

# The NIH Record

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National  
Institutes  
of  
Health

## Dr. John Gallin Presented Clinical Research Award



Dr. Gallin

(See DR. GALLIN, Page 9)

## NIH Proposal on Animal Welfare Policy Tightens Some Rules, Clarifies Others

The National Institutes of Health has proposed a revision of the Public Health Service animal welfare policy that is a refinement of, and in some instances stricter than, the current policy.

Since almost half of NIH research projects supported through grants and contracts involve the use of animals—most of them rodents—the revised policy could have a broad impact on the biomedical research community.

Dr. William F. Raub, NIH Deputy Director for Extramural Research and Training, discussed NIH's rationale for the revision and outlined some of the changes at the recent national symposium on "Imperatives in Research: Scientific Needs and Animal Welfare."

He covered five major areas that differ from current policy:

- **Greater specification of responsibilities within the awardee institution.** The revision speaks more clearly than the current policy on the responsibility of "a senior official" at the local institution signing off and committing the institution to certain activities and associated requirements. It also broadens the role of the attending veterinarian and goes into considerable detail about the institution's animal research committee.

## NCI Scientists Identify New Virus As Highly Probable Cause of AIDS

A science team at the National Cancer Institute, led by Dr. Robert C. Gallo Jr., has uncovered strong evidence that variants of a human cancer virus—called HTLV-III—are the primary cause of acquired immune deficiency syndrome (AIDS).

Though the discovery won't yield an immediate treatment for those who already have AIDS, it makes possible a simple test to screen blood donated to blood banks or sent to diagnostic labs and eventually may produce a vaccine against AIDS.

It may also lead to some type of medical intervention during the pre-AIDS phase which would prevent development of the full-blown, usually lethal disease.

Dr. Gallo and Assistant Secretary for Health, Dr. Edward N. Brandt Jr., both estimated it would be 2 to 3 years before any vaccine would be ready for testing and emphasized this was only a guess.

- **Changes in the role of the NIH Guide for the Care and Use of Laboratory Animals regarding the requirements of grants and contracts.** The revision distinguishes between the few requirements in the *NIH Guide* and its many recommendations. In addition, the proposed policy states that acceptance of the "Principles of the Care and Use of Laboratory Animals" would be "mandatory," and not just recommended as in the current policy. (The "Principles" are included in the appendix of the current *NIH Guide*.)

- **Types of Assurance.** Awardee institutions would have a choice of two ways to comply with the proposed policy: full accreditation by the American Association for the Accreditation of Laboratory Animal Care (AAALAC), a national nonprofit organization with a well-established inspection and accrediting system, or an assurance based on self-assessment.

The self-assessment option would be more specific (than stated in the current policy) in providing NIH with details and results of self-assessment and an annual report on progress toward correction of deficiencies. Institutions choosing the self-assessment option also would be subject to random selection for site visits by NIH.

(See ANIMALS, Page 11)

Dr. Gallo, chief of the Laboratory of Tumor Cell Biology in NCI's Division of Cancer Treatment, reported isolation of the new group of viruses. They are variants of a family of viruses known as human T-cell leukemia/lymphoma virus (HTLV).

The scientists isolated the new HTLV-III viruses from the helper T-cells of more than 50 patients with AIDS or pre-AIDS symptoms, and from some healthy individuals at risk of developing AIDS.

About 90 percent of AIDS patients tested so far have high levels of antibody to the virus (an indicator of infection). Similar results have been found in patients with pre-AIDS, such as the lymphadenopathy syndrome.

Normal people who are not at high risk of developing AIDS have very low levels or none.

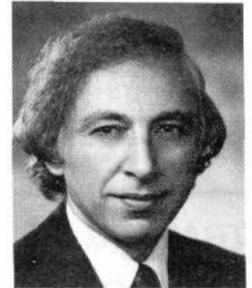
Four papers published by Dr. Gallo and his coworkers in the May 4 issue of *Science* document the scientists' ability to isolate the HTLV-III viruses from infected persons; the development of a method for growing the viruses in T-cells in the laboratory in bulk amounts; the biochemical and immunological characterization of proteins and genes of the viruses; and the presence of viral antibodies in blood samples of infected people.

"Although this evidence does not prove absolutely that these viruses cause AIDS," said NCI Director Dr. Vincent T. DeVita Jr., "it is very strong evidence that we have isolated the causative agent. Short of preventing the disease with a vaccine, we may find no better proof."

The NCI effort was set up as a coordinated AIDS task force headed by Dr. Peter J. Fischinger, NCI associate director, with Drs. Gallo and Samuel Broder as the scientific and clinical directors of this research. Scientists from other HHS agencies and the extramural community were regularly involved.

(See GALLO TEAM, Page 12)

See DCRT 20th Anniversary—pages 6, 7 and 10.



Dr. Gallo

# The NIH Record

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## TRAINING TIPS

The following courses sponsored by the Division of Personnel Management, are given in Bldg. 31.

Technical	Course Starts	Deadline
Principles of Editing	6/5	5/17
<i>Executive, Management and Supervisory</i>		
Making Time Productive	5/31	5/15
Effective Supervision	6/4	5/21
Effective Communication	6/12	5/25
Committee Dynamics	6/19	5/25
Planning for Prevention and Results	6/27	6/12
Managing Performance Feedback	7/9	6/22
<i>Administrative Systems</i>		
DELPRO (Delegated Procurement for new Delpro users only)	5/21	5/27

To learn more about these and other courses, contact the Development and Training Operations Branch, DPM, 496-6371.

## Reminder: Institute Relay May 23

The NIH Health Angels Jogging Club is sponsoring its annual Institute Challenge Relay this year on Wednesday, May 23, beginning at noon in front of Bldg. 1.

Entry forms and instruction sheets are available at the R&W Activities Desk in Bldg. 31, Rm. B1W30. Completed forms must be returned to the Activities Desk by Friday, May 18. Entries will be limited to 80 teams.

A \$3 entry fee is required by each team to help defray the cost of the event. Make checks payable to the R&W Association.

The Institute Relay is intended to promote friendly competition among runners and joggers at NIH. Runners and joggers of all abilities are encouraged to participate. □



The Easter Bunny (Lois Deninno), Baby Chick (Pat Moore), and Papa Bunny (Jeanne King) spread Easter cheer through the ACRF nursing units to patients and their families.

## Easter Bunny Visits Clinical Center

Dressed as the Easter Bunny, Papa Bunny, and Baby Chick, three National Eye Institute (NEI) staffers brought Easter cheer to the children in the 6 West oncology nursing unit on Good Friday. Lois Deninno, Jeanne King, and Patricia Moore tossed bags of jelly beans to delighted children, parents, and nurses during a lunchtime romp through the Clinical Center.

Almost 150 bags of jelly beans were donated by other NEI personnel who had been tipped off to the Easter Bunny's plans. Costumes and props for the three were donated

by local merchants.

Lois, Jeanne, and Pat are volunteers in a Clinical Center pilot program. They spend several lunch hours a week playing games and talking with children and their parents in 6 West.

Although the lunchtime program doesn't need more volunteers, NIH staffers are needed as volunteers for other programs. If you can give 3½ to 4 hours on weekends or after work on a regular basis, contact Linda Quick, Volunteer Coordinator, at 496-1807 for information. □

## Two Institutes Sponsor Special Lecture May 16

The National Institute of Allergy and Infectious Diseases and the National Cancer Institute will present a special lecture by Dr. M. A. Epstein, "A Prototype Antiviral Vaccine to Prevent Epstein-Barr Virus-Associated Tumors" on Wednesday, May 16, at 4 p.m. in Bldg. 1, Wilson Hall.

Dr. Epstein is professor of pathology at the University of Bristol Medical School, Bristol, England. In 1964 he and Dr. Y. M. Barr, for whom the virus is named, examined cultured

cells of biopsy specimens from patients suffering a rare form of cancer—Burkitt's lymphoma. This form of cancer occurs mainly in children in the warm, rainy lowlands of Africa.

Inside the cells they observed particles of the virus that is now known as the Epstein-Barr virus. This virus is one of the human herpes viruses which causes infectious mononucleosis and is also causally implicated in some forms of human cancer—Burkitt's lymphoma and nasopharyngeal carcinoma. □

## Brain Scientists Will Meet To Honor Nobelist Axelrod

A generation of brain scientists from around the world will converge on NIH in late

May to celebrate the career of their mentor and colleague, Dr. Julius Axelrod.

