

THE LASER'S NEW HEALING POWERS

By LAWRENCE GALTON

One of the devastating problems many diabetics have had to face is loss of vision from diabetic retinopathy. That complication has affected half of those who have had diabetes for 10 years, more than 95 percent of those who have had it for 25 years.

Now, it's clear that the toll can be cut significantly. Just a few months ago, the National Eye Institute announced the results of the largest clinical trial in the history of eye research—in which the laser literally has been focused on diabetic retinopathy in hundreds of patients at 16 medical centers.

In diabetic retinopathy, tiny eye blood vessels deteriorate and leak and new vessels grow on the surface of the retina and protrude and hemorrhage into the vitreous humor, the normally clear fluid in the center of the eye. To make matters worse, scar tissue forms in association with the new vessels and may pull on and detach the retina from

the back of the eye.

With a fine, intense beam of laser light focused precisely where it's needed, weakened blood vessels can be coagulated, or destroyed. The process is much like focusing the sun's rays through a magnifying glass to burn a hole in a leaf. The incidence of vision loss has been cut by 60 percent.

Certainly, the laser is no panacea for diabetic retinopathy—since it treats the symptoms, not the disease itself. But until scientists can penetrate the mystery of why and how the disease occurs, the laser is a tremendous help.

And this use is just one on a growing list as the laser assumes an increasingly important role in everyday medicine—from obliterating birthmarks to effectively dealing with some tumors, and still more.

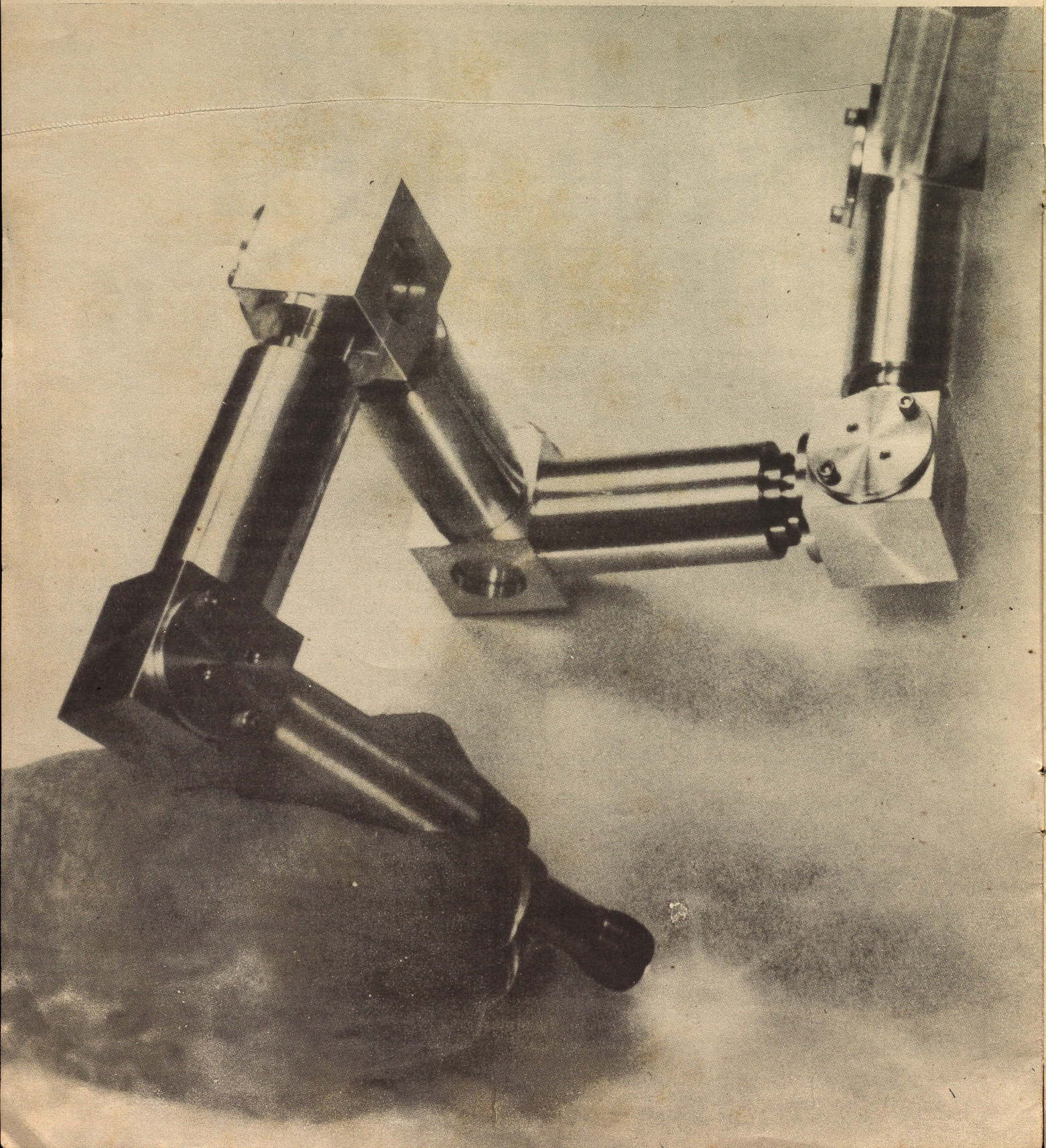
A laser generally consists of a glass rod or a tube filled with gas whose molecules can be so stimulated that

