To Control Mosquitoes

HEALTH. EDUCATION, AND WELFARE Is Assigned to HEW

male mosquitoes. sented to him by Dr. Milton Green-

royalty-free, nonexclusive licenses. The topic of this year's meeting

mosquitoes with a hormone ex­ MacLean received testimonials from

dr. Morton Fuchs, sterilized female In addition to a $500 prize, Dr.

Diseases' grantee at the University Dr. MacLean is with the Section

ting has been awarded to a National field of brain function and sexual

Insecticides Toxic

For many years, insecticides have been the most successful means of destroying insects that are disease carriers. In recent years, the toxic effects of these chemicals on both man and his environment have become of increasing concern.

The problem is further complicated by the emergence of insecticide-resistant strains of insects. These insects require stronger and more toxic compounds for eradication.

Dr. Craig's patent describes both

(See PATENT, Page 7)

Dr. MacLean Receives Special APPA Award

Dr. Paul D. MacLean, NIMH, recently received a special award from the American Psychopathological Association. He was honored for his scientific contribution to the field of brain function and sexual behavior.

Dr. MacLean is with the Section on Limbic Integration and Behavior, Laboratory of Neurophysiology.

In addition to a $500 prize, Dr. MacLean received testimonials from prominent scientists that were presented to him by Dr. Milton Greenblatt, president of the association, at its annual meeting in New York.

The topic of this year's meeting was "Critical Issues in Contemporary Sexual Behavior."

The first part of the paper presented by Dr. MacLean covered a summary of findings reported earlier concerning sexual manifestations in animals resulting from specific stimulation of the limbic system in the old mammalian portion of the brain.

He then discussed an innate sexual display among squirrel monkeys both as a mechanism of challenge among males and of mating.

In his concluding remarks Dr. MacLean discussed the implications of the experimental work as it relates to human behavior.

Computer Tells Nature of Lethal Drugs, Helps M.D. Decide Correct Treatment

During the past 15 months 45 patients who have entered Suburban Hospital in Bethesda suffering from rates or other drugs have survived

friends Assured of Leakey's Recovery From an Accident

Frequent disappointment was the reaction to the cancellation of Dr. Louis Leakey's scheduled appearance on Feb. 3.

Just prior to leaving for his trip to the United States, Dr. Leakey was hospitalized in Nairobi, Kenya, as a result of an accident.

While there has been reassurance that Dr. Leakey is making a most satisfactory recovery, his future plans are of necessity indefinite.

(See LETHAL DRUGS, Page 4)

NIAID Employees, Families Join Efforts To 'HELP' Pakistan Cyclone Survivors

Thousands of homes on Manpura Island—as well as on the rest of the Ganges River Delta of East Pakistan—were destroyed by the Nov. 12 cyclone. Survivors attempted to erect temporary reed and thatch homes such as these until reconstruction could begin.—U.S. Agency for International Development Photos.

By Krin Larson

To the survivors of last November's devastating cyclone on Manpura Island in East Pakistan, HELP has become a continuing way of life.

HELP—the Heartland Emergency Lifesaving Project—developed out of the concern of a group of Paki-

stani and Americans in Dacca, the capital of East Pakistan.

Many of the HELP volunteers are NIAID employees and their families at the Pakistan-SEATO Cholera Research Laboratory (PSCRL) in Dacca.

However, what began as an attempt to provide immediate relief to survivors through voluntary private contributions is now evolving into a long-term plan for redevelopment that has gained the support of the Pakistan and U.S. Governments.

Manpura Island, about 10 miles long and 2 miles wide, lies at the mouth of the Ganges River on the Bay of Bengal.

Because of its location on the coastal lowlands, the area is vulnerable to cyclones, monsoon floods, and other natural disasters. Despite the great fertility of the soil, it is a very poor area.

When the flood waters accompanying last November's cyclone receded, 50 to 60 percent of Manpura's population was gone.

The cyclone came at harvest time when the normal population was augmented by migrant workers, and losses ranged from 14,000 to 19,000.