They will participate in a symposium on "Mechanisms of Synaptic Regulation," which will mark the pro forma retirement this year of the Nobel prize-winning National Institute of Mental Health neurochemist.

Dr. Axelrod plans to continue his research at the Institute. Many of these areas of modern neurobiology to which Dr. Axelrod and his colleagues have contributed will be surveyed at the symposium.

A banquet at which leading scientists, policymakers, and media representatives will honor Dr. Axelrod's work is also planned.

The symposium will be held May 31-June 1 in the amphitheater of the Clinical Center in Bethesda, Md. For more information contact: Dr. Martiri Zatz (301) 496-5590. □



Dr. Axelrod

## Amusing Chemical Hobby Turns Into Serious Science For Fogarty Scholar, Dr. Jerrold Meinwald

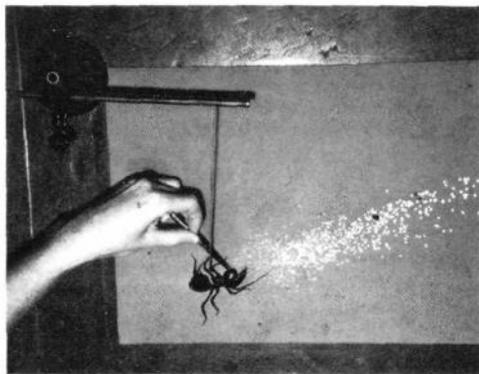
What started out as "an amusing chemical hobby" has led to serious scientific investigation over the last 25 years for Dr. Jerrold Meinwald, Fogarty Scholar-in-Residence from Cornell University's Department of Chemistry. When he's not playing his flute, you'll find him excitedly studying all kinds of insects. "They are marvelous creatures," he says.

After completing his graduate studies in organic chemistry at Harvard working with Nobel laureate R. B. Woodward, Dr. Meinwald joined Cornell's chemistry faculty in 1952.

About a half dozen years later, a young colleague in biology, Dr. Thomas Eisner, interested him in chemical defense and communications mechanisms among insects and other arthropods. Most of this research is now concerned with insects or plant-insect interactions.

"Insects are particularly important because they are uniquely successful on earth. Much of this success depends on their skillful use of organic chemistry. Of course, they are also serious competitors of ours," he says.

Among the animals he has studied are whip scorpions, millipedes, ticks, daddy



Whip scorpion sprays defensive secretion (84 percent acetic acid).

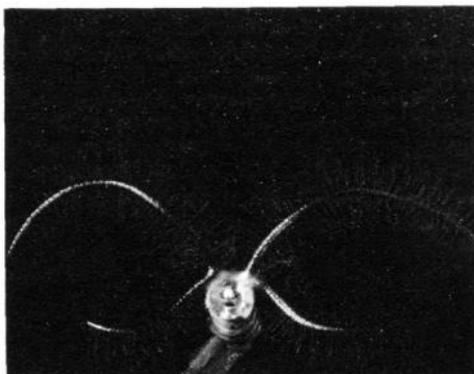
longlegs, centipedes, butterflies, moths, many kinds of beetles (there are over 200,000 species), ants, termites, cockroaches, fireflies, and some marine organisms such as alypsia, or sea-hare.

Some insects are agricultural pests and some are important disease vectors. For instance, mosquitoes carry malaria and yellow fever; the tsetse fly carries African sleeping sickness. Another disease spread by an invertebrate vector is schistosomiasis. In this case, a snail carries the schistosomes which are transmitted to man as larvae.

Currently there is little pharmaceutical research being done in the United States on these types of diseases because they are not commonly found here.

One of Dr. Meinwald's hopes is that his research could be applied to solving some of the outstanding problems presented by these diseases.

On May 16-18, a meeting is planned under his direction entitled "Molecular Messengers in Nature," cosponsored by the Fogarty International Center and the U.S. Department of Agriculture. The meeting will be concerned



Hairpencils of a male Sumatran tiger moth. These structures, as long as the entire insect, dispense an aphrodisiac-messenger compound.

primarily with chemical communication—how organisms interact using chemical messengers. (See box.)

Dr. Meinwald's study of firefly defenses, carried out in collaboration with Dr. Eisner, provides a good example of how chemistry and biology can go hand in hand.

Fireflies have been widely studied for their species-specific light signals, which are used during courtship. Dr. Eisner reasoned that light signalling, while useful for mate location, should be dangerous unless the fireflies had some sort of protection against predators.

Working with Drs. Leroy Haynes and David Wiemer, they soon found that the blood of some firefly species is filled with lucibafagins—cardiotonic steroids—which are the chemical defense compounds of this group of insects. These fireflies taste terrible to their predators.

Cardiotonic steroids are a group of steroids not previously known to occur in the animal kingdom except in the venom glands of oriental toads. These firefly compounds could provide useful leads for human use as heart drugs.

### Conference on Molecular Messengers

The Fogarty International Center will host a conference on *Molecular Messengers in Nature*, May 16-18, in the Clinical Center's ACRF amphitheatre.

Outstanding biologists, biochemists, and chemists will come together to discuss topics such as the isolation and characterization of new messengers, their synthesis and biosynthesis, how they are recognized by receptors, and how these chemical signals are translated into behavioral or developmental responses.

The program is being planned by Dr. Jerrold Meinwald, FIC Scholar-in-Residence, along with an organizing committee consisting of Drs. Thomas Eisner (Cornell), Henry M. Fales (NHLBI), Leo Levenbook (NIADDK), Richard L. Ridgway (USDA), and Jesse Roth (NIADDK).

Preregistration is necessary. Please contact: Nancy Shapiro, FIC, Bldg. 16A, Rm. 101, Bethesda, MD 20205; (301) 496-2517.

Where do the lucibafagins come from? In most species it is unknown. In one predatory species, however, males of another genus, containing the lucibafagins, are lured and eaten by the chemically unprotected females. These insect *femmes fatales* thereby acquire chemical protection from their food.

Many male moths and butterflies possess special organs, called hairpencils, which dispense chemicals that act as aphrodisiacs. These chemicals encourage the female to accept the male for mating. Typically the male rubs his hairpencils against the female's antennae in flight.

### Pheromone as Aphrodisiac

The aphrodisiac is an example of a pheromone, a compound which serves as a messenger substance between individuals of the same species. It acts like an external hormone.

As a research director of the International Center for Insect Physiology and Ecology in Nairobi, Kenya, from 1969 to 1976, Dr. Meinwald studied the African monarch butterfly with Dr. Dietrich Schneider.

In this species, the male butterfly makes his pheromone by seeking out a specific alkaloid-containing plant. He then extracts the alkaloid along with the plant juices, and uses it as a synthetic precursor to his pheromone.

Dr. Meinwald says of his continuing research:

"What is exciting about this work is that you never know what you're going to find. We start with observations in the field, take the insects into the laboratory, and try to identify the compounds responsible for interesting behaviors.

"The work then goes on to chemical isolation, structure proof and synthesis. In the end, we are able to appreciate some new role played by organic chemistry in nature." □



Dr. Henry Metzger, chief, Arthritis and Rheumatism Branch, NIADDK, will be honored May 16 by his alma mater, the College of Physicians and Surgeons of Columbia University. He will receive the Joseph Mather Smith Prize of the university, an award given to an alumnus whose research is judged by committee to be the most meritorious. Dr. Metzger's research interests have focused on the nature and effect of antibodies in inflammation. His studies have broad applicability in biology, specifically in understanding the immune system.

# Area Students Win NCI Awards for Science Fair Projects

By Conrad J. Storar

The quality of science and technical education in America's elementary and secondary schools has been a concern of many public officials. Some argue that quality is deteriorating and worry that the United States will lose its position as the world leader in scientific and technological research.

Such worries may be valid, but a visit to recent area science fairs might have alleviated them to a degree. More than 1,000 area students displayed projects at annual science fairs in Montgomery and Fairfax Counties in March and April.

The National Cancer Institute's Pediatric Branch awarded 34 special prizes—23 to Montgomery County students, 11 to Fairfax students—for creativity and scientific achievement.

This was the second consecutive year the Pediatric Branch awarded prizes to Montgomery County students, but the first time Fairfax County students were recognized.

It was also the first year that several other NIH components—the National Institute of General Medical Sciences, the National Institute of Allergy and Infectious Diseases, the National Heart, Lung, and Blood Institute, and the Division of Computer Research and Technology—presented awards to participants in the Montgomery County fair.