they emit a very pure, orderly, concentrated form of light so powerful that some have thought of it as likely to bring to reality the fictional death ray.

A laser's beam can be so narrowed that it can remove from a single cell a component less than 1/10,000th of an inch (1/2,500th of a centimeter) in diameter. Lasers employing different gases can be used for different specific purposes: the carbon dioxide laser, for example, as a surgeon's tool, a knife of light; the argon ion laser to photo-coagulate and halt bleeding. With the proper gas and wavelength of light, a laser beam can be made to pass through the eye, for example, without being absorbed or affecting any tissues in its path until it reaches its target, which may be the retina at the back of the eye.

The laser is proving valuable in a number of eye disorders. Tears of the retina lining the back of the eye and containing light receptors, can lead to

A laser beam shines from a "light knife" designed as a scalpel for use by a surgeon. The flexible hollow arm can be moved in any direction. The beam is guided through the arm by prisms mounted in the corner cubes. The laser scalpel is germ-free and can be focused for depth and fineness of cut.



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retinal detachment and vision loss. With laser light, ophthalmologists now can seal down the edge of a tear and prevent detachment. The light works as a glue.

In sickle cell disorders, little blood vessel tumors of the retina may develop, bleed, and cause vision loss. Laser light clots the tumors and prevents the bleeding.

For vision-impairing macular degeneration, studies indicate that some cases are due to leakages of fluid under the retina, and the laser can seal the leaks. Dr. David K. Berler of George Washington University Hospital, Washington, D. C., has reported the case of a 24-year-old woman whose vision had deteriorated to 20/200. Laser therapy restored her vision to normal 20/20.

Among the latest feats of the laser is the control of hemorrhaging in the gastrointestinal tract.

At Beth Israel Medical Center in New York recently, Dr. Albert M. Waitman resorted to the laser for a 58-year-old man with stomach inflammation that had not responded to partial removal of the stomach and had been requiring multiple blood transfusions.

A fiber bundle to carry the laser beam was coupled to a fiberoptic endoscope that can be inserted through the mouth into the stomach. With bleeding sites visible through the scope, the laser could be discharged, the whole procedure taking less than 10 minutes. With three such treatments, the bleeding stopped, and two weeks later the affected area had a normal appearance.

In another case, a patient oozing blood in the stomach and requiring 50 units of blood in the past year received four treatments over a 10-day period. The bleeding stopped and the once-raw, blood-oozing areas became normal in appearance.

