable, is not painful. Refreshed by an ice-cap and frequent sips of cool water or lemonade, the patient can lie and doze, or be read to, for five hours while his temperature hovers in the neighborhood of 106 degrees. There is no delirium. A special attendant checks the rectal temperature through electro-thermal coupling attached to a wall dial. While the initial treatment may call for an overnight stay in the hospital, thereafter the patient may return for twice-weekly sessions in the hot box of five hours each, followed by short rests in which to cool off, and then go home. In modern institutions where artificial fever therapy is part of the Physical Therapy Department, a regular physician makes recommendation for its use after a personal examination of the patient. There are reasons for not giving it at all, such as heart and kidney conditions, pulmonary tuberculosis, and pronounced debility.

Aside from paresis, its first brilliant cure, fever therapy has been used with encouraging results on chorea, or St. Vitus Dance, in children. Drs. Barnacle, Ewalt and Ebaugh of Denver reported to *The Journal of American Medicine* a series of such cures, some in a single treatment, some in three,

each treatment consisting of two and a half hours in the Hypertherm, at intervals of six to eight days. The medical treatment of chorea may take several months, and require special home conditions for the young patient.

So difficult a disease as chronic arthritis has also responded quite readily to the fever treatment. But it is in the cure of gonorrhea that artificial fever has scored its most remarkable result. Held at a high temperature, often as much as 110 degrees, for the regular course of five treatments, the human body can be positively sterilized of this dread infection. The charge for the fever course in the average private hospital is around \$200.

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The discoverers of Frozen Sleep were Dr. Temple Fay, neurologist, and Dr. Lawrence Smith, pathologist, of the Temple University School of Medicine in Philadelphia. In July 1936, while taking routine skin temperatures, Dr. Fay noticed the skin over the breasts was regularly several degrees warmer than the skin below and above. Furthermore, the skin in the extremities below the elbows and knees was from six to twenty degrees cooler than the rest of the

body. At once he began to connect his discovery with the fact that while cancer of the breast is extremely common, the disease is seldom found in the hands and feet where the body temperature is at lowest level. Was it possible, wondered Dr. Fay, that cancer cells in the blood stream actually reached the hands and feet but failed to survive because it was too cold for them there?

Attracted by the idea of the possible destructive effect of cold on cancer, Dr. Fay decided to make an experiment on a woman with a far-advanced pelvic case. For months she had been taking three grains of morphine daily, in spite of which her pain was so severe that she was sent to Dr. Fay for surgical cutting of the pain pathways in the spinal cord. He made up his mind to postpone the operation to see what the cold treatment might do.

A hollow metal capsule attached to a continuous circulation of ice water was inserted deep into the cancer, and constant freezing of the area maintained by circulation of water at forty to fifty degrees Fahrenheit. Within forty-eight hours the woman was free of pain and morphine was discontinued. At the end of five days the cancer began to shrink, and in five

weeks had healed. Tests taken before and after the freezing, according to Dr. Smith, showed that under cold treatment, cancer cells disintegrated, whereas the normal connective tissue and normal blood vessels survived. The woman returned to her home, remained in good health for five months, but later developed a brain tumor from which she eventually died.

The results of local refrigeration in this case were so significant that similar applications were made to cancers of the breast and skin. In all these improvement was noted, with reduction of the size of the tumors and even healing of the broken skin. After about two years of work with local freezing, Dr. Fay decided to try the cooling down of the temperature of the whole body for the relief of cancer in parts not accessible to local freezing, such as the abdomen.

This experiment was first reported to *The Journal of the American Medical Association* by Drs. Fay and Smith in August 1939. Only cases given up as beyond help by surgery, X-rays or radium were taken to the Temple University Hospital for treatment. All patients volunteered with the understanding that nothing could be promised in the way of cure. The Philadelphia doctors offered the

hibernation technique as a means of treatment which could greatly reduce suffering, and which, by causing a diminution in the amount of cancer cells, in many cases lengthened the life of the patient.