More than 400 students, in 7th through 12th grades of 46 public and private schools, displayed projects at the 28th annual Montgomery Area Science Fair. Almost 600 students took part in Fairfax County's 29th annual event.

NIH was one of many government, business, and private organizations which supported the fairs with special prizes.

General awards were presented in 12 subject categories in junior and senior divisions at each of the fairs. Dr. Elizabeth Weisburger, assistant director of the chemical carcinogenesis program in NCI's Division of Cancer Etiology, presented the special NCI awards to first, second, and third place winners, and to 20 honorable mention winners at the Montgomery County fair. Dr. Weisburger said it was the first time she had ever been to a science fair.

"I was pleasantly surprised by the number of girls who won prizes in the engineering and physics categories, areas normally not associated with women in science. If the number of students taking part means anything, there are definitely a lot of future researchers out there," she said.

## The Winners

Projects were judged on originality, creativity, and scientific merit. Each student selected a special problem to investigate or question to answer, and prepared a plan that included a research of the scientific literature, discussions with teachers or other advisors, and proposals for getting additional information through their own observations.

Students kept detailed records to document day-to-day progress with their projects. The judges evaluated those records along with charts, graphs, photos, maps, and models used to illustrate the experiments.

NCI's first prize in the Fairfax County fair



**Winners of NCI Pediatric Branch and NIGMS Science Fair Awards. Students participated in the 28th Montgomery Area Science Fair on Mar. 31 and displayed their projects in the NIH Visitors Center the week of Apr. 2.**

went to Kenneth Bellian, a 17-year-old junior at Hayfield Secondary School in Alexandria, Va., for a project titled "Teratogenic and Mucocutaneous Changes as Result of Accutane."

Bellian said he got the idea to study Accutane, a medication recently approved by the FDA for treatment of severe acne, during talks with a physician neighbor.



**Fairfax County Science Fair grand prize winner Kenneth Bellian (r) discusses his project with Clinical Center pharmacist Tony DeCicco, a volunteer judge for the fair.**

Over a period of several months, Bellian bred laboratory mice until he had a sufficient number of equal size and weight. He then removed Accutane gel from the capsules in which it is marketed, and administered it through a tube into the esophagus of each mouse.

He compared his findings, changes in organ size for example, with data collected from dissected controls.

He found size discrepancies between the organs of controls and those of mice which received Accutane. Male reproductive organs seemed to be most affected.

In a second experiment, he fed Accutane to five female mice, bred them, and observed the offspring. Most of the offspring were deformed in some way, and many had abnormal growths on the adrenal glands.

The amount of work Bellian devoted to his project impressed the judges, according to NCI judge Tony DeCicco. "The work he did demonstrated his awareness of many basic laboratory procedures," DeCicco said.

In addition to the NCI award, Bellian's project earned him the grand prize in the senior division. His project will be entered in a national competition in Columbus, Ohio, later this year. He also won awards from the FDA and the Potomac Pharmaceutical Association.

College is definitely among Bellian's future plans. "I plan to study medicine and would like to become a physician," he said. Ken is the son of Alvin and Mary Ann Bellian of Lorton, Va.

At the Montgomery County fair, Timothy



**Timothy Grislus, an 8th grader at St. Mary's School in Rockville, Md., won the top prize from NCI at the Montgomery County Science Fair.**

*(Continued on next page)*

(SCIENCE FAIR continued from page 4)

Grisius won first prize from NCI for "Analyzing Functions and Properties of Trypsin." Grisius, 14, an 8th grader at St. Mary's School in Rockville, also won second prize overall in the fair's biochemistry category, junior division.

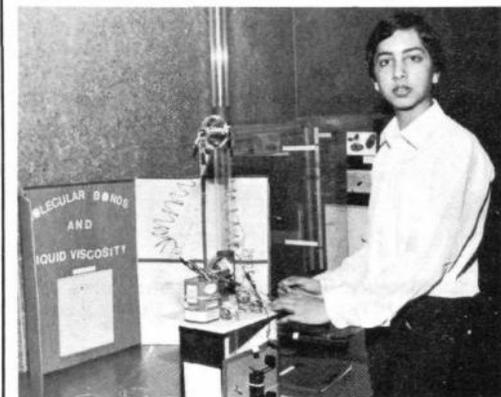
He conducted three different experiments to demonstrate that trypsin, an enzyme found in human intestines, is used to digest proteins. He also showed that trypsin can be used to analyze the structure of a protein, and that temperature affects trypsin's activity in the body.

Dr. Solomon Zimm of NCI said the judges were impressed by both the amount and the sophistication of the work Grisius did. "He did all of his work at home and did not use university, industry, or even high school lab space, as many of the entrants did," Dr. Zimm said.

Grisius worked on his project for more than 3 months and is already making plans for next year's science fair. He would like to study at Georgetown and hopes to become an orthopedic surgeon. Tim is the son of Richard and Sylvia Grisius of Potomac, Md.

NIGMS awarded nine prizes to participants in the Montgomery fair. Winners in the biochemistry category were Valerie Flax of Walt Whitman High for a study of the "Effects of Dexamethasone on Bone Cells *In Vitro*" and David Gray of Bethesda Chevy Chase High for "Graphic Simulation of DNA Protein Synthesis."

Neal Goldman of Gaithersburg High and Raja Shroff of Ridgeview Junior High re-



**Raja Schroff of Ridgeview Jr. High School in Montgomery County displays his project on molecular bonds and liquid viscosity which won an award from NIGMS.**

ceived awards for their chemistry projects on "Relative Enthalpy of Silicon Nitride B Structure" and "Molecular Bonds and Liquid Viscosity."

Toby Millman of Robert Frost Intermediate won in the medicine and health category for his examination of "Symmetry and Aging." Awards were also given for microbiology projects by Kathryn Dolecek of Paint Branch High ("Effect of an Electric Field on Population Growth and Morphology of *Tetrahymena*") and Niklos Perlmutter of Robert Frost Intermediate ("Zap Those Microbes"), as well as for zoology projects by Brian Lamacchia of Thomas S. Wootton High ("Crossing Over and Chromosome Mapping") and Edward Piou of Westland Intermediate ("The Nervous System of the Annelida").



**Julie Simonds of St. Camillus School in Silver Spring, Md., won third prize from NCI in the Montgomery County Science Fair for her project "How Do You Spell Relief?"**

The fairs are successful because of significant commitments made by volunteer judges and other interested adults. Two hundred and nine area scientists, engineers, and teachers volunteered to help judge the projects at the Montgomery County fair this year.

Volunteer judges from NCI for both fairs included Diane Cole, Jane Peters, Sheila Santacroce, Tony DeCicco, Cathie Schumacher, and Drs. Solomon Zimm, Frank Balis, Agnes Donahue, Barry Gause, and Herbert Holmes.

NIGMS judges were Drs. Elke Jordan, Fred Bergmann, and Carl Kuether, along with Ann Dieffenbach and Sandy Hecker.

At the invitation of NIH officials, winners of special awards from both NCI and NIGMS displayed their projects for a second time at the NIH Visitors Center in the Clinical Center's ACRF.

Peggy Brandenburg, chief of the NIH Visitors Center, said visitors and NIH staffers alike were impressed by the quality of the projects displayed by NCI and NIGMS award winners.

"I heard comments from visitors and NIH scientists. Everyone was impressed by the imagination and amount of work evident in the projects, especially those by the younger children," she said.

Any NIH groups interested in learning how to sponsor awards for next year's science fairs should contact Kathleen J. Robichaud, NCI pediatric program specialist, who coordinated the Pediatric Branch's participation in this year's program, at 496-4256. □

### **R&W Rafting on the Cheat, May 26**

Shooting the rapids is an exhilarating experience. Your cost for the trip to Cheat River Canyon will be \$48 (plus \$1 service charge), which includes the raft trip and lunch on the river.

R&W will provide a list of camping and lodging facilities in the area or if you desire you can join our group for overnight camping at Chestnut Ridge in West Virginia. Sign up at the R&W Activities Desk, Bldg. 31. □

### **CORRECTION**

In the last issue of *The NIH Record*, in the NIDR story on Herpes-1 antibodies which appeared on page 5, the rate of patients whose IgG response fell below the median level was incorrectly printed as 4 percent. It should have read 44 percent. □

## **Kinyoun Lecture To Be Given By Dr. Nathenson May 14**

Dr. Stanley G. Nathenson will deliver the Kinyoun Lecture, sponsored by the NIAID, on Monday, May 14, at 3 p.m. in Bldg. 1, Wilson Hall.