Recently, too, Dr. Richard Dwyer and other physicians at the University of Southern California's Center for Laser Studies in Los Angeles have reported using the laser in similar fashion to control acute bleeding in a patient with an inflamed stomach and another with a stomach ulcer. And at the University of Erlangen-Nuremberg in West Germany, Dr. Peter Fruhmorgen has used the laser to heal bleeding duodenal and stomach ulcers.

The laser is showing promise in a number of feminine disorders. At Louisiana State University Medical Center, New Orleans, Dr. Joseph H. Bellina has used laser therapy in 250 women with vaginal and cervical abnormalities, including cancer, and has reported healing of wounds—often within 21 days—with no pain, bleeding, scars, or impairment of function. The light beam, he notes, is extremely accurate, even micro-accurate: "If I wanted to remove five cells from a particular site, I could remove five—and that's all. The adjacent cells wouldn't be injured."

At Boston University School of Medicine, Dr. M. Stuart Strong and other physicians used the laser four years ago to remove vocal cord lesions in a small group of patients. Since then, doctors have treated more than 500 patients with benign tumors of the larynx, laryngeal polyps and nodules, horny growths of the mouth and larynx, early cancer of the larynx, and recurrent tonsillitis.

Says Dr. Strong: "Laser surgery is associated with minimal morbidity, excellent healing, minimal scar formation, and excellent residual function." Commonly, with laser surgery, patients go home in a day.

The laser has now begun to show promise in other surgery—including cancer of breast, neck, tongue and other sites—because its use involves as much as 90 percent less bleeding than

when the scalpel is used.

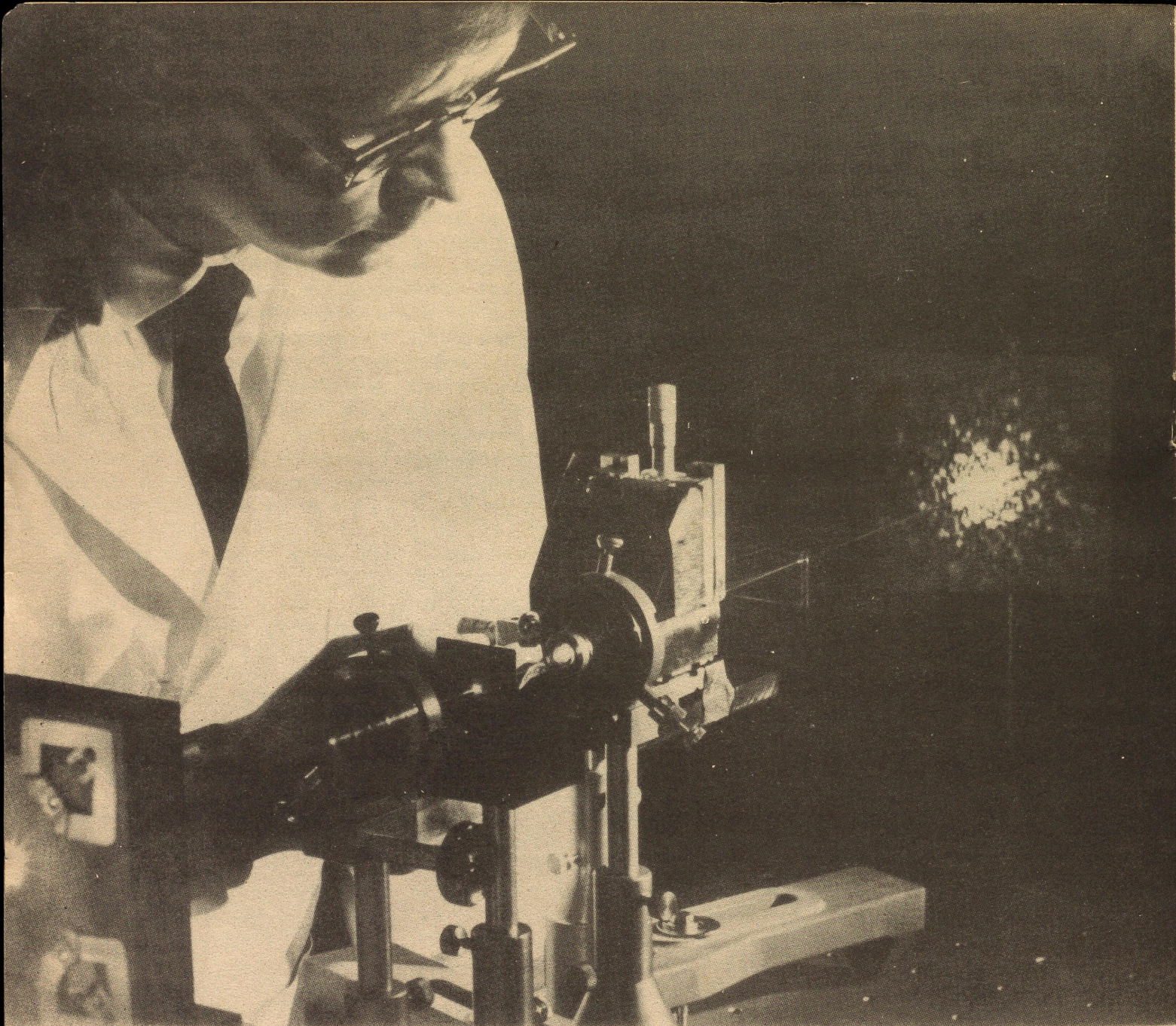
Some suggestion that it may have value in the most difficult brain cancers comes from early studies by Dr. Stanley Stellar at St. Barnabas Medical Center, Livingston, New Jersey, who has tried it in a few patients with large, deeply embedded, heavily blood-vesselled brain tumors. The patients had virtually the most hopeless of tumors, had already undergone as many as three unsuccessful operations. Because of the nature of the tumors, which could not be removed in all cases, the laser's value is by no means proved, Dr. Stellar points out. But he does note that the laser evaporates brain tumor tissue with relatively little blood loss and "offers a gentle way to destroy this malignant tissue, at least in part."

