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A UK / Industry Emphasis

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ODYSSEY

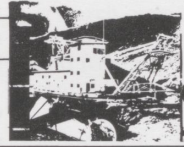
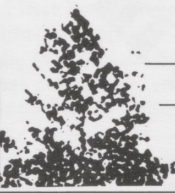
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An Emphasis On Industry

The amount of industry supported research at the University of Kentucky could double within the next few years. Industry sponsored research currently accounts for three percent of all externally sponsored research at UK; however, within the next 10 years that percentage could approach 10 percent.

The anticipated increase reflects a national trend for universities to turn toward industry for research support. During the past four years, this has become increasingly evident in both east and west coast universities and in private and land grant schools. Recent multi-million dollar agreements have given impetus to this trend.

"Traditionally the University of Kentucky has felt that as a state university it has had an obligation to work with industry, particularly in projects important to the state," says Executive Director of the UK Research Foundation James Y. McDonald. "But it has also been traditional for industry to support more applied research as opposed to basic research and, generally speaking, UK has felt that its role was more in the realm of basic than applied research. Of course, there are some notable exceptions within the UK structures; the colleges of Agriculture, Engineering, Medicine and Pharmacy have always worked closely with industry to significant degrees and often in the applied end of the spectrum. In fact, it is in these areas that we expect industry support to increase—building on strength, as it were. But we hope that the increase will not be limited to these areas."

Industry supported research accounts for approximately 25 percent of UK's College of Pharmacy's funded research says Dr. Harry Kostenbauder, associate dean for research in the College of Pharmacy. "We have been involved in industry supported projects since about 1969 and think that our support will increase."

In the College of Agriculture industry support also accounts for approximately 25 percent of funded research. This amount includes grants and gifts. "Industry support supplements and complements our federal and state funded basic research programs and experimental stations," says Orin Little, associate dean for research in the College of Agriculture.

For the most part, the industry sponsored research in these areas is in the form of specific grants for specific projects, and in many cases the industry support was only available to UK through personal contacts between faculty and industry personnel. Although this approach has been successful, UK hopes to broaden the effort and to build on the record of success that has been established largely through the efforts of individual faculty.

"The type of university/industry research agreements we are expecting to see in the future are those of a different magnitude," says Vice Chancellor for Research Wimberly Royster. "It could involve individual support of individual faculty, but more than likely it would involve support of a program in one of the natural sciences, health sciences and engineering, involving faculty members from a variety of schools conducting related research."

In the past UK has received a large gift from Ashland Oil Corporation, as well as support from tobacco companies that have allowed UK to establish visiting professorships and recruit research assistants. These kinds of university/industry sponsorship agreements do not contain the expectation of a certain outcome or product, although, eventually industry will benefit from whatever kind of research it supports at the university.

"There is no doubt that industry sponsored research is one of the high priorities in UK's research plans," Dr. Royster says.

Several current university/industry sponsored projects are featured in this issue of *ODYSSEY*. For example, the article entitled "Reclaiming The Land" concerns research sponsored in part by Peabody Coal Co. "The Flying Taxicabs for Plant Viruses" is a project funded by grants from the U.S. Dept. of Agriculture and the R.J. Reynolds Tobacco Co. It discusses methods under study to protect agricultural land from the devastating effects of plant infection which is spread by aphids. "A Kentucky/Texas Endeavor" describes a collaboration between Hahn & Clay Company of Houston, Texas and several of the UK engineering faculty and "Vitamin Research" concerns a study of vitamins A, C and E which is funded in part by a grant from Hoffman La-Roche.

Industry collaboration, as pointed out, is not new to our campus but for now, and in the coming years, it is our intention to assist in providing an atmosphere where such partnerships can grow and become an even more significant part of the University of Kentucky research program.

Reclaiming The Land

By Michael Kirkhorn

For more than a decade now, Richard T. Barnhisel has been working quietly to disprove the notion that stripmined land cannot be restored to full productivity. If his reclamation experiments in Western Kentucky continue to succeed, it will be due to his ability to combine scientific understanding with ordinary "horse sense."

Barnhisel, professor of agronomy at the University of Kentucky, began to work on reclamation at a time when the consensus was that reclamation

It also meant paying closer attention to the techniques used in preparing mined soil for reclamation. "Traditionally," Barnhisel said, "stripmined land is bulldozed and flattened almost as hard as a floor. So they got fifty percent runoff. They couldn't keep water on the soil because it had a rock pavement surface.

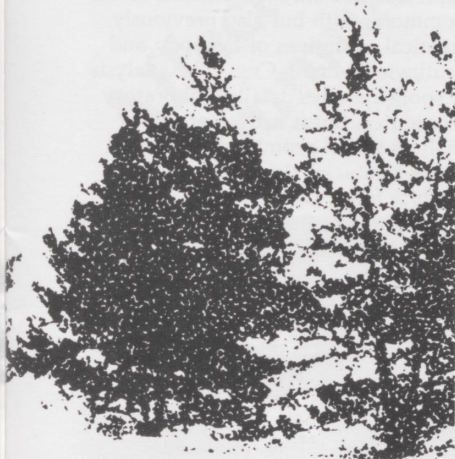
"We went in with a disk harrow, roughened the land and ripped it on the contour," he said. This combination of ploughing, ripping and applying phosphates to the mined land dramatically improved the growth of grasses. It also attracted increasing amounts of attention from mining companies, who, Barnhisel said, had been "convinced that environmentalists were right" in their bleak assessment of the prospects for effective reclamation.

Barnhisel has found, among other things, that not all stripmined land in

Western Kentucky is too acidic to be reclaimed for agriculture. "Some spoils are acidic, some are not," he observed. A more common problem is that mined lands are "very low in phosphorus—this is the limiting factor in plant growth."

Barnhisel said that he has received about \$1.5 million to support his research over the last decade. Much of the money has come from state and federal grants, but he estimates that the Peabody Coal Co. provided about one fourth of his research money and a lot of technical support.

CONTINUED PAGE 4



was "somewhat hopeless." But Barnhisel and his associates—including representatives of mining companies—found that much of the pessimism was unfounded.

"We found that by applying farming technology—ordinary horse sense—that growth of grasses on stripmined land could be promoted," he said. "That meant paying attention to the right seed, to timing and fertility."



RECLAIMING THE LAND CONTINUED

As the coal companies begin to mine increasing amounts of prime agricultural acreage—land which the federal government will require be restored to its premining productivity—Barnhisel's research becomes more and more important to them.

As coal companies begin mining increasing amounts of prime agricultural acreage—land which the federal government will require be restored to its original productivity—Barnhisel's research becomes more and more important to them.

The research also has been beneficial for his students, about 15 of whom have received masters degrees in reclamation. As he runs down the list of students, the rippling effect of his research becomes evident: one student is in Thailand, applying Barnhisel's reclamation techniques to family-owned mines; one is with the Tennessee Valley Authority; another works for the United States Soil Conservation Service; several are studying for doctorates. "Whether or not they go into reclamation for their careers, they will have had the opportunity to do some research in this important area and to solve some problems," he said.

One of Barnhisel's earlier collaborators was UK graduate student James L. Powell, who was hired by Peabody and made reclamation supervisor for the company's Western Kentucky mines. Some of Powell's and Barnhisel's discoveries sound deceptively simple. In an article published in a 1977 issue of the *Mining Congress Journal*, they noted that the maintaining of vegetation of mined land depends on "climate, spoil testing, plant species selection, final grading, adequate fertility and lime amendments, seedbed preparation, mechanics of seeding and management of newly-

seeded areas. Poor planning or incorrect choices, as well as failure to properly complete any of the above, could result in total or partial failure of the reclamation project. All of these factors are equally important, and their effects upon ultimate vegetation establishment and long term maintenance are interrelated."

Obvious, perhaps, but the sort of comprehensive attention Barnhisel has devoted to reclamation was uncommon in Western Kentucky

before he began his work.

Barnhisel came to the University of Kentucky as an assistant professor of agronomy in 1964. He has published more than 30 articles, but attributes much of his achievement to the farming practices he observed during his rural upbringing in Miami County, Indiana. For example, the Commonwealth of Kentucky—responding to Barnhisel's



experiments—now encourages Western Kentucky miners to roughen the surface of reclaimed land after grading so it will hold more moisture for crop growth. Though there are differences between soils and spoils (water soaks into mining spoil more slowly), any farmer knows that roughened land will hold more water. "We just showed that plants grow better with water," Barnhisel said. "These are just farmer common sense things applied to mining."

Too much can be made, however, of Barnhisel's common sense approach. He is, after all, a scientist, and the persuasiveness of his approach depends in part on his effectiveness as a researcher. A reading of his scientific papers indicates that sophistication of the scientific verification which has impressed not only the officials of the Commonwealth but also previously skeptical executives of Peabody and Southwind Mining Cos. The analysis of spoils requires detailed laboratory procedures, but it is this sort of analysis which promises that in the future Kentucky stripmining will produce fewer "moonscapes" and desert-like remains, and more fields of clover, corn and soybeans.