He will speak on "The Murine Major Histocompatibility Complex: Polymorphism, Diversity, Complexity."

Dr. Nathenson is professor of microbiology and immunology, and cell biology at the Albert Einstein College of Medicine in New York. He has been interested in transplantation immunity and immunogenetics for the past 20 years.

Dr. Nathenson's recent studies have centered on structure-function relationships in a series of mouse lines carrying mutations in their major histocompatibility complex



**Dr. Nathenson**

genes—a group of genes which, by their products, regulates a variety of immune processes.

These studies are being used to analyze the precise function-structure relationships of the classical transplantation products.

The Kinyoun Lecture series honors Dr. Joseph J. Kinyoun, who was the first director of the Laboratory of Hygiene at the Marine Hospital on Staten Island. The Laboratory of Hygiene, established in 1887, evolved into the National Institutes of Health. □

### **NICHD Brochure Available On Birth Control Pills**

A new brochure from the NICHD offers detailed, up-to-date information on birth control pills. In lay terms, *Facts about Oral Contraceptives* describes both the benefits and the risks to women who take the pill.

The 19-page brochure includes sections on: Today's Low-Dose Pills; Why Pills Fail; Minor Side Effects; Benefits Besides Contraception; The Major Risk: Cardiovascular Disease; The Pill and Cancer; The Pill and Body Chemistry; Depression; The Pill and Childbearing and How to Minimize the Risks.

The brochure is a reprint of an article produced by NICHD staff for the June 1983 issue of *Good Housekeeping* magazine.

Copies are available free in limited quantities from the NICHD Office of Research Reporting, Bldg. 31, Rm. 2A32, NIH Bethesda, MD 20205. □

## Organization And Collaboration

The Division of Computer Research and Technology has undergone several reorganizations in the past 20 years. Today, DCRT is made up of four laboratories and two branches working in many areas of collaborative research involving biomedical computing.

*Computer Systems Laboratory (CSL)* consults and collaborates in the design and implementation of specialized computer systems for laboratory and clinical applications.

*Laboratory of Applied Studies (LAS)* relates mathematics, statistics, and computer sciences to such biomedical problems as ECG analysis, evaluation of physiological systems in health and disease, modeling of the microcirculation, and estimation problems in laboratory medicine.

*Laboratory of Statistical and Mathematical Methodology (LSM)* offers statistical and mathematical help in analyzing biomedical data; provides computer program packages to perform these analyses; and performs research in statistics, mathematics, linguistics, and computer science.

*Physical Sciences Laboratory (PSL)* consults, collaborates, and conducts research in mathematical theory and practical instrumentation to explain biological phenomena in terms of chemistry and physics.

*Computer Center Branch (CCB)* designs, implements, and operates the NIH Central Computer Utility, and provides assistance, training, and technical communications to its users.

*Data Management Branch (DMB)* serves as a central resource of systems analysis, design, and programming for data processing projects relating to scientific, technical, management, and administrative data.

*Office of Automatic Data Processing Policy* promotes effective use of computer systems throughout NIH; provides advice to NIH management concerning automatic data processing policies and regulations affecting NIH.



The initial NIH venture into digital computing was tentative and exploratory. By 1964, NIH had two Honeywell H-800 computers, running about 30 jobs a day for a handful of NIH scientists and administrators.

## From Punch Cards to Powerful Computers:

Twenty years ago last month, the Department of Health, Education, and Welfare approved NIH's proposal to establish a new Division of Computer Research and Technology. In those 20 years since, computing has become an essential aspect of all NIH activities, and DCRT is an integral part of the conduct and support of biomedical science at NIH. It continues to meet the challenges of new opportunities in both biomedical and computer sciences.

Computing at NIH actually began 30 years ago and in that time, NIH's central computing system has evolved from a small number of separate rudimentary machines to an integrated system of powerful computers.

In 1965, NIH began to replace its Honeywell equipment with new "third generation" IBM 360 computers. These computers used integrated circuits rather than transistors, which allowed much faster processing of data.

Even with this hardware, the computer facility could accommodate an average of only 43 batch jobs per day. There were still no interactive systems, and almost all data storage was on magnetic tape, although eight disk drives did provide online storage for the massive NIH grants files. By the early 1970s, three computers were working together in the Central Utility.

In the mid-1970s, more efficient IBM 370



Today, DCRT is the world's largest biomedical computing facility. It has a role in conducting and managing all of the NIH programs. Its five IBM 3081 computers run 24 hours a day, 7 days a week to handle over 16,000 jobs a day for over 14,000 computer users.

The first data processing facility was established at NIH in 1954, and it consisted of electrical accounting machinery (EAM). The facility used punched cards for data entry and storage, and it took 22 employees to operate the equipment.

NIH's first electronic digital computer was installed in 1958. The machine was an IBM 650, and although it was not state-of-the-art, it had proven to be a reliable piece of equipment. It also was relatively easy to understand, because—unlike later models based on the binary number system—its operations relied on the base-10 or decimal system. But by the end of 1959, the 650's capacity was saturated and new equipment was needed.

A Honeywell H-800 computer was installed in 1961. It had far greater capacity than the IBM 650, and it could run eight jobs simultaneously. It was in operation 20 hours a day, 5 days a week and 20 to 25 hours on the weekend. However, its capacity soon peaked, a second Honeywell H-800 computer was in-

stalled in 1963, and a third added soon after to serve the other two.

computers gradually replaced the older 360 models. These new machines, along with new online disk storage units, provided much greater storage capacity, could handle data much faster, and facilitated both batch and interactive jobs.

Today, the NIH Central Computer Utility covers 26,000 square feet of space, making it one of the world's largest computer centers devoted to biomedical computing. The center runs 24 hours a day, 7 days a week; serves over 14,500 users, and processes over 30,000 batch and interactive jobs daily.

There are two major components of the utility. The primary one consists of five IBM 370 Model 3081 computers and a large array of peripheral devices for data storage and output.

These devices include 115 tape drives, 344 disk drives, 2 mass storage systems, 11 high speed printers, card reader/punches,

(See *COMPUTERS*, Page 10)

# DCRT Celebrates Two Decades of Growth

## Expanding Computers and Concepts

DCRT staff members have developed numerous systems to meet the varied computing needs at NIH. The shared spool concept, MLAB, NIH WYLBUR, DELPRO, and the Cardiology/Surgery Data Base are examples of the various achievements created on the NIH central computer systems.

*Shared spool* is a concept proposed by DCRT staff in the early 1970s that allows several computers to work together and accept jobs from one common "queue" or "spool." In the past, each computer had its own independent queue from which it could receive jobs.

Many times, one computer would have an overwhelming number of jobs waiting to be processed while another computer might be sitting idle with its queue empty.

The shared spool facility maximized use of all the computers in the central NIH computer utility by routing jobs to the next computer available for work. This concept later was picked up by computer manufacturers and has become an industry standard.

**MLAB:** Modeling LABoratory is a set of computer programs developed in 1970 and progressively enhanced to form an interactive system for mathematical modeling.

It allows the user to define models and specify data to fit a curve, to solve differential equations, and to produce high-quality graphic plots.

MLAB is now used at scientific facilities worldwide and has proved to be particularly useful for chemical kinetics and equilibrium binding models, for nuclear magnetic resonance models, and for pharmacological and other computational modeling.

**NIH WYLBUR:** WYLBUR began as an online interactive text editor and job entry facility. Terminals connected by telephone

lines to the NIH Computer Utility allow users to create, change, search, and display all kinds of text ranging from computer programs to office memoranda.

Other features of WYLBUR now include data manipulation, document formatting, powerful command procedures, and electronic mail.

The current NIH version was completely developed by DCRT staff. It is a successor to the original WYLBUR program designed by the Stanford University Computation Center.

**Administrative Data Base:** Material and financial management functions were unwieldy tasks at NIH until computer professionals in the Data Management Branch devised an automated system to handle these complex functions.

By the early 1980s, the Administrative Data Base (ADB) system was in place, to automate the ordering, receiving, and paying process at NIH. The ADB system is now an "electronic headquarters," eliminating manual processing of orders, speeding bill payments, and reducing paperwork throughout NIH.

**Cardiology/Surgery Branch Data Base:** This data base provides the Cardiology and Surgery Branches of the National Heart, Lung, and Blood Institute with comprehensive up-to-date information on all their patients.