In very severe burn cases, too, the laser is proving valuable at Cincinnati's Shriners Burn Institute for early removal of dead tissue, allowing immediate skin grafting.

At the University of Cincinnati Medical Center, Dr. Leon Goldberg, a pioneer in medical use of lasers, is employing the beam to remove skin cancers, and even to erase tattoos.

Research is suggesting many important possible applications for the laser. The liver in particular is full of blood vessels, making for potentially dangerous hemorrhaging when any surgery is attempted for removal of tumors or repair of wounds from accidents and other cases. Recent animal studies show that even partial liver removal by laser is simple and safe, with minimal bleeding, and no laser complications.

At Los Alamos Scientific Laboratory in New Mexico, Dr. Gary Salzman and other scientists have developed a laser system for identifying cancer cells more quickly and perhaps more accurately than the familiar Pap test. Cells of various kinds scatter light differently to form distinctive patterns or "signatures." In the new system, as cells in a



Blood cells as they multiply in normal growth and are projected on a screen by laser light for a pattern different from other cells in the same sample of blood. It is during this process, called mitosis, that the primary determinants of heredity, the chromosomes, are visible and therefore of great interest to genetecists.

saline solution are passed through a tube at the rate of 60,000 a minute, each is hit by a laser beam and its identifying pattern picked up.

Recently, too, scientists at the National Heart and Lung Institute in Bethesda, Maryland, have developed a laser instrument that permits harmless measurement of blood circulation. It's expected to have many valuable uses in monitoring circulation of patients in shock, following the progress of

blood-vessel diseases of the legs in response to treatment, and screening drugs for actions on the circulation.

At the State University of New York, Buffalo, Dr. Sheldon Winkler and other investigators are conducting trials of tooth-filling materials that can be laser-heated, hopeful that a suitable one could actually be welded to a tooth with a burst of laser light so there would be much less likelihood of recurrent cavities around fillings.