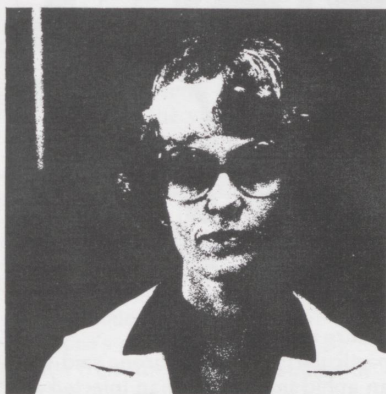
Faced with more stringent government regulation, miners obviously must do what they can to predict the effects of stripping on certain kinds of soil, and to understand what measures will be needed to restore it to productivity. Barnhisel and his associates are responding to this need. A recent project, supported by the U.S. Office of Surface Mining, is intended to "develop predictors of the erodibility of mine spoil and reconstructed topsoil and to make this information available to design engineers."

This research, continuing at sites in Ohio County, in Western Kentucky, has led to refinement in the measure of runoff and in the collection of data so "voluminous" that it is best analyzed through the use of computer programs written for this research.

The outcome of all this investigation is not yet entirely clear, but it already has dispelled some of the pessimism Barnhisel noticed when he began the work 11 years ago, and it has led to substantial cooperation between the University of Kentucky and coal companies operating in the state.

By Betty Tevis

Tracking and Cloning Enzymes Affecting Our Immunity

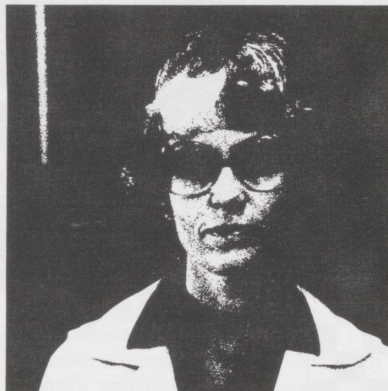


The enzyme TdT was discovered by former University of Kentucky biochemist Dr. Frederic Bollum. Mary Sue Coleman, then a postdoctoral fellow working with Bollum, is now in the forefront of TdT research. Robert Lester, chairman of the Department of Biochemistry in which Coleman is an associate professor, says, "You cannot tell the story of TdT without Dr. Coleman's work."

Over the past eight years, with continuous funding from the National Cancer Institute, Dr. Coleman and colleagues have begun unlocking some of the secrets of TdT.

Coleman's research attempts to understand particular enzymes which are believed significant to the human immune system. She seeks ways to isolate, clone, mark, and monitor those enzymes which are found in significantly high or low levels in patients with certain leukemias and lymphomas.

TdT—terminal deoxynucleotidyl transferase—is often found in increased levels in the bone marrow of these patients. Using new techniques in the field of molecular biology Coleman is attempting to answer certain questions about terminal transferase. She is concerned with how the synthesis of TdT is regulated at the genetic level, and with the cellular role of TdT and the role of TdT in the body's immune system.



Coleman's interest is to understand those enzymes crucial to the human immune system—isolate them, clone them, mark them, monitor them.

Another enzyme of interest to Coleman is ADA—adenosine deaminase. ADA is absent in the bodies of children suffering from Severe Combined Immunodeficiency Disease. Coleman and Dr. John Hutton discovered that deficiency of ADA in these children causes the buildup of a substance which destroys the immune system. Their findings are currently accepted as an explanation of the pathology of this disease. As a result, drugs which inhibit ADA have been found to be usefully clinically when reducing the immune function in humans is desirable.

Coleman, along with University colleagues Drs. Robert Dickson and Robert Rhoads, is currently attempting to clone the genes for TdT and ADA. Her laboratory is also making monoclonal antibodies to TdT and ADA and conducting clinical and chemical studies of both enzymes.

Coleman's work is respected by her colleagues. Dr. Michael Grever, a hematologist at The Ohio State University Medical Center, says, "Dr. Coleman has been a major help to us in relating changes in red blood cells to the toxicity of new cancer drugs. She is," he adds, "a first-rate scientist who is willing to put time and effort into finding what will help medicine and man, what will make therapy safe and effective."

Coleman and Dr. Yosh Maruyama, chief of radiation medicine at the University of Kentucky, are using TdT as a marker in the study of changes in the hemopoietic (blood-forming) system caused by radiation. Dr. Lester calls this kind of collaboration between basic and clinical scientists "taking biochemistry to the bedside."

Despite her accomplishments, Coleman maintains that hers has been the "normal career progression." She finds the university setting an exciting one in large part because it offers close associations with co-researchers, fellows, and students. "We gain from

having students and fellows around. They ask questions and challenge old ways of doing things." It was in a college laboratory that Coleman herself consolidated her interest in a career in science. "In a research lab," she says, "you learn an aspect of science you could never learn from books and lectures."

"I like the life I live," Coleman says. "I cannot imagine doing anything else."

The Flying Taxicabs for Plant Viruses

By Michael Kirkhorn

The aphid, wriggling in its cage under the microscope, aphidic proboscis, through which it eats, tucked into its chest—good thing it isn't bigger: it would not make an attractive pet. Why not just close your eyes and ignore it?

Ask Professor Thomas P. Pirone of the University of Kentucky's Department of Plant Pathology. The aphid is at the center of his attention just now. He should have an answer.

It happens that the aphid is one indispensable ingredient for an intricate transaction which leads to the infection of plants, therefore to the loss of agricultural products to humankind. Pirone is investigating the process, and it is a complicated one.

Think of aphids as the only taxi company willing to pick up this kind of fare—in this case, potyviruses, described in the literature as "flexuous rods with modal lengths from about 680 to 900 nm" and by Pirone as "a class of viruses which contain more viruses of economic importance than any other."

The Aphid Cab Company is very fast. Once it picks up a potyvirus it delivers the thing to its destination, a healthy plant, in seconds or minutes. Virus and aphid hardly have time to chat, and that doesn't help the plant, nor those who are trying to prevent the spread of the virus.

Worse yet, the plant cooperates. Once infected it produces a protein "helper component" which allows other aphids to spread still more virus to other plants. One of Pirone's principal goals is to further explore the mystery of the helper.

The practical agricultural problem is sizeable. Kentucky's major cash crops: tobacco, soybeans and corn, its major forage legume, red clover, as well as numerous types of vegetables and ornamentals have potyviruses which infect and cause serious losses in yield and quality.

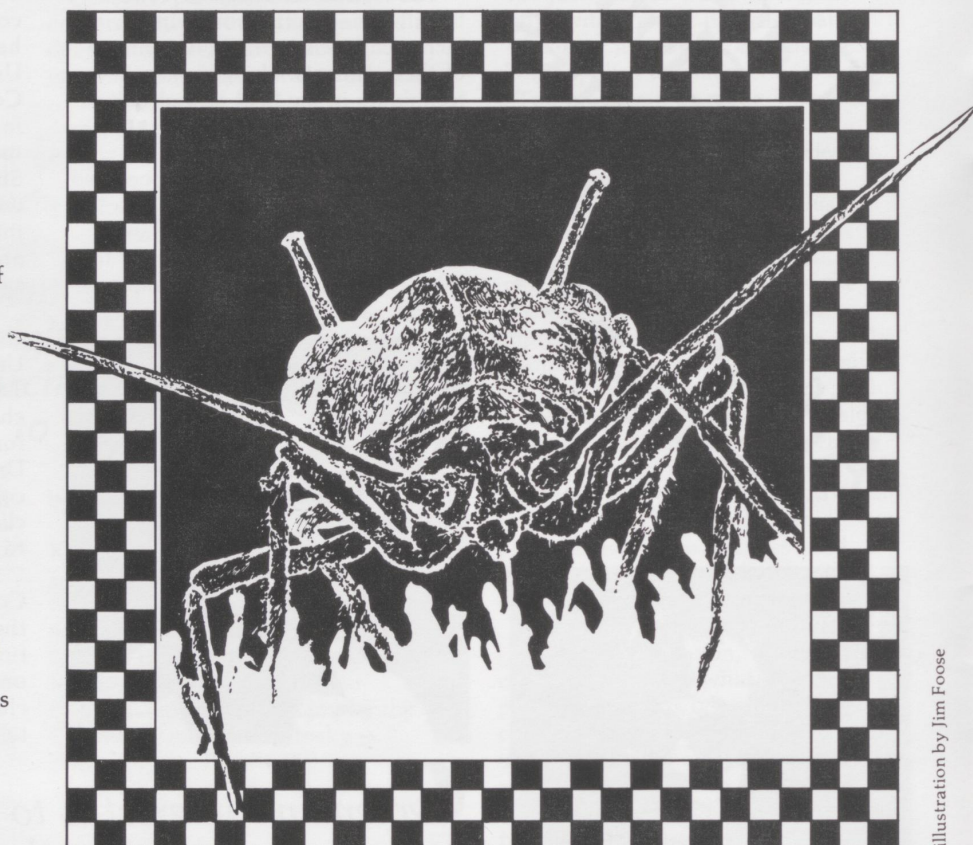


illustration by Jim Foote

The more than 60 viruses which belong to the potyvirus group occur worldwide and attack more than 110 different plant species.

Scientists have bred plants which resist infection, but new virus strains constantly arise which overcome the resistance. Methods of control, such as oil sprays or aphid-repellent mulches, are useful only on high-value crops such as flowers and certain vegetables and even then there are limitations.

The quickness with which virus

occurs makes the problem particularly difficult. Pirone said that an aphid may land on an infected weed, take up the virus, then inoculate two or three healthy plants. Once infected, the crop plant serves as a source of virus for further contamination. In this way an entire field of tobacco may be infected. "In Kentucky, year in and year out, two viruses, tobacco-etch and tobacco-vein mottling, cause more losses than any other disease, he said.

Insecticide spraying would seem to

Unfortunately, the plant seems to cooperate with the aphid, inviting infection.