Designed and implemented by the DCRT Data Management Branch, it produces three types of output for a physician's use: reports that list tests, procedures, and operations previously performed on a patient; counts of the number of patients as a function of specific data items; and statistics to allow physicians to calculate various risk factors involved in surgery.

## Projects And Problems And Solutions

DCRT's four laboratories are involved in many independent projects and collaborative research both with other BIDs and with other Federal, private, and international organizations. Some typical examples of the varied research and development projects of the past 20 years include:

**Nuclear Medicine:** In the late 1960s, staff members of DCRT's Laboratory of Applied Studies moved to bring computers to the field of nuclear medicine. Members of LAS and Computer Systems Laboratory worked with the NIH Nuclear Medicine Department to develop a system to collect scintillation data from a patient's heart at measured intervals over several hundred heartbeats and record this information to a small computer.

Then, algorithms were developed on a central computer that used the data to create images representing different stages of the heartbeat. Viewed as a series of video frames, scientists could see a "movie" of a beating heart.

Once the technique was refined, a new version was developed to collect the data and create images providing these movies on-site in the NIH Clinical Center.

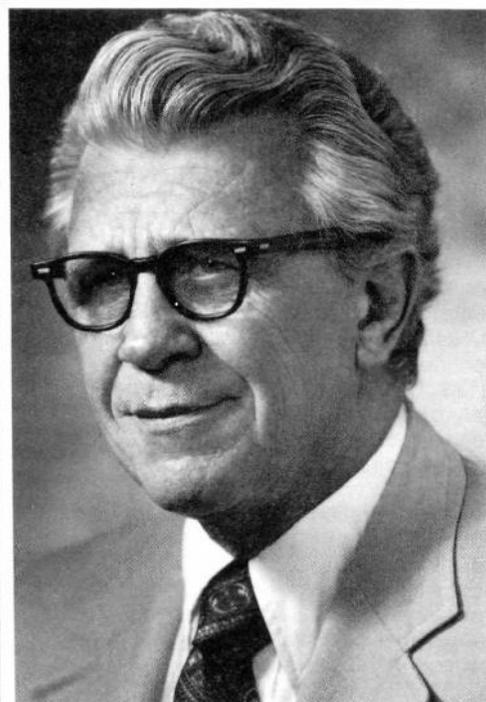
The field of nuclear cardiology blossomed. The technique was adapted by industry and today nearly every major cardiology group now uses this approach to examine the function of their patients' hearts.

**Molecular Graphics:** In the mid-1960s, crystallographers worldwide began to determine the coordinate structures of many proteins and nucleic acids. DCRT staff in the Heuristics Laboratory and the Computer Center Branch created a computer system to turn these coordinate numbers into three-dimensional graphic "TV" images that could be rotated and manipulated by the scientist.

This stereo capability allowed scientists to think of molecules as real objects in three dimensions and a microfiche output device in the computer center could be used to create

(See *PROJECTS*, Page 10)

## Dr. Arnold Pratt: DCRT's First and Only Director



Dr. Pratt

When Dr. Arnold W. Pratt was appointed the first and only Director of DCRT in August 1966, computing at NIH was a tentative and exploratory venture.

Under Dr. Pratt's leadership, DCRT has put NIH at the forefront of biomedical computing. The Division serves as a key scientific and technological resource for not only NIH, but also for other parts of the Public Health Service and for other Federal organizations with biomedical and statistical computing needs—a diverse and dynamic community of over 14,500 users.

### Internationally Known

He is internationally known for his research in computational linguistics and has published extensively in his field. Dr. Pratt is an alumnus of Hobart College and received his medical degree from the University of Rochester School of Medicine in 1946. He served on the staff of the New York Hospital from March 1946 to July 1947.

While a research associate at Cornell Medical School for 1 year, Dr. Pratt was a resident physician at the Protestant Children's Service. He first came to NIH in 1948, as head of the Energy Metabolism Section in the NCI Laboratory of Physiology.

His honors and awards include: a DHEW Superior Service Award in 1968; an honorary doctor of science degree in 1973 from Hobart and William Smith Colleges, Geneva, N.Y.; a Meritorious Executive Presidential Rank Award for the Senior Executive Service in 1980; and a Senior Executive Service Outstanding Performance Award in 1983.

## Dr. Seymour Kety Receives Two Prestigious Awards For Studies of Cerebral Circulation and Schizophrenia

Two prestigious honors were recently presented to Dr. Seymour Kety of the National Institute of Mental Health. He received Japan's Mihara Foundation Award for his work on circulation and metabolism of the brain and Germany's Golden Kraepelin Medal for his achievements in psychiatry.

Dr. Kety, who was the first scientific director of the National Institute of Mental Health, returned to NIMH last year to work with the Intramural Research Program he established in 1951. He is now the associate director for basic research.

The Mihara Foundation Award was conferred on Dr. Kety for his pioneering research on cerebral circulation, which began in 1945 at the University of Pennsylvania and continued after he came to NIMH.

Drs. Kety and Louis Sokoloff, whom Dr. Kety brought to NIMH from the University of Pennsylvania, studied the effects of normal aging on circulation and metabolism in the brain.

In collaboration with Drs. William Landau, Lewis Roland, Walter Freygang and Martin Reivich, they measured circulation in various parts of the living brain, building on Dr. Kety's earlier work.

Dr. Kety had developed a method for measuring the rate of total blood flow through the human brain, but realized that the method did not account for differential circulation in various parts of the brain. He then studied the process by which substances diffuse from capillaries into tissues.

In 1951, he developed equations that became the basis for the autoradiographic method to quantify local blood flow in animals as well as the techniques for imaging regional circulation in the human brain that have recently come into prominence, through use of positron emission tomography (PET scan).

The deoxyglucose technique for measuring regional brain metabolism, described by Dr. Kety as "a major leap forward which has opened up vast areas of exploration of functional activity in the human brain," was later developed independently by Dr. Sokoloff.

Back when Dr. Kety was at the University of Pennsylvania, he was visited by a young Japanese scientist, Toyozo Aizawa, who published a Japanese monograph on Dr. Kety's techniques and later established an important center for the study of cerebral circulation in Japan. Aizawa, is now professor emeritus of neurology at Keio University in Tokyo.

The Golden Kraepelin Medal was awarded to Dr. Kety during recent ceremonies at the Max Planck Institute for Psychiatry in Munich. Dr. Kety, who is only the 12th recipient of the award since its establishment in 1926 after the death of psychiatric pioneer Emil Kraepelin, received it for "outstanding achievements in the field of basic and clinical psychiatric research."

Among his achievements is a series of studies commencing in 1962, carried out with NIMH colleagues David Rosenthal and Paul Wender and Danish psychiatrist Fini Schulsinger, which has provided compelling evidence of a genetic factor in schizophrenia.



Dr. Kety

Using Denmark's excellent birth and health records, the scientists were able to identify from among 15,000 people who had been adopted at an early age, 76 who had developed schizophrenia and 76 matched controls who had not. They then traced the prevalence of schizophrenia among the adoptive relatives of both sets of subjects.

They found the disorder much more prevalent in the biological than in the adoptive families of adoptees who became schizophrenic. Prevalence in adoptive families was similar to that found in the general population.

According to Dr. Kety, the Danish study also supports the views of Kraepelin and Bleuler that schizophrenia is a persistent disorder occurring in two basic forms: "typical" schizophrenia—chronic and severe symptoms requiring hospitalization—and "simple" or "latent" schizophrenia—a milder disorder whose victims may be considered strange or eccentric but who are often able to make reasonable social adjustments.

The diagnosis of "acute" schizophrenia (non-reoccurring psychosis), which gained acceptance in this country and abroad, has muddied the diagnostic waters, Dr. Kety said in an interview.

He and his colleagues found not a single case of acute schizophrenia among the biological relatives of Danish adoptees who became schizophrenic, whereas they did find many cases of latent schizophrenia.

Psychosis—a break with reality typically involving hallucinations and delusions—is not necessarily schizophrenia, Dr. Kety said. While schizophrenia often involves such symptoms, its hallmarks are impoverishment of affect (emotional responses), withdrawal from or inappropriate responses to society, and diminution of volition (inability to plan or take action). Only a fraction of those who experience an acute psychotic break end up with schizophrenia, he pointed out. □

## Fogarty Scholars Arrive

Three more Fogarty International Center Scholars-in-Residence recently have arrived at the NIH.

