



ILLUSTRATION BY OSCAR LIEBMAN

Coming: The Era of Electronic Medicine

Techniques which have revolutionized U.S. industry now offer new hope for solving the most vexing health problems

By LYDIA RATCLIFF

TWO YEARS AGO, a New York boy fell from a sixth-story window. The result: a severely damaged spinal cord which, at the time, meant permanent paralysis.

Recently, however, a medical pioneer, Dr. Adrian Kantrowitz of Brooklyn, conducted a radical experiment involving the boy. He taped electrodes over four of the lad's key leg muscles. Then an attending engineer twisted a computer dial; electrical impulses were fed into the long-unused muscles—and the boy rose gingerly to his feet! In that simple act, he became the first paraplegic in history to stand up by the strength of his own muscles.

But the wizardry of medical electronics reaches beyond the problem of paralysis. In modern hospitals, age-old diagnostic instruments are rapidly being replaced by new electronic ones. Instantaneous electronic thermometers and stethoscopes have taken over the time-consuming jobs of their predecessors.

Tiny radio pills, dubbed "gutniks" by doctors, are used to pinpoint intestinal troubles. Swallowed by the patient, they act as miniature radio transmitters, broadcasting temperatures and pressures from the gastrointestinal tract. One radio pill even measures acidity in a newborn baby's stomach and thereby tells the physician what formula to prescribe.

Hemorrhages in the stomach can be pinpointed exactly by having the patient swallow a string of tiny Geiger counters. A radioactive substance injected into the blood stream will turn up at the bleeding site and register on a counter.

The electrogastragraph, invented in Russia and now undergoing tests in the U.S., detects stomach ulcers—and cancers. An electrode is placed on the surface of the abdomen to pick up the minute electrical waves which the stomach sends out when it contracts. Cancerous tissue generates electricity of a different frequency from that of normal tissue, and analysis of these waves indicates the presence and location

of tumors before they are visible by X ray.

In dentistry there also is a startling new electronic development. Dentists now can implant miniature radio monitors in tooth cavities—batteries and all—to chart faulty chewing patterns that may be the cause of gum disease.

Another electronic diagnostic device is the portable electrocardiograph. Until now, doctors had no means of detecting the kind of heart trouble that shows up only during exercise or in the midst of an emotional crisis. "Patients may show no sign of trouble when they're in your office," says one heart specialist. "It's when they're running for the bus or watching the stock ticker that attacks occur."

Today, a patient can wear a portable electrocardiograph, which pipes a continuous record of his heartbeat into a pocket recorder. If a radio broadcasting attachment is included, the device can even transmit heartbeat directly into the doctor's office. Via radio and telephone, a doctor in New York recently listened to his itinerant patient's heartbeat from California!

BUT THE MOST startling example of electronic control applies to heart block, which fells 40,000 people a year. In heart block, communication between the nervous system and heart muscle is blocked. Two years ago, the only remedy was use of a gigantic electrical stimulator. Two electrodes, fastened to the chest wall or to the heart muscle itself, sent painful wallops of electrical current through the chest to make the heart contract.

Surgeons today can actually implant an artificial "pacemaker" in a heart-block patient. The automatic ticker is painless and restores him to normal activity. The pacemaker, a signal generator the size of a cigarette pack, is buried in the abdomen just under the skin. Two wires run beneath the skin to the heart where they are sewed directly into the tough muscular part of its wall. When the batteries wear down, the patient undergoes a simple operation to replace them.

Another version of the cardiac pace-

maker allows the patient to step his pulse up or down, depending on whether he wants to walk, run, or sleep. A radio transmitter is taped to the patient's chest over the spot where the pacemaker is installed. It is connected to a simple battery unit in his pocket, which has dials to increase or decrease the heartbeat.

Russian scientists are using electrical stimulus to solve the problem of insomnia. They report that more than 100,000 patients have been successfully treated by passing low-current electricity from electrodes on the eyes to one at the nape of the neck, thus temporarily blocking sleep-killing brain activity.

These are only a few of the strides medical electronics has made to date. If they seem considerable, the future promise is even greater.

When the New York paraplegic stood for the first time, he pointed the way toward new hope for 250,000 of his co-sufferers. Dr. Kantrowitz believes that it is just a matter of time before more complex motion can be electronically induced. He says it is quite possible that paraplegics may one day carry miniature computers, linked to muscles, that will let them walk, run, and even dance!

Muscle stimulation might also free polio victims from imprisonment in iron lungs. Here, nerves leading to chest-throat muscles are impaired, and the patient is unable to breathe. Rhythmic electrical stimulation promises to reactivate dead breathing muscles as well.

RESearchers have also discovered appetite-control areas of the brain that might be regulated electrically to prevent obesity. Others have located centers of aggressiveness and extreme pleasure in the brain that might be stimulated to prod recalcitrant soldiers at the battlefield or provide instant bliss for the discontented. While it is doubtful this knowledge will ever be put to this kind of use, one Swedish doctor has found evocation of the pleasure sensation extremely effective in easing pain for terminal-cancer patients.

Glands, too, might be prodded electrically. Stimulation of the adrenal cortex, for example, might be used to produce extra hormone for the control of arthritis or low blood pressure.