The whole body was exposed to a constant low room-temperature of around 55 degrees, maintained by air conditioning and aided by ice packing of the body. Food was withheld during treatment. Metabolism was reduced to an almost negligible level. Bowel and kidney functions were arrested. And in each case, the doctors were able to report prompt reduction of pain, rapid decrease in the size of the lesion, general improvement in the patient's weight, appetite and mental state. The dramatic aspects of iced sleep brought on spectacular publicity. But gradually the public excitement died down, and at present the news of Frozen Sleep is confined to medical reports on the long-time systematic research and testing now going on throughout the country. Medical men feel that patients thus treated will have to live at least five years before it can be said definitely that they have been cured.

Besides the elaborate program at Temple University Hospital, there is the hibernation investigation at Lenox Hill Hospital in New York

City, and at City Hospital on Welfare Island, there is a special refrigeration chamber made possible by a private gift. Two authorities, Drs. Disraeli Kobak and Louis B. Newman, of the Presbyterian and Cook County Hospitals in Chicago, have demonstrated to the American Congress of Physical Therapy in New York their methods for administering Frozen Sleep. And from Detroit comes word of the cold treatment of drug addicts by Dr. J. M. Berris and Dr. M. K. Newman of Grace Hospital. The first patient, a twenty-three-year-old woman, emerged from a three-day refrigeration treatment for a cancerous shoulder, showing no symptoms of morphine addiction and no longer craving drugs for the first time in seven years. The technique affords unexplored possibilities for the treatment of other types of diseases, including heart maladies. Doctors feel that if they can relieve or lessen the amount of work a diseased heart must do for a period of time by means of hibernation, definite help would result. Such investigations are going on in many of the hibernation chambers.

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The large air-conditioned room, registering a temperature of about

55 degrees, contains three porcelain beds of hospital design, each housing a cold-storage case—a human being, literally frozen, and temporarily dead to the world. The freezing is done swiftly and painlessly. The night before, a simple sedative is given; the next morning Avertin or evipal renders the patient unconscious. He is laid naked on the bed, his wrists and ankles tethered with padded restraining loops. Rectal temperature is checked by thermo-coupling, a rubber-covered wire cable leading to a mammoth wall thermometer which bears an important looking black indicator. From a container on wheels, the doctor scoops up loose nuggets of ice and packs the body of his patient from shoulder to half-way down the thighs. Excess moisture is handled by a sponge mattress, rubber sheets arranged in neat folds, and a drain basin at the foot of the bed.

From a normal of 98 degrees, the temperature goes down to 90 degrees within one-and-a-half to two hours, although in a very stout patient it may take twice that time. When 90 degrees has been reached, the ice is removed, the patient dried, and the room temperature of 55 degrees maintained, at which time the temperature of the Frozen Sleep subject drops to the 80's. It is

possible to reduce it to as low as 76 degrees without doing any definite harm.

A special nurse is in charge of each case. She remains at the bedside until she is relieved at four-hour intervals by another member of the hibernation staff. The chart of this bustling young woman, who wears sweater, coat and woolen stockings against the cold, is a masterpiece of painstaking attention. The temperature recordings alone call for fifty times the work of an ordinary case. Pulse and respiration, blood pressure and temperature are recorded every half hour. No possible emergency is neglected. An oxygen tent stands beside the bed. Two complete hypodermic kits rest in a small enclosure, ready to serve for heart stimulation. You can't miss the arsenal of hot-water bottles, twenty to a patient, filled and ready, hanging on the wall.

The bed bears a brass plate showing the name and telephone number of the air-conditioning company, ready for an SOS to the technician should the system fail. When the room temperature falls below 55, blankets and hot-water bottles surround the iced body. When it begins to rise, ice bags without cloth covering are applied. Every two hours saline and glucose are administered through a stom-

ach tube. Twice a day the stomach is siphoned empty, and once a day, the stomach is washed with normal saline. Catheterization is done every twelve hours.