**Dr. Francesco Blasi**, professor of Microbial Genetics at the Second Medical School, University of Naples, and director, International Institute of Genetics and Biophysics of the National Research Council of Italy, began his FIC Scholarship-in-Residence March 1.

Well known for his work on the regulation of gene expression in the histidine operon of *Salmonella typhimurium* and *Escherichia coli*, Dr. Blasi has recently turned his attention to eukaryotic chromosome structure including the plasminogen activator gene as well as various aspects of the human X-chromosome and its activation.

In 1968, he came to the Laboratory of Chemical Biology, NIAMD, at the NIH where he began his work on the histidine operon with Dr. Robert Goldberger. Returning to Naples in 1970, he rapidly rose to become full professor of Human Genetics and director of the Biophysics Institute.

During his scholarship, Dr. Blasi will be associated with the Laboratories of Molecular Biology and Biochemistry, NCI.

**Dr. Pablo Rudomin**, professor of physiology in the Center for Research and Advanced Study of the National Polytechnic Institute of Mexico City, arrived March 1, 1984, to begin his first term as a Scholar-in-Residence at the Fogarty International Center.

Dr. Rudomin received his university education in the National Polytechnic Institute and was granted his doctoral degree in 1965. He is well known for his work on the neurophysiology of the mammalian spinal cord and the mechanisms of presynaptic inhibition.

While maintaining an active research program that has achieved international recognition, Dr. Rudomin has devoted himself to advancing support for basic science in Mexico. He was president of the Mexican Academy of Sciences from 1981 to 1983 and is director of the National Program for Basic Sciences of the Mexican National Council of Science and Technology (CONACYT).

Dr. Rudomin will be associated with the Laboratory of Neural Control, NINCDS.

**Dr. Nathan Kaplan** arrived March 15 to begin his Fogarty Scholarship-in-Residence. He is professor of chemistry in the University of California at San Diego, where he has been on the faculty since 1968.

Dr. Kaplan is a well known enzymologist who enjoys worldwide recognition for his work in pyridine nucleotide chemistry, bioenergetics, bioenzymes, and chemical carcinogenesis. He is also the editor of *Methods of Enzymology*.

He is a member of the National Academy of Sciences and has received numerous honors, including the Eli Lilly Award in 1953 and the American Association for Clinical Chemistry Award in 1976.

Dr. Kaplan will be associated with the Laboratory of Biochemical Pharmacology, NIADDK.

The three Fogarty Scholars will have offices in Stone House, where they can be reached at 496-1213. □

## DR. GALLIN

(Continued from Page 1)

Dr. John I. Gallin, who heads NIAID's Bacterial Diseases Section of the Laboratory of Clinical Investigation, was presented the American Federation for Clinical Research Award for "outstanding contributions in clinical research," on May 6 at a plenary session of the federation held in Washington, D.C.

This award, which originated in 1983 and consists of a \$15,000 tax-free prize, was shared by Dr. Gallin and Dr. Stuart Orkin of the Harvard Medical Center. The awardees presented talks describing their work. Dr. Gallin's address was entitled, "Neutrophil Specific Granules are a Fuse that Ignites the Inflammatory Response."

Dr. Gallin is one of the country's foremost experts in phagocytic cells, scavenger cells which ingest microbes or other cells and foreign particles. His research has focused on phagocytic cell physiology with emphasis on immune cells, called neutrophils, and the evolution of the inflammatory response.

He and his group demonstrated that neutrophil secretory products have profound influences on the evolution of the inflammatory process. A major area of his research has been on the chemotaxis (chemically directed movement) of neutrophils.

His laboratory's contributions have included development of an automated assay of chemotaxis, description of several chemoattractants including chemotactic activity of histamine for eosinophils, and the discovery of a large intracellular pool of chemoattractant receptors within neutrophils that get mobilized with secretion.

As a consequence of the studies by Dr. Gallin and several other laboratories, neutrophils are now being viewed as an important secretory organ of inflammation.

Clinically, Dr. Gallin and his colleagues have described neutrophil defects in diseases characterized by recurrent bacterial infections, such as Chediak-Higashi syndrome, chronic granulomatous disease, Job's syndrome, neutrophil specific granule deficiency, and disorders of neutrophil microtubule metabolism. In addition, he has helped define appropriate programs for the management and prevention of the infections afflicting these patients. □

## Chamber Orchestra Concert, May 20

The NIH R&W Chamber Orchestra will present the third concert of its second season on Sunday evening, May 20, at 7:30 p.m. in the Masur Auditorium, Bldg. 10.

The program will include G. F. Handel's Concerto grosso in G, Op. 6 No. 1, the Concertino for Piano and Chamber Orchestra by American composer Walter Piston, and W. A. Mozart's Symphony No. 38 ("Prague"). Soloist in the Piston concertino will be Dr. Dean H. Hamer, piano, of the Laboratory of Biochemistry, National Cancer Institute.

Admission is \$3 for adults. Tickets will be available in advance at the R&W offices in Bldg. 31 and in the Westwood Bldg. and also on the evening of the concert. NIH Clinical Center patients and children under 12 will be admitted free. □

## NIH Wins Parklawn Classic for the Second Time



**Henry O'Connell crosses the finish line with a time of 25 minutes and 48 seconds to take 1st place in the Parklawn Classic.**

With an overall crowd of 254 runners, approximately 1,100 walkers, and a large cheering audience, Dr. Edward N. Brandt, Jr., Assistant Secretary for Health, started the 1984 Parklawn Classic at noon, Apr. 25.

Henry O'Connell, an NINCDS biochemist, led the race all the way and finished with a record time of 25 minutes and 48 seconds. Jerry Moore, last year's winner, finished third with a time of 28 minutes and 51 seconds. NIH'ers Brian Kay, Phil Snoy and Bill Willmering placed 4th, 7th and 10th respectively. In the overall classic race, NIH won five of the top 10 honors.

In the men's masters (40 and over), NIH won two of the top five awards with Bill Willmering taking 4th place and Jerome Kerkoff, 5th place.

NIH won 1st place again with Alison Wichman winning the women's open. Dr. Wichman, a neurologist in NINCDS, won with a time of 33 minutes and 51 seconds. In this category, NIH took 6 of the top 10 awards. Placing 6th through 10th respectively were Cheryl Jo White, Maureen Fagan, Lynda

Bennett, Anne Weisenborn, and Christine Grady.

NIH had no participants in the 40 and over women's masters category.

For the first time, this year's race was expanded to include team competition along with the other categories. Each team consisted of two men and two women from the same agency who had to register as a team.

NIH had three teams participating and again won 1st place in team competition with team #1. Members of the winning team were Henry O'Connell, Alison Wichman, Cheryl Jo White and Brian Kay.

NIH also had a big turnout in the 2-mile Health Walk with 47 walkers participating. Wilford Forbush, Deputy Assistant Secretary for Health Operations and Director, Office of Management, PHS, led the 2-mile walk again this year.

This was the second year that participants from NIH and other PHS agencies were invited to participate in the annual Parklawn Classic begun in 1976. Of the 254 runners, 50 were from NIH.



**Allison Wichman, winner of the women's open, receives the trophy from Dr. Brandt.**

However, NIH's participation not only included the runners and walkers but volunteers who served as organizers, time keepers, and race officials.

Trophies were presented to the winners by Dr. Brandt and medallions to place finishers.



**NIH participants seem pleased with the race results. Runners include: front row (l to r) Louis Mocca, Jerome Kerkhoff, Audry Shawver, Louis Pribyl; back row (l to r) Phil Snoy, Brian Kay, Bill Willmering.**

## COMPUTERS

(Continued from Page 6)

and microfiche output units. The system also has over 1,200 telephone lines serving hundreds of remote terminals at NIH and other Federal agencies.



**The microcomputer-controlled voice generator developed by DCRT's Computer Systems Laboratory promises to expand job prospects for the blind not only in computer programming, but in other fields as well.**

The other major component of the utility, the DECsystem-10 timesharing facility, comprises two DEC KL10 computers and is used primarily for scientific purposes. It provides timesharing services and data communications support for over 2,000 laboratory scientists throughout NIH.

Although DCRT provides most of its computer support through the central utility, the Division also conducts research and support with both minicomputers and microcomputers. DCRT's Computer Systems Laboratory has designed and implemented numerous minicomputer and microcomputer systems for various laboratory purposes.