Many survivors suffered from the "cyclone syndrome"—severe abrasions, similar to third-degree burns, on the forearm, upper arm, inner thighs, and chest—as a result of clinging to a palm tree for hours while being tossed about by the flood waters.

Fortunately, an early fear—the spread of cholera—proved to be unfounded.

Besides the population loss, most shelter on the island was gone, as were most of the cattle used for farming and harvesting, and nearly three-fourths of the rice crop.

Because the areas were inaccessible and communication was lost, it was several days before the Paki-

(Continued on Page 7)

Hospitals' Research Role Reviewed in Publication

The first comprehensive review of the involvement of the Nation's state, local, and voluntary hospitals in biomedical research is contained in a report just issued by NIH.

The publication, Research in the Nation's Hospitals, State-Local- Voluntary, 1967 is Report No. 19 in a continuing series, "Resources for Biomedical Research and Education."

Dorothy Mathews Plans Visits to Cold Climes And Hawaii’s Beaches

Visits to Alaska’s icy shores and Hawaii’s (or Florida’s) sunny beaches are part of the retirement agenda of Dorothy Mathews.

Mrs. Mathews recently retired from the National Cancer Institute as administrative assistant in the Biologic Division. She has been with NCI for 23 of the 30 years of her Federal service.

At a farewell ceremony Mrs. Mathews’ co-workers and NIH friends praised her achievements and presented her with a gift.

And soon she will start her travels. First, Mrs. Mathews plans a trip to Alaska where her daughter and family live, and then a visit to warmer climes to “thaw out.”
Dr. Roger O’Gara Dies, Noted Cancer Researcher

Dr. Roger W. O’Gara, 55, National Cancer Institute physician and research pathologist, died of a heart attack on Jan. 25. He was stricken as he walked to his laboratory in the Clinical Center.

Dr. O’Gara, a native of Lynn, entered the field of cancer research at a young age. He was the first investigator to succeed in producing cancer in monkeys, a feat he accomplished in the early 1950s. His discovery redefined the understanding of cancer research and led to the development of new treatments.

After his internship, Dr. O’Gara returned to NIH in 1952 as a pathologist with NCI in Bethesda. He then started night classes at George Washington University. Both work and studies were interrupted during service as a medical corpsman in the Aleutians from 1942 to 1945.

Dr. O’Gara then moved to NIH in 1956 as a research pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.

Dr. O’Gara then returned to NIH in 1962 as a pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.

After his internship, Dr. O’Gara returned to NIH in 1952 as a pathologist with NCI in Bethesda. He then started night classes at George Washington University. Both work and studies were interrupted during service as a medical corpsman in the Aleutians from 1942 to 1945.

Dr. O’Gara then moved to NIH in 1956 as a research pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.

Dr. O’Gara then returned to NIH in 1962 as a pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.

After his internship, Dr. O’Gara returned to NIH in 1952 as a pathologist with NCI in Bethesda. He then started night classes at George Washington University. Both work and studies were interrupted during service as a medical corpsman in the Aleutians from 1942 to 1945.

Dr. O’Gara then moved to NIH in 1956 as a research pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.

Dr. O’Gara then returned to NIH in 1962 as a pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.

After his internship, Dr. O’Gara returned to NIH in 1952 as a pathologist with NCI in Bethesda. He then started night classes at George Washington University. Both work and studies were interrupted during service as a medical corpsman in the Aleutians from 1942 to 1945.

Dr. O’Gara then moved to NIH in 1956 as a research pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.

Dr. O’Gara then returned to NIH in 1962 as a pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.

After his internship, Dr. O’Gara returned to NIH in 1952 as a pathologist with NCI in Bethesda. He then started night classes at George Washington University. Both work and studies were interrupted during service as a medical corpsman in the Aleutians from 1942 to 1945.

Dr. O’Gara then moved to NIH in 1956 as a research pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.

Dr. O’Gara then returned to NIH in 1962 as a pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.