One aphid-spread virus infects plants belonging to more than 40 different botanical families.

be an obvious solution, but, Pirone observed, infection "can happen in seconds—too fast for the aphids to be killed by poison."

A deeper understanding of the interaction between plant, virus, aphid and the protein helper component (HC) should improve the effectiveness of currently used methods of protection, and perhaps lead to the development of new methods of control.

A conversation with Pirone suggests the presence of some genuine mysteries, of intriguing puzzles which become more complex and more intriguing with investigation. The aphid seems, for example, to be nothing more than a "casual" carrier of the virus, but if the relationship is casual, "why do only aphids transmit these viruses?" From an evolutionary standpoint, the question is even more interesting: How does it happen that particular viruses are transmitted only by particular insects, and what about the evolution of this protein, "whose only purpose seems to be to help the aphid spread the virus?"

"You seldom get a total answer to anything in biology," Pirone said and scientists sometimes find that they are not even asking the right questions, but he seems confident that by focusing research on the helper component, some important answers may be found.

Pirone's research, supported by grants from the U.S. Department of Agriculture and from the R.J. Reynolds Tobacco Co., is proceeding in the laboratory and in the field, where, on two four and one-half acre plots, the spread of aphid-borne viruses in tobacco is being studied.

By collecting aphids from plants, trapping aphids live and determining which species are carrying virus, and correlating the incidence of particular aphid species with the incidence of infected plants, Pirone hopes to obtain a better understanding of precisely how virus spread occurs.

In the laboratory, the helper component remains a mystery, but a mystery which gradually is being uncovered. David Thornbury, a postdoctoral research specialist in

Pirone's lab, has been able to purify the HC, and they have learned that helper components produced by different potyviruses differ significantly.

In a joint effort with other scientists in the Plant Pathology and Biochemistry departments at UK, evidence has been obtained that the message for HC production is in the RNA genome of the virus. Any plant the virus can infect will apparently be directed to produce this protein. "This is a very exciting finding," Pirone said, even though the finding makes it appear that "it is no longer viable to look at breeding for resistance to helper component production as a potential means for control of virus spread.

Pirone's current research is intended to complete the characterization of the helper component and to determine conclusively whether it is a viral gene product. To do this he and Thornbury have adopted an immunological approach, using antibodies to highly purified HC to neutralize specific polypeptides or to identify specific gene products. Once this is completed, the focus will be on determining just how the HC works.

The minuteness of the research is troubling . . . the amounts of virus and HC involved are so small; there is almost nothing there.

The minuteness of this aspect of the research is troubling for Pirone—"the amount of virus and HC involved in the transmission process is so small; there is almost nothing there"—and nearly defies the ordinary layperson's understanding. The outcome will depend on the converging of several indirect findings.

Pirone and his associates intend, for example, to test the hypothesis that HC binds the virus to the aphid's food canal by allowing the aphids to acquire radio-labelled virus with and without HC. Then electron microscope autoradiography of the sectioned food canal would be employed to determine whether binding of HC treated (transmissible) or untreated (nontransmissible) virus has occurred. This is difficult enough, but Pirone says that it will be even more difficult to obtain conclusive evidence about the hypothesis that the aphid protects the virus, if the binding hypothesis does not work out.

It seems to be too soon to be optimistic or pessimistic about these experiments. But knowledge is increasing, and eventually the outcome may bring about some rerouting of the old, reliable aphid transportation business.



A Virus Called Herpes

By Tawny R. Acker

The three most common untruths of the 1980s may well be: The check is in the mail, the Mercedes is paid for and I don't have herpes.

And indeed in the latter case, it is probably an untruth because approximately 42 million people have either herpes simplex I or II. If a vote were taken, herpes would probably be elected the social disease of the decade. It would win by a wide margin if media coverage is any indication, since it has certainly graced enough magazine covers.

A brief synopsis of the herpes story, as it has appeared in the media, is as follows: Herpes is a virus that infects a host at some part of the body and stays with that host forever; although, it may be dormant for extended periods of time. There are two strains of herpes receiving the most attention: herpes simplex I and II. Herpes simplex I exhibits itself in what used to be called "cold sores" or "fever blisters" which appear on the inside or outside of the mouth. Herpes simplex II also takes the form of fluid-filled blisters, but they appear primarily on the genitals (although they can appear anywhere on the lower body.) Both strains of herpes are usually transmitted by close contact with an infected individual and, herpes simplex II is most often transmitted by intimate sexual contact, hence the psychological and sociological implications.

One prevention a sexually active person can take is to use condoms as a sanitary measure. However, this precaution is not 100 percent effective because the eruptions may appear anywhere on the lower body and in women, internally.

This is not to suggest that sexual

contact is the only way herpes simplex II may be transmitted, although it is the most frequent. The virus may be transmitted from one person to another by the infected person touching some object and another person, especially one with an open wound, immediately touching the same object. There is also minor evidence that the virus can

live on clothing, towels and the ever-guilty toilet seat.

Both strains of herpes may be treated with a drug called Acyclovir, which appears to hasten the drying of the blisters and provide relief from the itching and burning. However, the drug is only a treatment not a cure and does nothing to prevent further episodes. It has been suggested by some researchers that large amounts of caffeine and emotional stress may be responsible for triggering repeated episodes.

The national media attention herpes attracts usually focuses on psychological and sociological implications of human herpes strains rather than on scientific research being done toward a treatment or cure. And most of the coverage has touched only briefly on the research being done on the more than 50 different strains that attack a diverse range of animals from horses to tree shrews and catfish.

The herpes virus takes little from its host cell except a place to attach itself for life.

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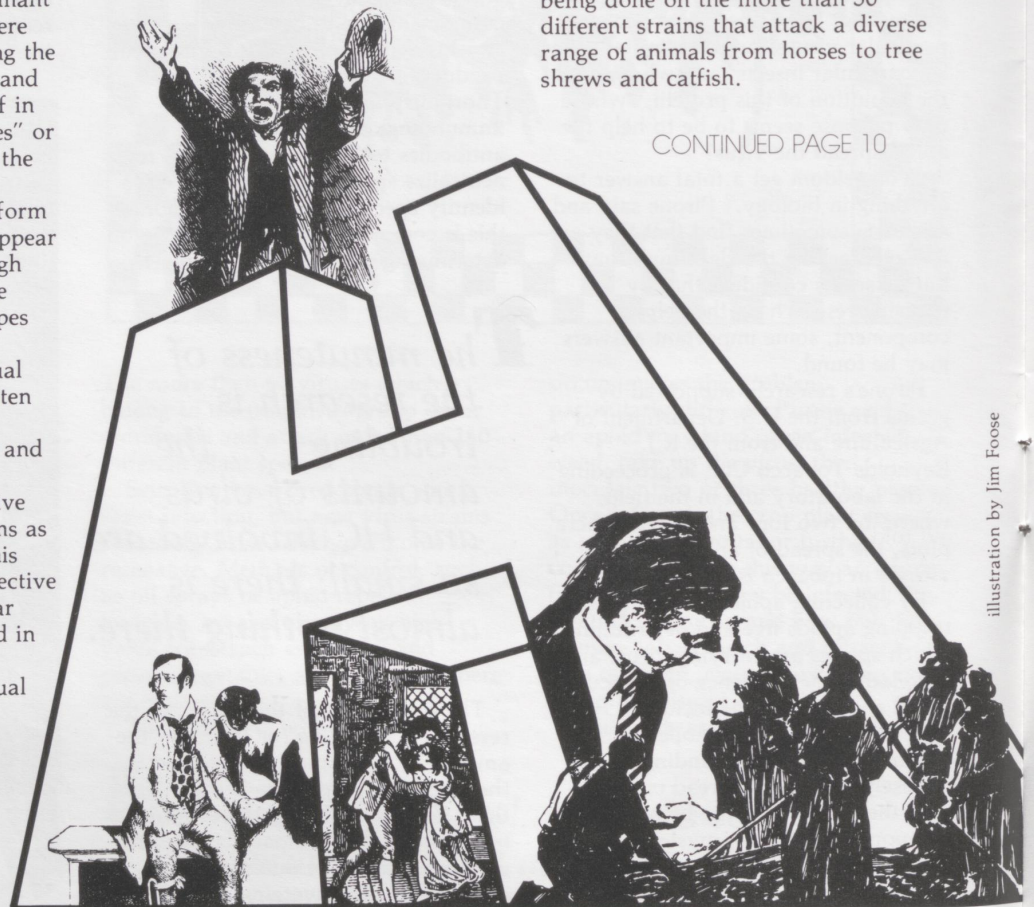


illustration by Jim Foote

*Mad All
The Time,
Sad All
The Time*

A young woman with herpes who is associated with the Lexington herpes group, HELP, consented to write a personal account of her experience with contracting the disease. The names used in the story are fictitious.

I have herpes.

If you could see me, you would see a young, attractive, well-groomed, middle class woman who appears to come from a good family. I have a master's degree and a salaried job with fringe benefits.

I consider myself a happy person. So why is it such a big deal that every once in a while I get some tiny blisters? They only last a few days, and they go away. Often I don't even have a breakout for two or three months. And usually the blisters are only marginally painful; only when I had my first attack did I have it bad.

That was three years ago, in the summer. I was 27 years old and very much in love—with Martin.

"It's called a herpes blister," Martin had told me when I noticed he had a small lesion. "I get them every once in a while."