The Division also is conducting a personal workstation project to evaluate the usefulness of personal computers in both offices and laboratories. The goal is to link the potential convenience and flexibility of personal computers to the proven power and capacity of larger central computer systems.

DCRT staffers also are involved in over 100 other collaborative research projects to help develop and design new ways that computers can be used in all facets of biomedical research. The details of this work are described each year in the *DCRT Annual Report*. □

The most general survey shows us that the two foes of human happiness are pain and boredom.—*Schopenhauer*

## PROJECTS

(Continued from Page 7)

selected stereo images of molecules.

DCRT staff members collected large amounts of data and, through extensive computation, created the Atlas of Macromolecular Structure on Microfiche containing over 100,000 pages of text and stereographic information on 96 macromolecules.

As technology progressed, a new display system that produced more advanced graphics was purchased. An algorithm was developed that could generate three-dimensional color spheres to represent the atoms of molecules.

Since 1976, over 70,000 macromolecular images have been produced. Many have appeared in scientific journals and textbooks.

**DLDACs:** The Distributed Laboratory Data Acquisition and Control System (DLDACs) was designed and developed by DCRT's Computer Systems Laboratory in the late 1960s. The system now consists of a network of "satellite" microcomputers, each of which connects a laboratory instrument to a central "host" computer shared by many laboratories.

The network design allows the laboratories to function independently of each other yet share the computational features that only the larger computer can offer.

The data collected from the instrument by the microcomputer can be transferred to the host computer at a convenient time. Thus, experiments do not depend on immediate access to the larger computer. The microcomputers also minimize the risk of losing data because they isolate the instruments from any failure in the rest of the system.

**Flow Cytometer/Electronic Cell Sorter:** Since 1975, the Computer Systems Laboratory has designed computer systems for electronic cell sorting at NIH. The most ad-

vanced version of microcomputers connects cell sorting units to a central host computer where the collected data are stored, analyzed, and displayed.

These machines count and sort all types of cells based on the rate of 50,000 per minute. It allows the microcomputers to collect new data while previously obtained data are still being processed on the host computer.

The CSL designs have become well-known, and have been copied by medical laboratories here and abroad.

**Voice Output Terminal:** In 1978 engineers in the Computer Systems Laboratory began collaboration with a blind computer programmer to develop and design a voice output computer terminal.

This "talking" terminal operates like a conventional terminal with one added feature. Besides displaying data on a video screen, the voice output terminal also speaks the words and numbers that appear on the screen.

CSL staff combined a commercially available voice synthesizer unit with a microcomputer controller. This "voicebox" unit is connected to a conventional terminal to interpret information received from the computer.

Using previously programmed rules of English speech, the voice terminal converts the electronic signals to the spoken words. The monotonal, mechanized voice may take a short while to get used to, but it has opened up endless possibilities for the handicapped. Additional CSL terminals have helped other blind Federal programmers in their work.

The design of CSL's voice output terminal has been given to private companies, and several similar models based on CSL's work are now on the market. □

## Dr. Lenore A. Bajda Retires From NINCDS

Dr. Lenore A. Bajda, a medical officer with the Demyelinating, Atrophic and Dementing Disorders Program, National Institute of Neurological and Communicative Disorders and Stroke, retired Feb. 3, ending her 23-year NIH career.

Since joining the NINCDS in 1961, Dr. Bajda has focused on a collaborative perinatal (from the 28th week before to 7 days after birth) study of cerebral palsy, other neurological and sensory disorders, and medical concerns involving pregnancy, birth and early childhood.

"I liked being in on the planning of the perinatal project," Dr. Bajda said of the study that evaluated medical records of 45,000 pregnant women and their children. "I'm truly glad to have been part of this study and still hope to finish up my latest part of it—on congenital heart disorders."

Because of her interest in reporting the results of her research, Dr. Bajda looks forward to continuing her membership in the American Medical Writers' Association.

"I want to learn how best to present the perinatal study data that's been collected and make it useful to society," she said.

Before joining NINCDS, Dr. Bajda served

as an assistant health officer for the Montgomery County Health Department in Maryland and as a maternal and child health clinician and health officer in Mississippi.

Dr. Bajda said she has always had an interest in science, medicine, and infectious diseases.

"I was fortunate to have inherited an inquiring mind from my father," said Dr. Bajda. James J. Bajda was the chemist who in the early 1920s developed the first color-fast blue dye for fabric.

With her father's encouragement, Dr. Bajda earned her B.S. degree from Wagner College and her M.D. degree from Women's Medical College (now called The Medical College of Pennsylvania). She later received an M.P.H. degree from the University of North Carolina.

Dr. Bajda plans to continue her church activities and community service work. Groups in which she is active include Mobile Medical Care, Inc., the Montgomery County Medical Society Public Health Committee, and Soroptimist International of Montgomery County.

"I like being in on the planning stages of any project," Dr. Bajda said. "And now that they know I'm retired, more and more people want more and more of my time." □

## Harvard Molecular Biologist Wins MacArthur Prize; May Use Money To Hunt for Lost Greek Tragedies

Dr. Matthew Meselson, a National Institute of General Medical Sciences (NIGMS) grantee, was recently awarded a MacArthur Prize: \$256,000 over 5 years, tax free, no strings attached.

The John D. and Catherine T. MacArthur Foundation has awarded approximately twenty 5-year grants to "exceptionally talented individuals" each year since 1981. The MacArthur Fellows Program—the most famous of the four foundation grant award areas—is for "highly talented individuals in any field of endeavor."

Dr. Meselson is the third current or former NIGMS grantee to win a MacArthur Fellows Prize.

A biochemist and molecular biologist currently teaching and doing research at Harvard University, Dr. Meselson has made many significant contributions to the advancement of biomedical research, particularly in genetics.

Dr. Meselson has a long list of research accomplishments. In 1957, at the California Institute of Technology, he and Dr. Franklin Stahl showed that DNA replication (the DNA duplicating process) is semi-conservative.

They found that the two strands of DNA separate during replication and that each of the two new DNA molecules formed includes one strand of the old DNA and one that has just been manufactured.

With Dr. Sidney Brenner and Dr. Francois Jacob in 1961, Dr. Meselson proposed the existence of an intermediate carrier of genetic information which came to be known as messenger RNA. They realized that proteins are synthesized on structures called ribosomes which are protein factories in the cell's cytoplasm (material outside of the nucleus) rather than on the genes which are located in the nucleus.

It has since been demonstrated that the primary "plans" for proteins—which are recorded in DNA—are copied as messenger RNA, and this is used by ribosomes to direct the production of proteins.

In 1968, Dr. Meselson and Dr. Robert Yuan detected and isolated one of the first restriction enzymes from the bacteria *Escherichia coli*. It was found later that some restriction enzymes have the ability to cut DNA into defined segments, a process central to recombinant DNA technology.

In 1973, Dr. Meselson and Dr. Bob Baughman described a new and more sensitive test to determine the concentration of dioxin in body fat. Dioxin is a toxic and potentially carcinogenic substance found as a contaminant in the herbicide 2,4,5-T and in the defoliant "Agent Orange" used in Vietnam.

With Dr. Robert Wagner in 1976, Dr. Meselson predicted and described repair mechanisms in bacteria that correct mismatched segments of DNA. The four nucleoside bases (the informational content of DNA) are normally positioned in the DNA molecule with cytosine across from guanine and adenine across from thymine.

If the bases are not opposite their usual partners—if cytosine is paired with adenine, for example—that segment of DNA is said to

be "mismatched" and errors in reading the genetic blueprint will result.

Although most of these mutations are corrected, mismatched DNA can sometimes result in genetic disease. The correcting mechanism Drs. Meselson and Wagner described is now known as methyl-directed DNA mismatch repair.

Most recently, Dr. Meselson has been studying transposable genetic elements in *Drosophila melanogaster* (fruit flies). These elements are able to move around the genetic material. They may play a role in development, but can also cause mutations and changes in gene function in each location.

Many different types of transposable elements exist, but only those in bacteria, yeast, maize, and fruit flies have been well characterized thus far. It is now suspected that transposable elements are a major feature of many genetic processes, and studying them yields information on cancer, the immune response, evolution, and drug resistance.

Heat shock genes in *Drosophila* are another area of Dr. Meselson's research. When the flies are placed in an environment much warmer than they are used to, most protein production is shut down, but some genes appear to be switched on. These genes direct the production of new proteins called heat shock proteins.