After his internship, Dr. O’Gara returned to NIH in 1952 as a pathologist with NCI in Bethesda. He then started night classes at George Washington University. Both work and studies were interrupted during service as a medical corpsman in the Aleutians from 1942 to 1945.

Dr. O’Gara then moved to NIH in 1956 as a research pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.

Dr. O’Gara then returned to NIH in 1962 as a pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.

After his internship, Dr. O’Gara returned to NIH in 1952 as a pathologist with NCI in Bethesda. He then started night classes at George Washington University. Both work and studies were interrupted during service as a medical corpsman in the Aleutians from 1942 to 1945.

Dr. O’Gara then moved to NIH in 1956 as a research pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.

Dr. O’Gara then returned to NIH in 1962 as a pathologist in the Office of Field Investigation of Cancer. He was the first investigator to produce cancer in laboratory rats. This discovery led to the development of new treatments and strategies for cancer.
NINDS Invites NIH Employees to Tour Lab

Jerry Atkinson cares for animals housed in the isolation units which were designed by Dr. William London.

In his office Dr. Sever (r) discusses plans for the new lab with Dr. David Fuccillo.

Carol Nacy (l) puts on lab coat in women's bathing and dressing room. Lab workers are outfitted in special uniforms and change to this clothing kept at work. In lab at right she is removing material from one of the large freezers which open off many of the laboratories while (l to r) Anne Math, Sandra Fitzgerald, and Anita Ley conduct serum studies.

By Caroly

Next Friday, Feb. 19, from 1 to 5 p.m., all NIH employees are invited to an open house tour of the newly completed NINDS laboratories for the study of infectious diseases in Building 36.

After Friday, the 5th floor, C-wing corridor will be completely closed off permanently—except to "authorized personnel."

The laboratories belong to the Section on Infectious Diseases, Perinatal Research Branch, National Institute of Neurological Diseases and Stroke. The section is headed by Dr. John L. Sever.

It will study infections of the fetus and newborn child, such as cytomegalovirus, herpes virus, coxsackie viruses, papova viruses, hepatitis, and neurological diseases of a possible viral origin.

The section's isolation is for two reasons, according to Dr. Sever. "We are, of course, preventing any of our materials from getting out into the building, and we are also insuring that no 'outside' con-
Fuccillo held a quick conference in C corridor, which provide filtered-pure air.

Dr. David Madden (above) uses a safety hood designed for working with highly infectious materials and (below) uses gel electrophoresis with hepatitis samples.

Margaret Ashworth feeds a cuddly one-day-old monkey.

Safety features include:
- The entire corridor and laboratories will operate under negative air pressure so that no air from within the corridor can escape into the outer halls.
- The section will have its own liquid waste system—separate from the rest of the building's. Sewage will be treated, run through sealed (welded) pipes and autoclaved (sterilized) before going into the sewer system.
- Floor, walls, and ceiling are completely sealed, all pipes are welded.
- The section has complete animal holding and operating equipment.

"If anything, we are overengineered for safety," Dr. Sever said. "We expect that the laboratory will be a model for future laboratories dealing with infectious materials."

"The open house is to inform others of our unique set-up, and special safety arrangements."

Margaret Ashworth feeds a cuddly one-day-old monkey.
LETTER

(Continued from Page 3)

of blood were transfused. Five days later bleeding increased. Mr. Lusky was given another 20 units of blood and scheduled for exploration of the abdomen. This time the bleeding site was not readily accessible.

One solution was the Whipple procedure—an operating method which would have involved removal of the duodenum and all or part of the pancreas. This procedure may have meant risking complications including diabetes and continuous digestive problems.

The surgeons elected to perform a partial gastrectomy, removing the acid-secreting part of the stomach, and to continue massive blood support in the hope that the bleeding would ultimately stop. Such a decision was possible only because the Blood Bank staff felt assured that NIH employees would be willing to provide an adequate blood supply.

Meanwhile Mr. Douglass and other Blood Bank staff members continued calling potential donors. During the operation Mr. Lusky was given 16 units of blood and within the next 4 days required 40 more.