One problem with the laser has been high cost—as much as \$55,000 an instrument—which has militated against widespread use. But costs are coming down now, with indications that newer models may be available at half that price or even less. And that is likely to mean both greater availability of laser treatment for uses already demonstrated and expanded research on its potential to solve many other problems for which it has not yet been tried.

THE REFORMATION IN SCIENCE

By FRED HAPGOOD

The time seems right for an ambitious young playwright, out to make a mark, to rewrite the story of Galileo's persecution by the Church, casting Galileo as the villain. The debates between the physicist, who would be depicted as driven to follow his curiosity with no consideration of social costs, and a suave prince of the Church, who would insist that Galileo take responsibility for the cultural impact of his science, might or might not make good theater, but they would have a very modern ring.

Galileo would argue that it is noble to move closer to reality, to voyage into it, to make one's grasp of the world deeper and more true. The cardinal would reply that a tree bears fruit whether or not one knows the exact number of leaves on its branches. What is important is a knowledge of the *point* of what one sees, of its human meaning, and that sense of significance is a grace from God, not something sifted out of piles of facts. "There are many," the cardinal would say, "who have an accurate sense of life and who neither read nor cipher. And tell me this: Where will you stop? When will you be satisfied? If your answer is 'never,' and you have no

ends at all in view, why should you inflict your goal-lessness on mankind? And even if you will be satisfied—which we both know not to be the case—after you have solved ten or twenty more of these puzzles you set yourself, have you any reason to believe that you will then stand any closer to the meaning of the universe than you did as a child?"

If nothing else, such a play would give new dignity to the historical fact of Galileo's recantation; he would have throttled his science not from fear of torture but from genuine moral doubts. And potential producers might be enticed by pointing to the number of scientists who grapple, in their funding proposals and congressional testimony, with what our secular age can manage as the equivalent of these questions: Will your work bring us any closer to a cure for cancer or independence from Arab oil?

For some time now it has been obvious that profound changes are taking place in the public's attitude toward science. *Science* magazine reports that the words "basic research" have become a red flag to congressmen, who see no reason that some one should get thirty thousand a year for thinking about element abundances in interstellar dust grains when cities cannot afford

to pay one quarter that sum to hire someone to work in a hospital. The *Atlantic* ran an article recently by a primatologist who wrote that he hoped that the last species of primate likely to be discovered, the abominable snowman, would forever remain out of reach. He meant by that out of science's reach: that the yeti would never be studied, classified, have its stomach contents analyzed, its dominance hierarchies and breeding systems charted, and the like. What the primatologist was expressing was the intuition that science tames and domesticates nature, that a wild and free quality goes out of those parts of the world that fall under its procedures. He was expressing the sense of doom we feel at the prospect of a world in which "everything is explained."

Taken literally, there seems very little risk of that. Science is far more accurately understood as an enterprise which creates ignorance and uncertainty rather than solid explanations. I have yet to meet a scientist who does not feel that a successful experiment is one that opens up six new questions, and that the sweetest triumph of the business is to illuminate a whole new field of ignorance, to ask a question of a kind that no one even thought of asking before. Scientists always pose their

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questions as sweepingly and inclusively as possible, and present their answers cribbed up by more cautions and qualifications than one would think a human mind could endure. No doubt if we simply count the facts in our textbooks, we do know far more than the Victorians did; but set those facts against our sense of what we need to know but do not, calculate it on a net basis, and we are far more ignorant. This has not happened in spite of modern science but as an inevitable result of its normal operation.

Still, the intuitions suggested above, that scientists are a self-indulgent, quasiparasitic elite, demanding support from the public to pursue entirely private whims; and that science itself is destroying the most precious of our nonrenewable resources—a sense of the world's wonder—are based on something real. What could it be?

For most of us—working scientists aside—science is one of those “senses of the intellect,” like literature or religion, which give us a gut feeling of what sort of world we live in and how we ought to behave in it. What is the natural, harmonious way of relating to the world? Science gives us many little dramas, about the stars, and trees, and the movements of the earth, that feed this need. Literature conducts experiments into the realities of human nature, with plausibility the confirming test. Religion wraps both into one big drama.