When it is time to discontinue the treatment, the air-conditioning apparatus is shut off, and the room is allowed to come up to normal temperature. The patient, swathed in blankets, is restored to his own normal temperature in six to eight hours. On emerging from Frozen Sleep, he is usually a little hazy for twenty-four hours. And he is free from pain. Whatever its future in the cure of cancer or other diseases, this discovery in connection with Frozen Sleep is enough. The process provides comfort for inoperable cases, as well as those which do not respond to X-ray, because through freezing their pain has been practically eliminated.

Drs. Fay and Smith recently described a new development in their hibernation method. Instead of keeping their patients in cold storage in a state of complete unconsciousness, as in the past, they are bringing them back to consciousness after the proper low body temperature of 88 to 90 degrees has been reached. In this manner, the doctors report, patients can be kept "on ice" for as long as eight days. Five days was

formerly considered the safe limit.

The Temple experiment has also revealed a new mental effect of a prolonged sojourn in the ice-box. While the patients remain conscious and talk rationally with their physicians throughout the entire period, they have a complete mental blackout after their bodies are brought back to normal temperature. The refrigerator seems to produce a state of artificial amnesia. Dr. Fay suggests that impressions during the hibernation period do not sink deeply enough into the patient's mind to be recalled later in the conscious state of normal temperature.

The treatment of cancer by Frozen Sleep may be the opening wedge by which X-ray can effect the long-sought absolute cure of this disease. Dr. Francis Carter Wood, director of The Crocker Institute of Cancer Research in New York City, has reported to The Radiological Society of North America. Certain forms of cancer cannot now be treated by radiation because of the unknown quality

that makes them so resistant that doses large enough to destroy the growth will almost certainly destroy the patient. It is on this type of hopeless cancer that freezing has already been used with some degree of success in arresting growth. Research workers are now trying to determine if the cold treatment cannot break down cancer to the point where radiation can be successfully applied. "The same possibility exists, of course, for the artificial heating therapy," Dr. Wood added.

There may thus be a chance of combining the two forms of Thermometer Therapy — Artificial Fever and Frozen Sleep — with X-ray. Switching from heat to cold, Dr. F. W. Hartman of Detroit suggests in his discussion of Dr. Fay and Dr. Smith's report in *The Journal of the American Medical Association*, may perhaps kill the few remaining cancer cells which apparently are the difficult ones to eradicate, whether one uses X-ray, or artificial fever, or refrigeration.



► Portrait of a "muddled millionairess"
with a weakness for letter-writing:

THE RED QUEEN OF CALIFORNIA

BY WILLIAM HENRY CHAMBERLIN

SHE is a woman of vast wealth and vast goodness. Amid the luxurious setting of her mansion in Altadena, her heart throbs with indignation at the woes of the working classes. Strong sentiment and large leisure have combined to make her one of the most indefatigable letter-writers of our age. Our Red Queen of California, parlor rebel *par excellence* and the very incarnation of Muddled Millions, writes her daily dozen or score of what she is pleased to call "Letters of Protest." Few of these epistles from Altadena receive answers, and few appear in the ultra-conservative Southern California newspapers to which they are sometimes addressed. But to an heiress of the Crane millions, convinced of her mission to save the world and in particular its proletariat, this is a minor consideration. Carbon copies of the letters are preserved and in due course are published, at the author's expense, under some such fetching title as *The Parlor Provocateur, Letters of Protest, More Letters, Off to the Antipodes* and *European*

Impressions. Her Collected Works are already impressive, at least in bulk, and in addition she maintains a little house organ called brightly *The Open Forum*, mainly to house her brain children which would not find space elsewhere.

Dispensing with further introduction, let me present Mrs. Kate Crane-Gartz, who has been quite unconsciously running one of the funniest one-woman shows anywhere on the globe, a show possible only in our rich and relatively tolerant United States. Mrs. Gartz belongs decidedly in the category of persons who like to have their cake and eat it too. She not only lives in luxury but never tires of telling people how expensive and elaborate is her mansion, with its French windows opening out on a wide veranda and framing one of California's finest views, with its huge garden fitted out with palms, flowers, rustic footbridges and fountains. At the same time, on the strength of her numerous diatribes against conservatives in church and state, she likes to envisage her-