Fortunately, the bleeding did stop, but, before his discharge on Dec. 1, he had received another 15 units, making a total of over 140 units.

Eventually, after several weeks of rest, Mr. Lusky was able to return to his job.

Vernon E. Taylor (r) receives a gift, presented by Arthur Moore, acting chief of the Medical Arts and Photography Branch, ORS, at a party in his honor. A former chief of the Photography Section and more recently photographic consultant, he has been at NIH 23 years. Vern, an avid yachtsman, plans a 6-month Caribbean cruise on his 35-foot ketch, "Melody."

Latest Participants in NIH Visiting Scientists Program Listed Here

1/25—Dr. Ione Polacow, Brazil, Cell Growth Regulation Section. Sponsor: Dr. Delph Hartfield, NCI, Bldg. 37, Rm. SD07.
1/26—Dr. Ingoborg Hansbauer, Austria, Laboratory of Clinical Science. Sponsor: Dr. Irwin Kopin, NIMH, Bldg. 10, Rm. 2D46.
2/1—Dr. Sankar L. Adhya, India, Laboratory of Molecular Biology. Sponsor: Dr. Ira Pastan, NCI, Bldg. 10, Rm. 10B09.
2/1—Dr. Rene Ray-hung Chen, Taiwan, Section on Physiological Chemistry. Sponsor: Dr. John J. Pisano, NHI, Bldg. 10, Rm. 7D13.
2/1—Dr. Hidehiko Kumagai, Japan, Laboratory of Biochemical Pharmacology. Sponsor: Dr. Edith W. Miles, NIAMD, Bldg. 4, Rm. 109.
2/1—Dr. Yukitaka Miyachi, Japan, Reproduction Research Branch. Sponsor: Dr. Merihauser, NCI, NICHD, Bldg. 10, Rm. 12N04.
2/1—Dr. Amin Mohammed Suria, Pakistan, Laboratory of Chemical Pharmacology. Sponsor: Dr. James R. Gillette, NHLI, Bldg. 16, Rm. 8N18.

Dr. Bloch Joins Nursing Staff
As an Educational Consultant

Dr. Doris Bloch has joined the Division of Nursing, BHME, as a consultant in nursing education and community nursing practices.

Previously, Dr. Bloch served as nurse-research consultant with the Regional Office of the World Health Organization at Manila.

She was graduated from Mt. Holyoke College in 1951 and earned a Master of Nursing degree from Yale University in 1954. Dr. Bloch received her Masters and Doctorate degree in public health from the School of Public Health at the University of California.

NII Blood Donors Needed
To Meet Needs of Patients

The Clinical Center Blood Bank reports that 517 units of blood were received from NIH donors in January, and CC patients received 1,141 units. To make an appointment to donate blood, call the Blood Bank, Ext. 64509.

Research on Brain Tumors Described in Pamphlets Issued by 2 Institutes

Research approaches followed by the National Cancer Institute and the National Institute of Neurological Diseases and Stroke on the problem of brain tumors—which cause nearly 8,000 deaths in the United States each year—are described in publications issued simultaneously.

Booklet Easy to Read

Brain Tumors and Spinal Cord Tumors, Hope Through Research is an easy-to-read booklet on current research and treatment of benign and malignant tumors of the central nervous system, published by NINDS.

The NCI publication, Research on Malignant Diseases of the Brain, is a more detailed report on detection and treatment of brain cancers.

Various types of benign and malignant tumors of the central nervous system are discussed in both books.

Early diagnosis is important for the successful treatment of brain tumors, according to the new publications. They also discuss surgery, radiation therapy alone or in addition to surgery, and the more recent use of radioisotopes.

Nationwide cooperative studies coordinated by NCI and NINDS are focusing on finding new drugs and new techniques of drug administration.

Other cooperative studies described in the booklets concern ways to enable cancer drugs—which are normally excluded by a protective mechanism called the blood-brain barrier—to enter the brain. Both publications describe a mechanism already developed for bypassing this barrier.