"Isn't that something bad?" I asked.

"I went to the doctor for it and he said it was nothing to worry about. It's the same as a fever blister."

This was before *Time* magazine's "Scarlet Letter of the 80's" cover, before herpes jokes ("What's the difference between herpes and love?" "Herpes is forever."), before anyone knew I had it.

Who Contracts "Sexual Leprosy"?

By Susan H. Donohew

On the day of her wedding, a young Lexington woman found out that her husband-to-be had herpes and had infected her. The wedding was called off.

Her story is one of many related during meetings of a local herpes self-help group. Contracting herpes, however, is just the beginning. What happens? How do they cope? How really bad is it for them? How does it affect them? These and other questions were recently put to members of the Lexington herpes group and a Cincinnati group, both called HELP. Not all HELP members chose to participate in the questionnaire. However, the 27 who did, 13 women and 14 men, provided some insight into a disease that has been termed "sexual leprosy."

The survey was put together by Robert Moore of UK's Department of Behavioral Sciences and included a section on coping developed by colleague John Wilson and the UK College of Agriculture's Health Hazard Appraisal, a much used questionnaire to determine behavioral factors that will affect an individual's health.

A recent *Life* magazine article cited a survey that 22 percent of all unmarried Americans between 18 and 37 have altered their sexual habits to avoid infection. However, according to the experiences of many of the HELP group, this strategy may not prevent their infection. For example, three members contracted it from their spouses, four from their fiancées, 14 from friends (the depth of the friendship was not determined by the question), and six from others. So over one-fourth were either engaged to be married or married to the individual who infected them and more than two-thirds had, at a minimum, been friends.

In other words there was a high level of certainty as to who infected them—complete certainty was expressed by 59.3% and only two individuals, 7.4 % were unsure as to how they contracted it.

Almost all of the relationships had been disrupted since the discovery of the herpes infection, although, as Moore points out, this does not necessarily mean that herpes was the cause for the break. "However, 81.5% indicated they had reduced or eliminated contacts with the persons who infected them," says Moore. The marriages of the three victims who had been infected by their spouses had ended, although one had ended by the death of the spouse.

Reports of just how frequent the herpes lesions occur varies from individual to individual. HELP members participating in the survey indicated they had occurrences of an outbreak, the period during which they have lesions and can infect others, from one time a year to three times a month and the periods of infection lasted from one-half day a month to twenty days a month. The average frequency of outbreaks was one time a month with a duration of eight days. However, UK microbiologist Robert Jacob points out that they are not equally infectious to others during the entire period—at some points infection is very likely, at other times, less likely.

The average age for the group is approximately 34 years old, although based on their diet, exercise and behavior patterns, the health risk index indicated their age to be 36, or two years older than a group of the same age, race and sex composition. Also they ran a greater risk of death from all causes in the next 10 years than a comparable group—14.1% higher. The higher rate is, however, independent of the fact that they have herpes.

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Most herpes vaccines under study are designed to be given to children to insure protection for later life.

"Media coverage usually increases the pool of monies available for research; however, herpes virus research has not yet begun to benefit—alot of talk, so far," says Dr. Robert Jacob, University of Kentucky professor of microbiology and immunology at the Chandler Medical Center. Jacob is one of the few researchers at UK studying herpes from a purely basic research angle aimed at eventually developing a means of preventing and treating the viral infections.

A viral infection, like herpes, spreads because the virus duplicates itself and increases its numbers. "Herpes is a somewhat unique virus, because it carries with it almost all of the genetic material necessary to duplicate itself, as well as the code for the enzymes and other gene products specific for the virus and takes little from its host cell, except a place to attach itself for life," says Jacob. "However, if the virus kills the cells it infects, and ultimately its host organism, it will terminate its growth. Herpes is a parasite that appears to make a decision to live quiescently in the cell and "persist" in a "latent" form in its host (man or animal). Understandably this uniqueness presents a challenge."

Jacob's research is on two important aspects of the herpes viral duplication. He examines how herpes simplex virus duplicates its chromosome. This research focuses most on the "primary" event that signals the DNA of the chromosome to duplicate. Since the DNA of the chromosome contains the code for the viral genes, it must be duplicated before the herpes virus infection can spread. The most popular drugs used to control herpes virus infections are targeted at stopping the viral DNA from duplicating. His work has contributed to improving our understanding of how DNA duplicates and how better drugs may be designed to stop this duplication; thereby, stopping the spread of infection.

The other aspect of Jacob's research concerns locating a specific gene in a

herpes virus that causes a sexually transmitted disease in horses (equine herpes virus III). This particular gene appears to stop the virus from duplicating when the temperature is elevated. Although this research is at an early stage, the gene appears to be present in both human and horse herpes viruses that are fresh isolates. The implication for the research is far reaching because the temperature that stops duplication of the virus is reminiscent of the elevated temperature seen during the fever that sometimes accompanies herpes virus infection. Jacob is curious to know if this is the mechanism responsible for signaling the virus to become "quiescent" or "latent" in the host animal. Ironically, the "latent state" of infection may be the virus's way of adapting to what the body does (fever) to stop the spread of the virus.

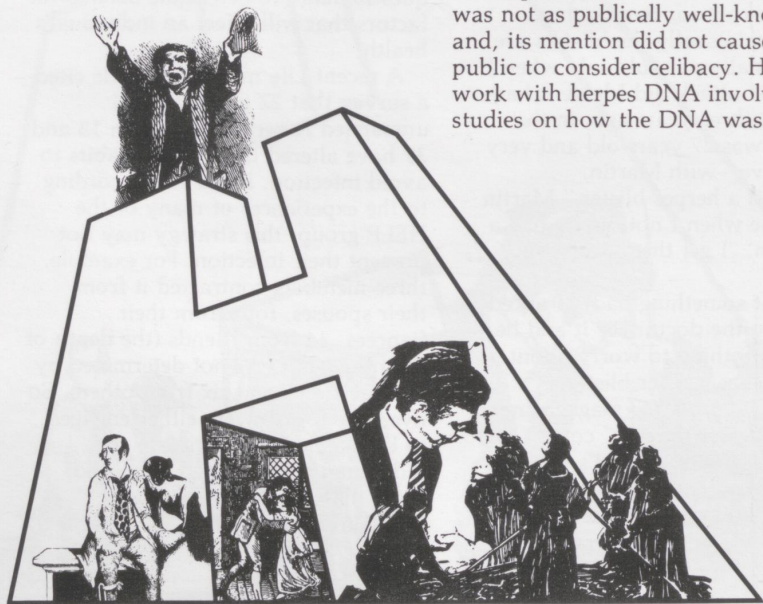
A large number of people do have or have had some form of herpes. If not "fever blisters" then they have had chicken pox or perhaps, shingles. Jacob says it is not yet known why some people are more susceptible to the virus in the first place, much less susceptible to a second assault from the same or another strain. In fact, he

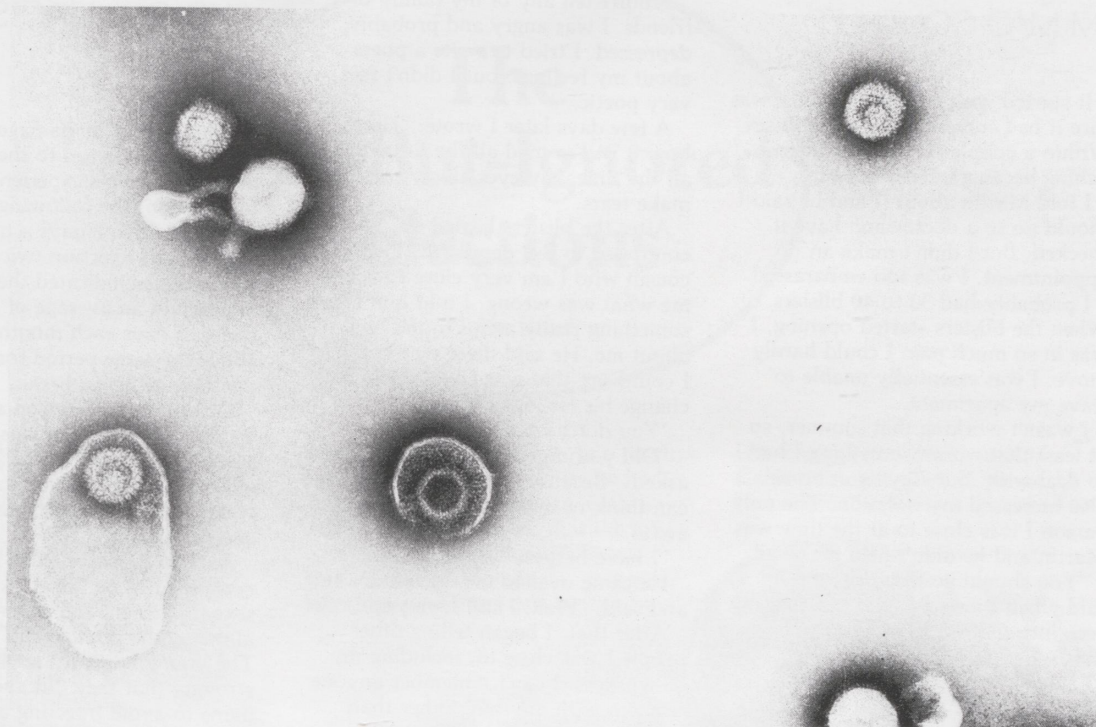
says, about 75 or 80 percent of the population have circulating antibodies created from having had herpes. Nonetheless this does not guarantee protection against another infection of the same viral strain or an alternate strain of herpes. Therefore, a vaccination that would simply increase the number of antibodies to herpes would not be 100 percent effective

A vaccine against herpes must be different than the vaccines that have been prepared in the past. It must protect the host against the "latent virus" as well as the alternate strain. Most herpes vaccines talked about today are pediatric in nature and would be administered to children to insure protection for later life.