The science that we were all brought up on instructed us in and stood for a view of nature that was not dissimilar from the Victorian's view of Africa. Both could be colonized, their secrets assaulted, their frontiers thrown back, without any fear that a trespass had been committed. Scientists explored and penetrated and mastered; they won victories over a nature that had been wastefully locked away in mystery

until they came along, and penned up in a cage of determinist relations. We applauded and trusted this kind of achieving in all aspects of the culture.

Obviously the day of optimistic expansiveness is past. All our “intellectual senses,” science very much among them, are blinking yellow or red, communicating the idea that the world of realities (defined by William James as those things which, like it or not, must be taken account of) is vast, complex, and threatening. The right attitude to take toward it is therefore one of great thoughtfulness, skill, and care, with an emphasis on coping with our present position and not rushing off to any new adventures. Science has therefore suffered, especially nuclear science, with its atom-smashing, and molecular biology, which is usually presented in such terms as “penetrating the secrets of life itself.” The suspicion toward nuclear science has centered upon nuclear reactors; that toward “unrestrained biological research” upon recombinant DNA experiments, which involve transplanting a few genes from one organism into the genetic material of another.

Of course both the nuclear reactor and the recombinant issues are argued in terms of their effect on the public health, but one is never sure how seriously one should take such terms. We are a pragmatic society, suspicious of philosophy, which means only that we must translate metaphysical questions into issues of health and economics before we feel they can be properly raised. No one argues against the space program on the explicit grounds that it embodies the wrong assumptions about man and his correct relationship to the earth and the stars, but such grounds seem to me to lurk just below the surface of the debates about diverting funds from health care. We talk as though all that concerns us is the health of the body, but it is difficult for me to believe that we are not, in our own

fashion, just as concerned with the health of our souls as the members of every other civilization have been.

Some analysts, pre-eminent among whom is the prolific Ted Roszak, have argued that what we need is a return to the “ancient gnosis,” a rehabilitation of the more venerable, and directly theological, categories of spiritual mysteries and meanings. Perhaps unfairly, though, I cling to the typically American prejudice that the clock cannot be turned back. Rather, I think that what we need, and what is happening, is a reformation within the scientific church, splitting a world view that was once as seamless as the Catholic Church's before Luther into two, a Worms and a Rome.

One can see evidence of this change everywhere. First of all, scientific terminology has begun to move away from words which emphasize how nature can be trussed up. Particle physicists have been labeling the attributes of new particles they discover as “charm,” “color,” and “strangeness,” words which set off a radically different set of vibes from those of terms like pion and K meson. Molecular biologists now tend to give to the phenomena they study names that frame functions and actions, such as “repressor,” “operator,” and “reverse transcriptase,” rather than names (such as deoxyribonucleic acid) that highlight the dead world of chemical reactions.

Evolutionary biologists talk freely of animals “choosing” evolutionary strategies, and attempting to maximize their genetic representation in the next generation. Recently I attended a conference in which two virologists referred to their creatures not as “it” or “them,” nor even as “he” or “she,” but as “you” (as in “You might want to produce just so much of enzyme X and no more. Therefore what you could do is...”). There seems to be a virtual

collapse of that stern deterministic discipline so rigorously imposed on the science students of a generation ago: that one must never speak of natural things as though they cooked up purposes on their own. Instead I find a flippant anthropomorphism everywhere.

Second, a whole new set of sciences has been developing. These new sciences are environmental and ecological. They are conducted in the field as much as in the laboratory. They observe more than manipulate; monitor and survey and watch and listen rather than rush into testing the simplest theoretical system. One thinks of ethology, or sociobiology; and people like Dian Fossey, who spent ten years living with the Eastern Mountain gorillas, or Lindauer, who watched a single worker bee for 176 hours. Another example might be the MODE project, a vast international effort, sponsored by a dozen nations, to chart ocean dynamics; or the burgeoning efforts to track down the composition and processes of the atmosphere; or the surprising interest in extraterrestrial communication.