But more practical work is getting the lion's share of attention. High priority is going to the development of electronic aids for the deaf, mute, and blind. Plans have already been drawn for a compact instrument that will allow the speechless to talk. The "vocal typewriter" will have a keyboard of commonly used words. When the mute punches a key, the device will emit the desired word in vocal form. The mute might have both a 500-word speaker for his living room and a small, 100-word pocket version.

FOR THE BLIND, medical engineers are exploring the possibilities of a similar device that would translate printed words into audible sounds, enabling the blind to "read." An electronic "seeing-eye dog" also is a near reality. The device emits a beam of light that precedes the blind person. When it hits an obstacle or a step, the reflection triggers a warning system.

Doctors also believe that someday the heart will be reproduced mechanically and powered either by an outside battery or by a spring mechanism wound like a clock by the breathing muscles. Scientists at Bell Laboratories have already built a duplicate of the brain cell with transistor components. They know that an electronic copy of the brain is no longer a question of size: "molecular electronics" today offers computer parts the size of molecules, compactness comparable to that of the brain itself.

Clearly, scientists have a long way to go before they can duplicate the exquisite human brain—or build a portable heart. Yet their achievements to date suggest a wide horizon of possibilities ahead.

More than 3,000 doctors and engineers in the U.S. alone are combining their talents to bring these miracles into being. Their efforts point to the dawn of a new era when "inner space" will be as fully explored as outer space.

SARAKA SOLVES THE PROBLEM OF "AFTER 45" IRREGULARITY

Doctor-approved bulk stimulant helps keep you comfortably on schedule as no ordinary laxative can!

As we grow older, our systems may often need outside aid to help maintain a normal regularity pattern. Continued use of strong drug laxatives can be irritating, even dangerous. That's why many doctors recommend SARAKA, the pure, all-vegetable bulk stimulant laxative for middle age and over. SARAKA supplies the moist, bland bulk that is so essential to healthy bowel function. And only SARAKA has a gentle stimulant action to help ease this bulk through your system plus Vitamin B₁.

Special note to weight watchers: Lack of sufficient bulk in 900 calorie liquids can lead to constipation. If this occurs, supplement your daily diet with all-vegetable SARAKA.



YOU CAN DRAW THIS!



Here's what artist-educator ANN DAVIDOW says about her book, "Let's Draw Animals"

"Let's! Let's find out together that it's simple to draw in steps—even more fun if the steps are also tricks, set to rhyme. So let's!"

Order this big book of fun for your children... or for a unique gift. It contains 80 of the bright "Let's Draw Animals" features our young FAMILY WEEKLY readers enjoy each week, with all new drawings and rhymes. Yours for only \$1.00 postpaid with paper cover; deluxe edition \$2.50 in handsome, long-wearing binding of quality Library Cloth. Hours of fun and complete satisfaction guaranteed, or return book for full refund.

To: FAMILY WEEKLY BOOKS

153 No. Michigan Ave. Chicago 1, Illinois

Enclosed find \$ for which please send me postpaid "LET'S DRAW ANIMALS" as follows: Quantity

PAPER COVER \$1.00 each

DELUXE BINDING \$2.50 each

Name _____

Address _____

City & State _____

Shrinks Hemorrhoids New Way Without Surgery

STOPS ITCH—RELIEVES PAIN
For the first time science has found, a new healing substance with the astonishing ability to shrink hemorrhoids and to relieve pain—without surgery.

In case after case, while gently relieving pain, actual reduction (shrinkage) took place.

Most amazing of all—results were so thorough that sufferers made astonishing statements like "Piles have ceased to be a problem!"

The secret is a new healing substance (Bio-Dyne®)—discovery of a world-famous research institute.

This substance is now available in suppository or ointment form under the name Preparation H®. Ask for it at all drug counters.

COLLEGES ARE IN A SQUEEZE



America needs college-trained leaders. But colleges face shortages. Support the college of your choice.

If you would like to know what the college crisis means to you write for a free booklet to: HIGHER EDUCATION, Box 36, Times Square Station, New York 36, N. Y.

PHOTO CREDITS

Page 2: CBS; Bob Grant from Globe. Page 3: CBS. Pages 4, 5: UPI.



SORE THROAT? RELIEVE PAIN
EASE SORENESS DOUBLY FAST



Taste good! Orange Flavored.

No Nagging Backache Means a Good Night's Sleep

Nagging backache, headache, or muscular aches and pains may come on with over-exertion, emotional upsets or day to day stress and strain. And folks who eat and drink unsavory sometimes suffer mild bladder irritation...with that restless, uncomfortable feeling.

If you are miserable and worn out because of these discomforts, Doan's Pills often help by their pain-relieving action, by their soothing effect to ease bladder irritation, and by their mild diuretic action through the kidneys—tending to increase the output of the 15 miles of kidney tubes.

So if nagging backache makes you feel dragged-out, miserable, with restless, sleepless nights, don't wait, try Doan's Pills, get the same happy relief millions have enjoyed for over 60 years. For convenience, ask for the large size. Get Doan's Pills today!