"My hope is that my research will be able to find a unique aspect of viral replication or gene duplication that will help us target drugs against viral duplication," Jacob says. "Right now the drugs available cannot be directed toward the virus unless there is an episode of duplication (blister) and the virus comes out of hiding in its host."

While doing post doctoral research at the University of Chicago from 1974-1979, Jacob began his research on herpes viruses. At that time herpes was not as publically well-known and, its mention did not cause the public to consider celibacy. His initial work with herpes DNA involved studies on how the DNA was





Herpes simplex virus is seen by researchers as a large (relatively speaking) virus enveloped in an amorphous mass. Examples in this electron micrograph have been isolated from cells in a tissue culture.

The virus in the upper left corner (white mass) of the micrograph is in tact, that is, the envelope is protecting it from the stain used to improve contrast when examining the virus.

The dark forms (lower left and center) have ruptured and the stain has permeated to the core called a cuspid.

Naked cuspids (without envelopes) can be seen in the upper left and right of the micrograph.

The virus is frequently difficult to identify, according to Dr. Jacob, even under an electron microscope. Sometimes it can be quickly determined that it is a herpes virus but pinpointing it as herpes simplex virus is more difficult because its structure is not particularly unique among other herpes viruses.

The micrograph was provided as a courtesy of Dr. B. Roizman.

organized in the viral chromosome, and included an examination of how the virus replicated this chromosome in animals and human cells.

Some researchers have found evidence of a possible link between the herpes viruses and tumors. Monkeys injected with a particular herpes virus develop leukemia and others will cause tumors in frogs. The implication between the virus and cancer is something Jacob must consider in his research to find a drug to target against the primary event.

"I think, if the funding for herpes research improves, a drug for treatment will be found within the next five years. But after the discovery, it must pass FDA standards of testing and then be marketed which might take another

You shouldn't feel guilty about having herpes, anymore than you would feel guilty about having any other incurable disease.

couple of years. As for prevention, what we are talking about is some kind of pediatric immunization, and

that is probably three to 10 years away."

And although Jacob's work is strictly laboratory-related, it has led him into the sociological/psychological realm of herpes. He has met with members of a herpes self-help group to inform them of current developments. He is aware of the physical symptoms of the virus and he has a healthy attitude toward the social stigma associated with it. "You shouldn't let it (the fact that you have herpes) ruin your life—You shouldn't feel guilty or dirty about having it anymore than you would feel about having any other incurable disease. However, if the disease is a result of a lifestyle that is detrimental to your well being and future interest, you better wise up."

I'M MAD CONTINUED

It started with intense itching. I was sure it had something to do with sex. Within a couple of days the intense itching became intense burning.

I told Martin about it and he said I should go to a doctor and have it checked. But I didn't make an appointment. I was too embarrassed.

I probably had 30 to 40 blisters. When the blisters started opening, I was in so much pain I could hardly move. I was essentially unable to leave my apartment.

I wasn't working that summer, so at least that wasn't something I had to deal with. But staying at home also increased my isolation. The only person I was close to at the time was Martin and he didn't help me at all.

"You should go to a doctor," he said when I insisted on discussing my certainty that I had caught it from him.

"I don't know what to tell you," he said, "but I don't think it's herpes."

"Don't you remember when you had that little sore?," I asked him.

"I don't think that's what this is," he said.

The next day I went to the library and found every article that had been written on herpes. There were only ten or so. This was still a year before herpes phobia had hit the country.

The first article I read confirmed that I had it. I was having a classic initial outbreak of herpes. I read the other articles and xeroxed them all before I went home. I was sitting on the porch rereading them that evening when Martin came home.

"I do have it," I said to him. "You should read these articles." I handed him a few. He thumbed through them while I dropped phrases like "infant mortality," "Caesarian section," "cervical cancer," and "viral encephalitis."

"This is all sensationalism," he said. I took the articles from him and started crying.

"You shouldn't believe all this stuff," he told me. "They're just trying to sell magazines."

The initial attack lasted about 20 days. I finally went to the doctor during the second week. She confirmed that I had herpes, but felt that I had also developed a secondary

infection through the open blisters.

I didn't tell any of my family or friends. I was angry and probably depressed. I tried to write a poem about my feelings, but I didn't feel very poetic.

A few days later I wrote: "Here's how it is: I'm mad all the time. Sad all the time. My eyes always ready to make tears."

After the blisters healed up, I continued to feel depressed. Finally a cousin who I am very close to asked me what was wrong. I told him I had something really awful to tell him about me. He said there was nothing I could say that was awful enough to change his feelings about me.

"You don't know," I told him.

"Did you murder somebody?," he asked. "Because that's the only thing I can think of that could be that awful."

"I have herpes."

He came over to me, gave me a hug and said, "Well, I still love you."

After that, I began telling other people I was close to, including my co-workers. I can't remember anyone reacting with anything other than curiosity. "How did you get it?" "Does it hurt?" "Will you be able to have children?"

Meanwhile I continued to cling to Martin who proved equally unsupportive in other aspects of our relationship. I think both of us knew we were doomed and we were afraid to carry the doom into any new relationship.

Recurrences began coming every other month or so, consisting of one or two tiny blisters and usually lasting four or five days. Each recurrence is a reminder of my sexual liability.

The last thing I would want to do is pass this to someone else.

It's been hard for me, but I've learned to handle it. Still, I can't deal with making someone else go through what I've gone through.

WHO CONTRACTS CONTINUED

Emotionally the damage seems to be great. Responses to the survey indicated victims experienced feelings of rejection (the following are averages) 11 1/2 days a month and experienced rejection twice a month. Respondents indicated they isolated themselves an average of seven and one-half days each month, which is about the same period for the average duration of an outbreak.

So how does a person avoid herpes? The question was recently asked of a herpes victim and she indicated there was no way to be completely safe, except celibacy. except celibacy.

And do herpes victims feel compelled to be honest with potential sexual partners and warn them before allowing the relationship to progress? The young woman I spoke to felt strongly that they did and had taken pains to avoid infecting anyone else. However, when the conversation led to the current law suit by a Florida woman who is suing her avowed "clean" but, in fact, herpetic consort for infecting her, the young woman felt the Florida woman should not be awarded damages.

"It's a risk you take," she said.

The All-But-Ignored Elections

By Maria Braden

What makes people vote in primary elections? Will political parties regain control of the nominating process if fewer and fewer voters cast their ballots in primaries? Does the enormous expense of political campaigns pose a danger to the election process? Do political party endorsements make any difference?

Those are a few of the questions that University of Kentucky Political Science Professor Malcolm Jewell has tried to answer in a comprehensive study of state primary elections—a topic he says has been all but ignored in political science research.

"It's a part of the general tendency of people to be interested in national rather than state politics," he said, leaning back in a chair in his book-filled office on the 16th floor of Patterson Office Tower.

"It's almost as if it's the major leagues and the minor leagues. Nobody with prestige and authority wants to be in the minor leagues."

That perception hasn't bothered Jewell, who has earned a national reputation as an authority on state legislatures. Although he's never run for public office, he's as intimate with state politics—and as intrigued by them—as the most seasoned politician.

His expertise helped persuade the National Science Foundation to give him \$75,000 to study the 1982 gubernatorial primaries in an effort to answer questions about party organization, laws governing political parties and elections, and voters' attitudes toward parties, candidates and primaries.

Because of the budget cutbacks, NSF's grant was half of what Jewell

had sought for his study. As a result, it's not as comprehensive as he had hoped it would be, but it's a start.

NSF "agreed with me that the area was virtually unexplored," Jewell said. "It's open territory. . . things have not been done and redone by

(Massachusetts, Michigan and California) instead of in the six he had originally planned. One had an



The campaign buttons used to illustrate this article are from an extensive collection belonging to Kentucky State Treasurer, Drex Davis.

others." But that's part of the problem. There was almost no data available on state primaries over the last 20-30 years, so Jewell had to rely mainly on newspaper accounts and his own research.

The grant allowed him to conduct primary surveys in three states

open primary, where voters are not required to register by party; one held a closed primary, where voters must register and vote in one or the other party's election, and one held a closed primary, but allowed independents to vote in either party's primary.

"From that I have a few little hints about the way people behave," Jewell said, "but with these kinds of resources, I can just get the suggestion of answers."

CONTINUED PAGE 14

IGNORED ELECTIONS CONTINUED

He may claim the "suggestion of answers," but actually his research provided material enough for three separate papers delivered at political science association meetings last spring and summer, and for an *American Politics Quarterly* article on why people vote in primaries. He's also finished a new book on state gubernatorial primary elections, to be published by Praeger.

Jewell began his study of gubernatorial primaries in November, 1981, working with UK's Survey Research Center in preparing and carrying out surveys of primary elections in California, Michigan and Massachusetts. In 1982 he began assembling data and doing preliminary analysis of survey results, and in late spring visited five states (Connecticut, New Mexico, Massachusetts, Minnesota and New York) that were holding nominating conventions before the primaries. He followed up by sending 3300 questionnaires to convention delegates.