Finally, there are signs of a new kind of science writing, one that will stress what is, after all, one of the basic qualities of science: the contemplative, quasi-meditative relation of man to the universe which accepts the judgment attained from natural evidence as the supreme authority. In this writing (it can be found in Stewart Brand's new magazine, *CoEvolution Quarterly*) scientists do not triumphantly penetrate nature's secrets; they are given answers as a reward for managing to frame their questions on nature's terms. The emphasis is on illuminating new dramas, new phenomena, and less on flattening them into networks of cause-and-effect reactions. There is a very high tolerance for uncertainty, even a reveling in it.

By contrast, my daily newspaper recently carried a story about an experiment in which a cancerous mouse sperm was implanted in a mouse egg, and a normal embryo resulted. The story stressed the miraculous powers of the *scientists*, in such lines as "scientists announced today that they had mated a cancer cell with a mouse and produced a normal mouse." That is an example of the "old" school of science journalism: the scientist is the active agent; nature is the passive backdrop. A member of the "new" school would instead (assuming this was compatible with the facts) have stressed the marvelous powers of the egg in accepting a diseased sperm, returning it to health, and then continuing with it along the normal path of development. The role of the scientist would have been reduced to that of witness, or, at most, the architect of the stage on which the drama was presented.

I think the "scientist as hero" form of science writing (a good deal of which issues from the scientists themselves) is responsible for the near total inaccessibility of molecular biology to lay persons. This is not a trivial cultural deprivation. Nowhere else does one find such natural intelligence, such elaborate self-sufficiency, such a scale of complexity regulated with such a degree of precision, as one does in the cell. No doubt there is a general suspicion that all these molecules—amino acids, enzymes, and so on—are not natural, but artifacts, like gears and screws, developed by scientists as a way of expanding their "mastery" over nature. But—purely as a question of the public interest—to the extent that our culture needs a vision of nature as active, up to any number of contingencies, highly competent in pursuit of a very wide range of purposes, and entirely self-regulating, the parable of the cell ought to serve magnificently. That it has not suggests that the "new" sci-

ence writing has, as one of its first orders of business, an act of cultural damage to repair. Ultimately, it is probably impossible to grasp the cell at all unless one begins with the assumption that nature is full of active purposes.

There is another theory for the trouble that science is now in: that is, that we have lost our self-confidence, and with it, our belief that we can do anything right. Science has just been caught up in the general failure of nerve, and the emphasis on preserving the natural order, the "balance of nature," stems from a willingness to hand over the reins to some other, more competent, authority.

The theory I favor is that we sense that the world has changed enough to make a search for new ways of addressing the realities necessary, and that what we are seeing now is both the signs of the search and the emerging answers. Man is a uniquely generalized species; not only have we adapted to the arctic, the jungle, the seashore, the mountains, the central plains, and the river deltas, but we have adapted to a life of continuous migration, and, at other times, to a stable life, bound to a given place for generations. We have coped with high and low population pressures, with rich and poor lands, with environments that were high in risk and danger and those that were benign and peaceful. It is reasonable to believe that such an animal must have evolved ways of grasping the nature of this situation at its most abstract and dealing with it.

Perhaps that was the evolutionary origin of religion. If this is true, then perhaps what we are doing now is listening: pulling away from those sense organs that seem to be likely to block nature off, developing others that are more sensitive and open, trying to learn, as we no doubt have thousands of times before, what it is, this time, that the world wants us to become. □

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A FOUNDATION FOR RESEARCH

By WILLIAM A. FOWLER

Courtesy of Science

Economic development for the betterment of mankind depends increasingly on scientific breakthroughs to improve our understanding and use of the planet we share—and, as Professor Fowler concludes, upon man's ability to transfer research into wisdom. In this article Dr. Fowler reviews the outstanding accomplishments achieved in the last 25 years through the medium of the National Science Foundation and notes that there is "best of all, rich promise for the future."