Heat shock genes may function in an evolutionary capacity and help the flies adjust to climate changes. Heat shock proteins have been found in other organisms as well, and scientists believe that studying this phenomenon will help them understand how specific genes are switched on and off. Better understanding of processes involved in growth and development could result.

Dr. Meselson has been involved in a range of research issues, but he has many interests outside genetics as well. When asked what he might do with his prize money, Dr. Meselson said that one of his ideas is to search for some of the lost classical Greek tragedies including those by "Sophocles and Sappho."

"Almost all the Greek tragedies written have been lost," said Dr. Meselson. He believes that clues to locating them exist and that receiving the MacArthur Prize provides the opportunity to go after them. □

### Horseback Riding Weekend, May 18-20

The R&W will again sponsor horseback riding weekends in the mountains of Western Maryland, near Deep Creek Lake. The first trip is scheduled for the weekend of May 18-20 at a cost of \$89 per person.

Participants will drive out to Deep Creek Lake on Friday evening (carpools will be arranged), where they will check into modern lake-side townhouses for the weekend.

Horses are available all day Saturday and Sunday, with half day and full-day trail rides and solo riding available. On Saturday night, a horse-drawn hayride is planned. Beginners as well as experienced riders can share in the fun. (Nonriders are welcome to come along at a reduced rate.) Sign up now at the R&W Activities Desk, Bldg. 31. □

## ANIMALS

(Continued from Page 1)

• *Composition of the Local Animal Research Committee.* Current policy calls for an animal care committee of at least five members, one of whom should be a suitably qualified veterinarian. The proposed revision specifies that the committee (to be called the animal research committee) also include at least one practicing scientist experienced in the use of laboratory animals, at least one individual who is not a scientist, and at least one individual who is not an employee or otherwise associated with the institution.

• *Functions of the Local Animal Research Committee.* Under the proposed changes, the animal research committee would be required to review and approve the care and use of animals in those research applications and proposals that involve animals. Dr. Raub noted that this function does not duplicate or substitute for the technical merit review carried out by NIH study sections or other peer review groups within the government.

Dr. Raub described the rationale behind the changes in the revised policy by touching on three basic premises:

"First, we at NIH continue to believe that the scientists and their institutions are in the best position to promote proper care and use of laboratory animals.

"Second, we remain convinced that the vast majority of scientists and administrators are guided by their knowledge that good animal care is an integral part of good science. Third, we hope that the proposed refinements in the PHS policy will make it easier for everyone involved to know what is expected of him or her and yet avoid both undue restraints on scientific inquiry and unnecessary expense."

Dr. Raub answered two rhetorical questions, "Why a revised policy statement?" and "Why now?", by listing several considerations. First of all, he said, NIH's experiences with the current policy over many years have yielded an accumulation of possible refinements.

In addition, there has been a significant increase in interest in animal welfare issues on the part of the general public and the biomedical research community. Also, NIH participation in congressional hearings on possible new legislation has "produced new ideas for improvement."

Other factors leading to the revision: stronger ties between the Public Health Service and the Department of Agriculture, closer interaction with the AAALAC, and findings from a series of site visits conducted by NIH over the past year at 10 awardee institutions.

These site visits suggested several policy changes that could strengthen the system so that NIH is assured of local compliance with the PHS animal welfare policy.

Dr. Raub mentioned that copies of the proposed policy have been mailed to all 22,000 subscribers of the *NIH Guide for Grants and Contracts*. This is part of an effort to stimulate written comments on the thrust and details of the document by a July 15 deadline.

The Office for Protection from Research Risks, the NIH unit that administers the animal welfare policy for the Public Health Service, plans to sponsor three open hearings before drafting the final policy. □

## Gallo Team Finds AIDS Virus

(Continued from Page 1)

Dr. Gallo's laboratory together with clinicians and scientists from the NCI Immunology Branch, Memorial Sloan-Kettering Cancer Center, Duke University, the University of North Carolina, North Shore University Hospital on Long Island, Walter Reed Army Institute of Research in Washington, D.C., the University of Medicine and Dentistry of New Jersey in Newark, and New England Deaconess Hospital in Boston were able to isolate the HTLV-III viruses by finding human T-cells that grow well in the laboratory and are especially permissive for infection by these viruses.

This discovery made possible the isolation of proteins made by the viruses from these cells. Enough viral protein was produced to test selected blood samples for the presence of antibody to the viruses. As a result, the scientists were able to devise a simple laboratory test that diagnoses the presence of HTLV-III antibodies in blood.

NCI scientists predict that within 6 months it will be possible to produce the amounts of viral protein needed for large-scale screening of blood samples by blood banks and diagnostic laboratories. Rapid tests for antibodies to HTLV-III in human blood are already feasible.

Scientists at the NCI Frederick Cancer Research Facility are collaborating with Dr. Gallo's group to develop procedures for large-scale production of these proteins.

NCI scientists also believe it will be possible to develop new ideas for treatment and a vaccine for AIDS.

These scientists are now exploring the detailed biochemical and immunological characteristics of the new HTLV-III viruses, which infect helper T-cells preferentially.

Their lethal effect on T-cells is unusual for the HTLV viruses. Together with detectable differences in some of their proteins and genetic information, their ability to kill T-cells clearly separates these viruses from other members of the HTLV family.

The virus isolated by the NCI scientists is a member of a family of retroviruses, which have been studied extensively in animals. The genetic material in these viruses is ribonucleic acid (RNA).

*AIDS is an often fatal disease characterized by a severe loss of natural immunity that predisposes the patient to severe opportunistic infections and other disorders. These include Pneumocystis carinii pneumonia and Kaposi's sarcoma, a rare cancer that starts in cells of blood vessel walls. It occurs predominately among homosexual men with multiple sexual partners, intravenous drug abusers, hemophiliacs, blood transfusion recipients, and close heterosexual contacts of members of these high-risk groups. The severe immune deficiency in patients with AIDS is caused by destruction of immune system cells in the blood called helper T-cells.*

The retroviruses are named for their ability to convert RNA into deoxyribonucleic acid (DNA), the hereditary chemical comprising the genes of human and animal cells.

In so doing, these viruses use the genetic machinery of the cells they infect to make the proteins they need to survive. In the process, many retroviruses cause a variety of ailments in animals, including depressed immune functions and cancer.

The first member of the HTLV family of viruses, HTLV-I, was isolated in 1978 and first published in 1980, also by Dr. Gallo and his coworkers. It has been re-isolated many times since then in this country and abroad from a form of leukemia and lymphoma that affects mature T-cells.

Extensive epidemiologic studies have linked HTLV-I to clusters of these cancers in certain parts of the world, particularly southern Japan, the Caribbean, and parts of South America and Africa.

A related virus, called HTLV-II, rarely isolated, originally taken from a patient with a hairy cell leukemia by Dr. Gallo and his group in collaboration with UCLA scientists.

Dr. Gallo and his collaborators first reported biochemical evidence, and Dr. Max Essex and other scientists from the Harvard School of Public Health and the Centers for Disease Control reported immunological evidence, for an association between HTLV or a variant of it with AIDS in the May 12, 1983, issue of *Science*. □

## PRAT Pharmacology Lecture Slated at ACRF on May 9

The Pharmacology Research Associate Program of the National Institute of General Medical Sciences will sponsor a lecture for its fellows, their preceptors, and all interested NIH staff on Wednesday, May 9, at 9:30 a.m. in the ACRF amphitheater.

"Of Toxicity and Panacea, of Cabbages and Kings" is the title of the talk to be delivered by Dr. Sidney Nelson, associate professor of medicinal chemistry, school of pharmacy, University of Washington, Seattle.

After obtaining his Ph.D from the University of California, San Francisco, Dr. Nelson was a PRAT fellow from 1974 to 1976 under Dr. James Gillette, chief of the Laboratory of Chemical Pharmacology, National Heart, Lung, and Blood Institute.

He is the recipient of two prestigious

awards—the John J. Abel Award of the American Society for Pharmacology and Experimental Therapeutics in 1981, and the Frank Blood Award in Toxicology (co-recipient) in 1983.

Following the lecture, the 22 current PRAT fellows will present informal poster sessions on the research they are conducting. The poster session will take place adjacent to the NIH Visitors Center.

The PRAT Program offers 2 years of postdoctoral research training in pharmacology within the intramural laboratories of NIH and the Alcohol, Drug Abuse, and Mental Health Administration for outstanding individuals with backgrounds in clinical medicine or basic sciences. □

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