For single free copies of the pamphlet contact the Research Information Branch, National Cancer Institute, NIH, Bethesda, Md., 20014.

Softball Leagues Now Forming,
Employees Asked to Call R&W

The R&W Men's and Co-Rec Softball Leagues are now forming.

Anyone interested in entering a team in either the Men's fast-pitch league or the Co-Rec League should call the R&W office, Ext. 66061, and leave his name, extension, and R&W membership card number.

New NIH/NIMH Chapter
In Federal Association
To Meet February 24

The NIH/NIMH Chapter of the Federal Professional Association will be established at a meeting on Wednesday, Feb. 24, at 11 a.m. in Bldg. 31, Conference Room 1A-17.

Dr. Edwin D. Becker, NIAMD, chairman of the Organizing Committee, announced the meeting.

FPA's Executive Committee authorized the formal organization of the chapter. Dr. Becker noted that the committee "looks forward to valuable suggestions for FPA activities and policies from this important bastion of Federal science."

Two NIH/NIMH members are already serving on FPA's national Executive Committee. They are Dr. George J. Cosimides, national secretary, and Mel White, editorial director and editor, FPA Newsletter.

Personnel who have formally applied for membership may attend Wednesday's meeting and will have full voting privileges.

For further information and application blanks call Dr. Becker, Ext. 62194, Dr. Cosimides, Ext. 67707, or Mr. White, Ext. 66011.

Axelrod, Nobel Laureate,
Honored by Alma Mater

Dr. Julius Axelrod, Nobel Laureate, was awarded an honorary Doctor of Laws degree this week by the George Washington University.

It was from this university that Dr. Axelrod received his Ph.D. in Pharmacology in 1955, the year he joined the National Institute of Mental Health. Until that time he had been associated with the research programs of the National Heart Institute.

Dr. Axelrod shared the 1970 Nobel Prize for Physiology or Medicine with Dr. Ulf von Euler of Sweden and Sir Bernard Katz of England for research on neurotransmitters.
NIAID EMPLOYEES HELP

(Continued from Page 1)

Pakistan Government and the world knew the extent of the disaster.

When the serious relief problem was realized, some PSCRL employees and their wives—Richard Guerrant, Lincoln and Martha Chen, George and Peggy Curlin, and Jon and Cornelia Rohde—as well as Pakistanis and other Americans in Pakistan, decided to bring emergency relief to a village of about 500 people.

Food, Clothing Distributed

They collected more than $8,000 in Pakistan currency in Dacca and from friends in the United States and with this purchased milk, rice, and clothes to distribute.

On Nov. 21, the PSCRL men and other volunteers arrived in Chittagong. The next day they moved on to the large island of Hapabari and when they learned that no relief had reached Manpura Island, they chose that island for their work.

Their field report describes what they found at Manpura the next morning: “The scene is at first unbearable with corpses widely scattered. Good water up to 4 feet from the bank, and wide open fields will make a good drop area.

“Tried to get further south but found that sheep and caracasses everywhere.”

By sunset, they had distributed clothes, utensils, rice, matches, mustard oil, kerosene, and a tin lamp to families and milk to the children, serving over 1,500 people. They also attended to those needing medical attention.

Planes Sight Red Crosses

The next day planes and helicopters began sight the red crosses on white sheets displayed in the fields and dropped more supplies. A distribution system was set up using a different line for each item.

With each line policed by local citizens almost 4,000 people were served that day. Eventually, they established three relief centers 6 miles apart.

While the men worked on the island, their families were busy in Dacca and Chittagong securing supplies and arranging for planes and helicopters to airift them to Manpura.

By their combined efforts, and with the cooperation of West German, French, Pakistani, and American pilots, the Manpura survivors were soon regularly receiving the bare necessities of life.

As of Dec. 21, the group’s expenses amounted to about $49,000. Actually because many items were donated, the value of the goods distributed was much higher.

Following the group’s early success, the American Government (represented by the Agency for International Development) agreed to contribute $2 for every $1 collected by HELP.