Last spring he began coding the data and writing articles, papers and the book on his findings.

Speaking in a distinctive New England accent, which belies the fact that he has been in Kentucky since 1958, Jewell talks about the history of political primary elections. Until the early 20th century, candidates were nominated by political parties.

The direct primary system grew out of the efforts of third party movements that wished to challenge the entrenched party structure.

"When the primaries came along, a



photo by Alen Malott

“There’s a mythology that political parties are fading away, but research . . . suggests that many states have strong, well-established party organizations.”

large degree of control was transferred to the voters,” Jewell said. “We don’t know how it works. . . how many people vote in primaries. There are more in some states. It would be interesting to see what makes them vote there. . . .”

One angle he has studied is the part played by independent voters who

have become more numerous, according to national election surveys. Jewell said there now may be more independents than Republicans. That raises some interesting questions: what incentive do they have to vote in party primaries, and if they have less incentive, is the primary system going

to lose its importance if fewer people participate? Theoretically, political parties could regain control of the nominating process if fewer and fewer people vote in the primary elections, he said.

On another level, do people feel more free to vote in a state that holds an open primary, which doesn’t

require people to tell how they're registered? Do the rules governing the primary have some influence on the way people vote? If you live in a state where you have to register to vote, does it tend to make you regard yourself as a Democrat or a Republican?

"I have more questions than answers," Jewell said.

However, he does have an answer as to why people are more apt to vote in a primary election in one state than another. "I think it's fairly clear. . . they'll vote if they think their vote will make a difference, such as when the race is close or where the party doesn't control the primary," he said.



Also, he said voting is a matter of habit. "I can't yet find good evidence that whether a primary is closed or open makes a difference. I'm not convinced that voters hop back and forth from one primary to another because of a candidate or a close race. If you're a Democrat, you'll probably stick with the Democratic primary, and if a Republican, you'll stick with the Republican."

In theory, if you're an independent, you should be more willing to vote in an open primary, he said, "but I can't see that independents are more willing to vote in open primaries or that people frequently switch back and forth."

Another trend that Jewell has been looking at involves the increased importance of media advertising in political campaigns, and the vastly increased expense of campaigns. He cited the classic example of the political amateur who raises a huge amount of money and spends it on television advertising, and wins the primary over a more experienced,

better-known candidate. Kentucky Gov. John Y. Brown is a good example of that phenomenon, but by no means the only one.

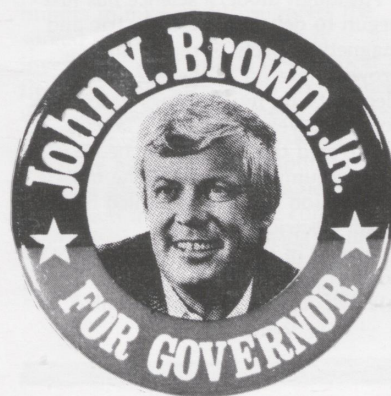
Jewell tells with relish the story of a millionaire drugstore owner, Lew Lehrman, who won the Republican Party's endorsement and the New York primary last year because of the amount he was able to pour into his campaign—more than \$7 million.

"It seems that this phenomenon is more common in primaries than in general elections," Jewell said, adding that the increased expense of campaigns poses some concerns. Well-qualified candidates who lack financial backing may never get their case before the public, he said, and those candidates who are not already well-heeled are going to have to make commitments and promises in order to secure campaign funds. The trend may give an unfair advantage to wealthy candidates, Jewell said.

In his study, Jewell also focused in part on the influence political parties have in primary elections. "There's a mythology that political parties are fading away, but research done in recent years suggests that many states have strong, well-established party organizations."

In almost every other country, parties select nominees, he said. But in the United States, there are only about a dozen states in which political parties make an organized, conscious effort to effect the outcome of the primary—by endorsing candidates.

Jewell used part of the NSF grant to travel to five states that were holding conventions at which candidates were trying to win party endorsements. Subsequently, he sent questionnaires to delegates, trying to find out such things as how endorsements are



made, what difference does the candidate make, and how important are the ground rules. He got back over 45 percent of the responses, which he termed a very good return rate.

He said that although he has not come up with "one sweeping generalization" about endorsements, the main effect seemed to be on the candidates themselves—by causing a candidate to drop out of or not to enter a race—and on party workers who have a focal point. The endorsement provides legitimization of the candidate they're working for. But as to whether a party endorsement has any effect on voters directly, Jewell said, "almost certainly, no."

Another aspect of nominating conventions that he finds interesting is that they can be an important part of building party organization. They give people an opportunity and an incentive to participate in the political process, and it's a way of building a strong grass roots organization.

"This is true in every state that holds conventions," he said.

And while he acknowledges that conventions where bitter in-fighting takes place can be destructive to a party, he said, in general, political conventions are a way of reviving flagging political party organizations.

After 25 years of studying state politics, Jewell still seems to be an optimist about the political process. He said the quality of people running for public office is improving and that better people are being elected.

"That doesn't mean that they are solving problems any better, because they're getting more complicated," he said, "but the net result is that the quality of what goes on is better."

Switching Cells On To Nerve And Limb Regeneration

By Maria Braden

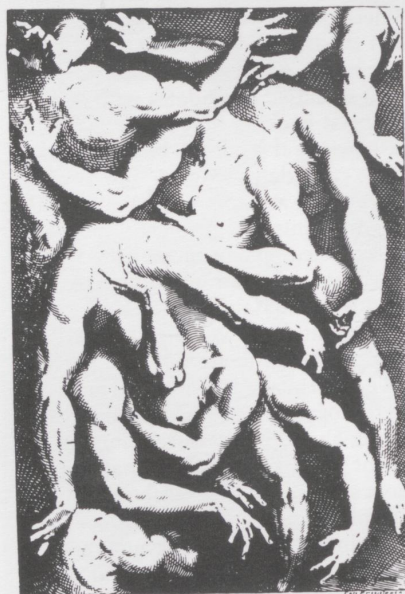
It may not happen tomorrow, but evidence being gathered by Dr. Stephen D. Smith and others indicates that limb and nerve regeneration could someday be a reality.

"There's no question that the potential is there," says Dr. James Lafferty, head of the University of Kentucky's Wenner-Gren Research Laboratory, where some of the research on nerve regeneration is being done.

Smith, 44, an associate professor of anatomy who is known internationally for his research on limb regeneration, believes that some day doctors will be able to help patients regenerate severed spinal cords or limbs. But he and other UK researchers caution that it's a distant prospect.

Each time Smith is interviewed by the media, people call him up, begging him to help them repair nerve or limb damage, he said. "We're ultimately trying to do that for people, but we're not there yet."

The Pennsylvania native, who has been at UK since 1965, uses electrical fields and low levels of direct electric current to stimulate limb regeneration. His work has been



financed by a variety of grants from sources that include the Office of Naval Research, National Institutes of Health and National Science Foundation.

Smith began publishing reports of work about 15 years ago but, by the scientific clock, it's a brand new area of research. That's one reason that he is hesitant about speculating on potential clinical applications.

Although modern science has just begun to delve into the electric and magnetic aspects of repair and growth, interest in the effect of electricity on living things dates back some 200 years. In 1796, Galvani discovered that a frog touched with a battery jumped, and that the muscle contraction was accompanied by direct electrical currents.

Interest in the effect of electricity on health reached an all-time high in the late 19th century, when so-called

"galvanic theory" spread across the country. After the journal of the American Medical Association reported that electrical charges appeared to help alleviate symptoms of cervical cancer, entrepreneurs began promoting electrical charges for a host of uses, from easing the pain of babies' teething to increasing the size of women's breasts. Even a major department store got into the act, marketing an electrical device for \$9 that was supposed to improve one's health.

Obviously electricity isn't good for everything, and its popularization signalled a setback for scientific research. Although a few scientists continued to explore the relationship between electricity and life through the first part of the 20th century, acceptance of their research was slow in coming.

Even though we are all accustomed to using electricity in our homes and places of work, most of us don't think about—and probably don't understand—what happens when we flip a switch. So the idea of using electricity in a new way, to repair our bodies, has something of a magical appeal.

In fact, regeneration is a lot like turning on a light, Smith says. Basically, regeneration means turning on cells, causing them to divide. The challenge is to discover what the switch is—what turns cells on—and how that process can be controlled.

"It's the fundamental problem in biology," he says. "What makes cells become what they are? What makes life tick?"

Whether it's one cell or an accumulation of trillions, each has its specific function. The cell in a finger knows how to make finger cells, for example, and those cells know how and when to multiply and to stop. If scientists could identify specific control mechanisms in cells, then they could manipulate them, Smith says.

"Since we know that every chemical reaction involves the

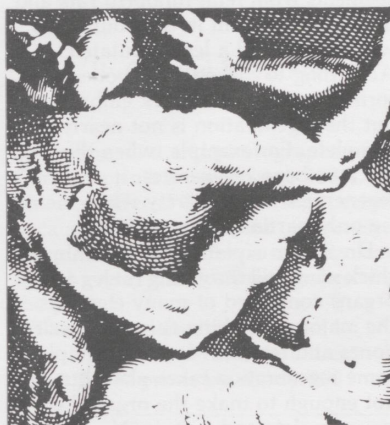


transfer of electrical charges and that life in its physical essence is a series of chemical reactions, then it ought to be possible to influence them with electrical charges," Smith says, "and thereby influence the course or progress of physical life events.