With these funds, HELP plans to execute a redevelopment project on the island, as described in a recent letter from Dr. Jon Rohde, PSCRL:

“Volunteer specialists in agriculture, water resources, health, road building, and education have joined HELP to assist in formulating the Manpura Plan, a multidisciplined outline for rehabilitation and development of the island.

“This plan supports the principle of self-help and group cooperation in the construction of dikes, new houses, schools, roads (the island has never had any), cyclone shelters and the introduction of more efficient agricultural methods.

“Already the people have joined into cooperatives that have embarked on harvesting, road construction and house building . . .”

The volunteers hope the plan will not only restore the islanders’ former standard of living, but eventually advance their economy beyond the pre-cyclone level.

Donations Requested

To do this, the group is expanding its efforts to obtain donations. Dr. Robert S. Northrup, Laboratory of Clinical Investigations, NIAID, who is also a contract coordinator in the SEATO-Cholera Research Program at NIH, and Dr. Robert S. Gordon, Clinical Director, NIAMD, are representing HELP’s collection efforts in the U.S.

Dr. Wiley Mosley, an NIAID scientist at the PSCRL, tests drinking water in the Delta area as part of a 4-day survey conducted by U.S. and Pakistani physicians and scientists to determine the area’s immediate needs and available resources.

Dr. Northrup is a former PSCRL program officer and is also a contract coordinator with the National Institute of Neurological Diseases and Stroke.

According to the editor, Dr. William H. Rickles, Jr., UCLA Medical School, the bibliography includes such topics as the botany and chemistry of marijuana and hashish, sociological and legal issues, and clinical studies and case reports.

Summaries of each paper give the reader enough of an idea of the author’s findings to enable him to decide if a reading is worthwhile.

The bibliography may be purchased for $3 from the Institute Publications Office, BIS, UCLA Center for Health Sciences, Los Angeles, Calif. 90024. Checks may be made out to the UCLA Regents.

Bibliography of Scientific Papers on Marijuana Published by University

An annotated listing of selected scientific papers on marijuana that have been published from 1924-1970 was recently issued by the Brain Information Service (BIS), University of California at Los Angeles.

The book, Marijuana: A Selective Bibliography, was published by BIS operating under contract from the National Institute of Neurological Diseases and Stroke.

According to the editor, Dr. William H. Rickles, Jr., UCLA Medical School, the bibliography includes such topics as the botany and chemistry of marijuana and hashish, sociological and legal issues, and clinical studies and case reports.

PATENT

(Continued from Page 2)

the sterilization method and the method of extracting and purifying this hormone, which is called “mature.”

The hormone is extracted by centrifugation of the gland in a saline solution or from whole male bodies which have been freeze-dried. The hormone can be lyophilized and stored.

Sterilization of females, which is lifelong, can be accomplished either by injection or by feeding.

The hormone can also be added to the food of mosquito larvae or sprayed on surfaces where young mosquitoes feed.
For Patient Monitoring

A new computer display terminal for on-line patient monitoring is adding several dimensions to biomedical research through its low cost and unique combination of features.

Engineering scientists from two universities, working under grants from the Biotechnology Resources Branch, Division of Research Resources, recently demonstrated this computer display terminal.

Known as the General Purpose Graphics Terminal, it was developed at Loma Linda University. Currently, the University of Iowa is building eight of the display terminals. The computer display terminal was designed so that it could be built from components costing less than $7,000, about half the price of a commercially built model.

Special Features Cited

Some of the special features built into the terminal are character and vector generators for easy building of letters, numbers, and graph axes on the display, and a "refresher" to keep the picture steady while the computer analyzes test results.

These features allow the researchers to cut down programming time and reduce the computer's load so scientific data and tests can be analyzed more quickly.

Another feature is a direct lead-in from the patient to the computer through the graphics terminal. This allows the display to show preliminary results of tests such as pulmonary function and electrocardiogram, while the computer does a complete analysis and then updates the display.

The low cost display terminal incorporates a built-in "refresher" to keep the picture steady while the computer analyzes test results of pulmonary function.