"If we can learn to direct cells in what they do, then we will be in a position to do all kinds of handy things," he says, such as repair a hand mangled in a garbage grinder or farm machine.

If that conjures up visions of Dr. Frankenstein's famous experiments, rest easy. Smith says there's no comparison. "One of the things we're always faced with is what I call the 'Frankenstein Syndrome'. Everyone always comes into the lab and expects to see animated bits of dead flesh," he says. "We have no prospects for reanimation: what is being regenerated is living tissue.

and so could the progress of some degenerative diseases. Even the aging process could be conceivably slowed, he says, and some day perhaps it could be used to suppress tumor growth.



The idea of using electricity in a new way, to repair our bodies, has something of a magical appeal.

Frankenstein we will lay to rest once and for all."

In fact, the evidence being accumulated by Smith and others is far more exciting than anything ever credited to the notorious Dr. Frankenstein, precisely because it deals with life, not death.

"I am confident that what we have hold of here is one of the fundamental control mechanisms of life," Smith says. "If you understand them (cells) well enough, there are all kinds of things you can tell them to do."

Understanding cellular reactions would enable physicians to manipulate what Smith calls the body's "biochemical throttle," which could be used to slow down or speed up body processes. For example, an overactive thyroid could be slowed,



Already the use of electrical currents to heal bone fractures is widespread, with UK basketball player Sam Bowie one of the better-known local beneficiaries. Bowie wore a pulsating electromagnetic device on his leg for several months to help heal a bone fracture. In addition, some success has been reported at Syracuse University in the use of electrical currents to alleviate arthritis symptoms.

In another area, Smith and a colleague, Jose M. Feola of UK's Department of Radiation Medicine, have shown that electrical currents appear to inhibit the growth of tumors in mice and to suppress the spread of cancer. Smith also is investigating the effects of electrical fields on plant growth, in accordance with his theory that some of the most fundamental regulatory processes in life have an electrical component.

There has been considerable discussion in the scientific community over whether electrical fields could, in fact, cause cancer instead of curing it. Smith says that is a real possibility,

CONTINUED PAGE 18

Growing New Wings

By Susan H. Donohew

Should regrowing of lost limbs ever be possible for humans, it will come primarily from the many years of work by researchers such as the University's Betty Siskin, who has spent the past 10 years studying the regeneration of tissues.

Dr. Siskin is a biomedical scientist and a pioneer in this area of research. Her colleague, Ira Fowler, has collaborated with her closely and is responsible for a great deal of their progress, according to Siskin.

The researchers, both in the UK Department of Anatomy, are working primarily with chick embryos. Specifically, Siskin and Fowler are studying groups of nerve cells surgically removed from the spinal cords of chick embryos.

To orient you to the size of their subjects, most of this research takes place under a microscope. In a set of experiments, funded by the Office of Naval Research, nerve cells are removed from the embryo and transferred to a culture dish containing two electrodes. Then minute currents (1-20n Amp) are administered, triggering the regeneration of neuronal processes. This is manifested by the cells growing long, antennae-like appendages called neurites.

In another series of experiments, spinal cord segments are surgically implanted in other chick embryos which have had a wing amputated. The goal is to have the embryonic nerve cells promote the growth of a wing to replace the amputated wing

CONTINUED PAGE 18



NEW WINGS CONTINUED

and the researcher's success rate is promising. By using the embryonic tissue alone, Drs. Sisken and Fowler have a 29 percent success rate in regenerating wings to replace the amputated ones.

However, Dr. Sisken points out that "the embryos are much more plastic than young animals." Consequently, the results may be different when similar techniques are

applied to other animals whose age makes them less malleable.

The researchers are also working with three week-old rats in experiments where they surgically remove spinal cord or brain segments from fetal (unborn) rats and then implant them in the young rats which have had a leg amputated. According to Sisken, new bones are formed, as with the chick embryos, but the regeneration is not nearly as complete. For example, when the chick embryo regenerates, it regenerates in its entirety while the rat leg only partially restores itself.

Dr. Sisken explains that the embryo chick wing and the young rat leg are organs composed of many elements—the major ones being nerves, muscles, bones and tendons. In the rat implant some regeneration takes place but not enough to make the organ, i.e. leg, complete and useful. "No one has accomplished a complete regeneration in a rat," says Sisken. However, she

points out that complete regeneration occurs naturally in salamanders and young frogs.

The study of regeneration is a long, slow process. Effects of varying the age of the tissue implant used and the point of maturation at which it is administered are among the variables being studied. Although regeneration in the embryo chicks occurs in about seven days, for the young rats it is a three to six month process.

However, the encouragement is there, as evidenced by the researchers' record of funding from the Office of Naval Research, Veterans Administration Hospital, National Science Foundation and National Institutes of Health. And the promise is there of eventually unlocking the key to limb regeneration or at least of adding substantially to the catalogue of research that will determine whether or not such a reality is possible.

REGENERATION CONTINUED

since using electrical currents for regeneration means turning cells on—which involves cell division.

"That's essentially what's going on with a tumor, and we don't want to turn them on. Scientists have yet to determine what is required for electrical fields to be effective and not to do what we don't want them to do."

To date, the research is positive. One experiment indicates that pulsing magnetic fields applied to animals in

have a more immediate payoff is the work on nerve regeneration," he continues. In the case of a patient with a severed spinal cord, "if we learn enough and get to the patient soon enough, there is a real potential for recovering function of the lower body. Such cases are very grim, involving motorcycle or football accidents to very young people. Even though there are not many cases, it is an area that could have tremendous impact."

What causes regeneration to occur? Obviously, that's the key question.

understanding the switches that turn cells on and off is in understanding how small metal ions behave in cells."

Smith does not appear dismayed at how slowly the research has progressed, rejecting the notion that scientific discoveries happen overnight. He says each research project adds a bit of information to the pile, which finally enables one scientist to stand on the top and peek over the wall—thereby taking a quantum leap to a level of knowledge previously not thought of.

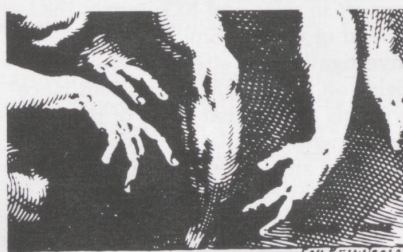
If you understand cells well enough, there are all kinds of things you can tell them to do.

conjunction with chemotherapy may enhance the effects of the chemical, and thereby be helpful in treatment of cancer, Smith says.

Wenner-Gren Director Lafferty sees that as one of the most significant aspects of the research.

"What I see as really exciting is a greater understanding of the cellular reactions and understanding of the tie-ins to cancer," he says. Even if the evidence indicates that there's a negative aspect, "we need to know it."

"The other big thing that might



Nobody's really sure.

"Some of the switches appear to be related to the passage of metal ions through the cell membrane," Smith says. "It may be that the key to

And he seems satisfied with his role in this new area of research. "Once you have shown the effect, somebody has to come along and say how," he says. "Any scientist wants to be the person that clinches a theory: he earns encomiums from his colleagues—but not as much as the guy who postulated the theory, who first noticed the effect."

While acceptance of his research has been slow in coming, Smith is not discouraged. "If I were interested in being safe," he says, "I wouldn't be in this business."

An Art Sleuth On A Trail Four Centuries Old

By Tawny R. Acker

One room in University of Kentucky art professor Jane Peters' house could qualify as a photographic archive. There are about 3,000 photographs of prints waiting to be measured and paired with the corresponding description and artist. But Peters is not a photographer, nor are the photographs part of a hobby. She is an art historian and the pictures are part of a project to revise the *Le Peintre-Graveur*, a 21-volume set of descriptions of European prints from the 15th through 17th centuries. The series, written in French by Adam Bartsch and published between 1808 and 1821, has remained the primary comprehensive reference tool for prints used by print scholars or interested laypersons.

Peters is one of approximately 30 European and American art historians, museum curators and academicians compiling information for a complete revision of the original Bartsch under the auspices of the general editor, Walter L. Strauss of Abaris Books, New York. The first part of the revision will include photographs of the prints described in the original Bartsch, as well as translations of these descriptions from French to English.

Locating and supplying photographs of the prints in the assigned area, as well as doing the translations, is only the first part of the project. The second part, a catalogue raisonné, will provide critical assessments of work by graphic artists of that period, including monogrammists, (prints by unknown artists which bear no signature, only initials). The volumes, from the second part of the project, will also include information about states, copies (with dimensions and repositories noted), watermarks (if available) criteria of authenticity, date and discussion when applicable of iconography, historical context and style.

Each historian is working on prints from a particular period. Peters is

compiling data and photographs of German prints from 1530 to 1600. She was offered this particular period because it reflects an area of interest she pursued in her thesis on Augustin Hirschvogel, a major print maker of the period.

The original Bartsch, volume IX, covering Peter's period, describes about 5,000 prints by nearly 200

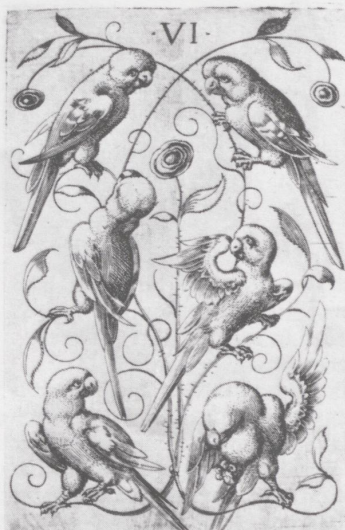
artists. These prints include illustrations for over 50 books. The massive number of prints to be included in the first part of Peter's assignment will require the publication of five volumes.

It is an onerous task, one which was supposed to take one year, but that was 1979. Now the end is in sight. In fact, Peters has already finished one of the five volumes in her period of German prints from 1530 to 1600.

For the last five summers Peters has been cloistered in the print rooms of art museums from Munich to Rotterdam. Her travels were to verify the existence of the thousands of prints Bartsch catalogued and go one

"Cupid shooting an arrow" appears in *Kunstbuchlein* (The Little Book of Art) which was published in Frankfurt, Germany in 1599. The book was a model book for artists and they frequently copied illustrations from it. This particular woodcut is 115 x 93 mm.





"Suit of the Parrots" is a set of playing cards designed by German printmaker Virgil Solis around 1544. The engravings, 94 x 61 mm, have the card number in the top center and the number of parrots on each card corresponds to the card number. The jack, queen and king also carry out the parrot theme. According to Dr. Peters, the cards were very popular during the period and similar playing cards can still be found although it would be difficult to find a complete set.

step further by obtaining reproductions of the prints mentioned as well as any prints perhaps not documented in the original.

Completing the project has become

a matter of lifestyle for Peters. Not only has it dictated where she spend her summers, it has literally taken over her house. More than that, she says, "It has become my whole house—with all of the typing and retyping and really mechanical stuff. A lot of the fun, the traveling, is over now and, it is a matter of putting it all together, until it is time for double checking information in the museums."

All of the photographs of prints she compiled from her museum travels must be correlated with the corresponding description and then sized. "We are trying to scale the photographic reproductions of the

prints to the actual size of the prints, unless a print exceeds the 14" x 9" format of the publication," Peters says.

Peters has already ordered about 2,000 photographs from a museum in Vienna and about 1,000 from Berlin. The prints are not always properly identified in museums, particularly in the smaller collections and, it has become a game of sleuth for Peters to determine if and how the prints she wants to use might be catalogued in a collection. The monogrammists present the biggest problem. They may have been catalogued under a "proposed" identity or they may be stuck in an anonymous box. These





complications require double checking Bartsch's information and measurements about each print.

When completed the revised Bartsch will provide more than easy access to visual reproductions and descriptions of prints for art academicians. "The first part of the revision will offer a rich visual source of various periods which will aid humanists in their study of the past," says Peters. From the prints you can study symbolism, iconology, costume, medicinal practices and learn more in general about the period, she says.

The role of the print as a disseminator of information to both intellectuals and the general populace grew tremendously in Northern Europe during the 16th century. Painting and sculpture were not in vogue in Germany during this period, but prints flourished. Through prints scholars can examine pro and counter reformational themes found in the form of biblical illustrations for religious texts and single-leaf propagandistic satires, Peters says. Prints were during this time the main method of educating a basically illiterate populace; therefore, the subjects of prints ranged from a depiction of many aspects of secular

life including social customs, costumes, and occupations as well as portraits, genealogies and hearldry. Prints were also used to illustrate treatises, maps, city views and landscapes.

For example, some of the woodcuts which will appear in Peters' volumes were intended for original publication in Sebastian Munster's *Cosmographia*, a kind of cultural geography illustrated with prints of maps, city views, well-known buildings or sites, customs and strange animals.

Another series of about 100 prints by Jost Amman, the most prolific printmaker of the 16th century, showing the styles and attires of women from different ranks of society will be included in the revised edition. Amman also did a similar series of prints showing the attire of the different monastic orders and ecclesiastical ranks of his day which will also be in the volumes. The illustrations of this series for the revision will be reproduced from a fine exemplar of the particular work in a book in the University of Kentucky collection.

Peters' particular interest in prints is also exercised in her teaching. One of

Etching by Augustin Hirschvogel entitled "Landscape with a winding wooden bridge." It is dated 1546 and is 138 x 208 mm.

the specialized graduate seminars she has taught is Prints from 1400 to 1700, another on the printmaker Albert Duer and his contemporaries. Other courses she teaches include Art History from 1300 to 1700, Italian Renaissance Art, Northern European Art from 1400 to 1600, Baroque Art and the Iconography of Christian Art.

She takes her role as an art historian educator as seriously as she does her role as a researcher. Her efforts have not gone unrewarded. In 1983 she was the recipient of the UK Alumni Association Great Teachers Award. It is easy to imagine how her enthusiasm would lend itself to a classroom setting because she is such an avid art appreciator. "I am an art appreciator, not an artist—and not a collector because there is too much I want that I can't have, so I prefer to visit it all in gallery and museum collections—as well as see it being made here by students every day," she says.

Research Briefs

A Kentucky/Texas Endeavor

A grant to study the "Behavior and Analysis of Layered Pressure Vessels" is the first award the University of Kentucky has received from the National Science Foundation Industry/University Cooperative Program. The award combines the efforts of three UK professors and one UK student with the Hahn & Clay Company of Houston, Texas.

UK Acting Engineering Dean Don Leigh and Engineering Mechanics Chairman Ted Taichert are principal investigators on the grant, aided by Asst. Professor of Civil Engineering George Blandford and Civil Engineering student, Linda Ferrell.

The grant is to develop design methods for layered, large-diameter, thick-walled pressure vessels to be used in U.S. "process" industries such as coal gasification and oil refinement. Currently Japan and other foreign nations lead in the manufacture of single-wall pressure vessels. However the design of a layered pressure vessel with the advantage of being limited in wall thickness without much additional cost and shorter overall construction time could place the U.S. in a competitive market situation.

The experimental phase of the research is also intended to provide data on heat transfer resistance and friction between layers. The outcome will be the establishment of reliable methods of analysis for safe, efficient designs of layered pressure vessels subject to severe mechanical and thermal loadings. It is anticipated that the design will become a part of the

American Society of Mechanical Engineering Pressure Vessel Code.

The joint effort represents a "good cooperative program where you need both partners," Leigh says. "It (Hahn & Clay) is a small company without the resources to do conceptual design research, but with the practical expertise to build layered pressure vessels to exacting specifications. We will produce the conceptual design and develop the calculational methods, while the company will build the test specimens in precisely the way they would be built in practical application.

Leigh and Taichert's relationship with layered vessels and the Hahn & Clay Company is not a new one. In recent years, they worked on a grant studying various pressure vessel construction for the Department of Energy and became acquainted with the Hahn & Clay Company's work. This prior relationship with Hahn & Clay was instrumental in developing the current grant, Leigh says. "This relationship developed over a period of years," he says. "It is important to realize that these kinds of cooperative programs do not develop overnight.

play in the body's response to the effects of cigarette smoking. It is Chow's supposition that deficiency or inadequacy of such essential nutrients as those vitamins may make cells more prone to the effects of cigarette smoking and may be related in the development/onset of chronic respiratory diseases and other disorders in humans.

By conducting collaborative research with other investigators at the University of Kentucky on volunteer smokers and non-smokers, he intends to determine the influence of cigarette smoking on the nutritional status of A, E and C. How does cigarette smoking and the intake of these vitamins in turn influence pulmonary functions, and other hematological and biochemical parameters in the blood, for example. The results obtained are currently being analyzed.

While Chow does not think vitamin supplements would cure or prevent the disorders associated with cigarette smoking he believes that nutrition could decrease or minimize the detrimental effects.

A portion of Chow's research is being sponsored by Hoffmann-La Roche Inc.

Vitamin Research

Vitamins are an integral part of what makes the body function properly in everything from simple hand-to-eye coordination to helping the body's defense system ward off diseases.

It is the latter function that interests Dr. Ching K. Chow, UK professor of nutrition and food science. Chow, who has worked in vitamin research for the last 10 years, is currently studying the role vitamins A E and C

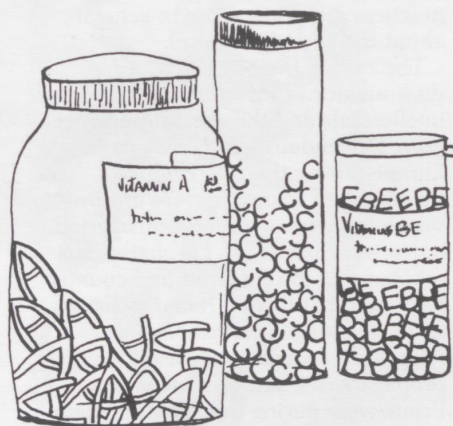
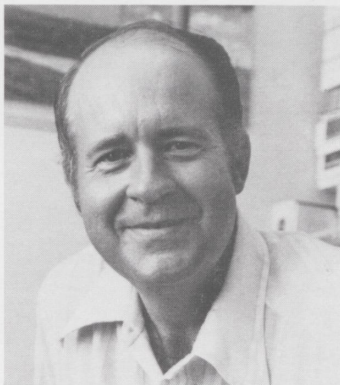


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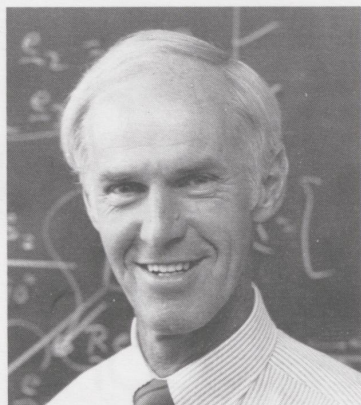
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