An internationally renowned scientist, Dr. Fowler received his doctorate from the California Institute of Technology in 1936 and, capping an unbroken association of 40 years there, was named Institute Professor of Physics in 1970. He is a prolific author, has taught in many countries, and became a fellow of the American Academy of Arts and Sciences in 1965. Two years ago he received the coveted National Medal of Science.

A quarter century ago the United States Congress created the National Science Foundation (NSF), authorizing and directing it "to initiate and support basic scientific research . . ." It is not *the* foundation; there are many other agencies and institutions in and out of government which support research. The word "foundation" is not used solely in terms of funding but more in its literal sense, the underlying structure on which all else rests. The word "research" is not qualified by the adjective "basic" because, in response to the pressures of our time, the NSF was authorized to support applied research in 1968 by amendment of the enabling act of 1950.

Research is an investment which may lead at first only to healthy conjecture and speculation, but which ultimately leads to understanding and to wisdom. The NSF has supported, encouraged, initiated and counseled a fair share of the research investment in the United States over the last 25 years and it seems appropriate to inquire into what return, not of conjecture but of knowledge, this investment has brought. The choice of research returns to be discussed will be arbitrary but, it is hoped, not capricious. The main subjects will be earth science, molecular science, environmental science, astronomical science, and social and applied science. The word "science" is used here because each of these subjects has involved a number of scientific disciplines. For example, molecular science includes molecular chemistry and molecular physics. Astronomical science includes astronomy, astrophysics, and astrochemistry. The mathematician will wonder why *The Discovery of New Sporadic Sample Groups* or *The Logic of Computers* was not discussed, as well they might have been. The physicist will wonder why *Parity Violation in the Weak Interaction* or *The Laser Renaissance in Optics* was not included; the chemist, why *Macromolecules in Plastics and Polymers* was omitted. Nonetheless the mathematician, the physicist, and the chemist will find his branch of science thoroughly involved. This piece is about the woods, not about the trees.

This story will be the whole story (within one man's limitations) and not just the NSF role; but some bias will be apparent. There will be no mention of the names of individual investigators. Anyhow, as Seneca said, "The reward

for a good deed is to have done it."

Where better to begin than here at home on the spaceship which we call Earth. It is, indeed, our spaceship and it is the only possible habitat in the foreseeable future for the thousands of millions of human beings who ride it. Thus we must learn all we can about it, if we are to conserve and utilize its resources for the benefit and survival of man.

During the lifetime of the NSF, the earth sciences have been revitalized by one of the most rapid, thorough and potentially practical revolutions in the history of science. Cliche or not, it has been a truly fascinating development. Instead of the fixed object which the Earth appears to be to one man during his lifetime, the Earth has been shown to be an intricate mechanism with interlocking movements on a global scale which involve its surface and extend deep into the interior. This big picture which goes under the name of continental drift, sea-floor spreading, and plate or global tectonics was put together from many sources, but a prolific one among these was the data gathered about the sea floor during the hundreds of seagoing expeditions sponsored by the NSF.

For many years the concept of continental drift was an intriguing but controversial one. It did not gain wide acceptance because of many apparent discrepancies in the evidence and because of the lack of a reasonable driving mechanism. It all started with the fit of continental margins, especially the west coast of South Africa and the east coast of South America; but by now a number of other pieces of evidence have been brought to light:

—*The matching of rocks between continents.* Detailed studies in northeastern Brazil and west Central Africa have shown that the older rocks in both continents are similar in composition, age and structure. Similar structures that appear to have been continuous have now also been identified in southern America, Australia and Antarctica.

—*Fossils.* The finding of fossils of shallow-water reptiles and amphibians in rocks more than 200 million years old in all of the southern continents, including Antarctica, argues strongly that these continents were once joined together. There is no other logical way for these animals to have spread from one continent to another.

—*Rock magnetism.* The Earth's magnetic field periodi-

cally reverses, and on land a sequence of chronology of these reversals had been established for the past six or seven million years. About 15 years ago it was noted that the mid-Atlantic Ridge is flanked by magnetic anomalies that are parallel to the ridge, and symmetrical on either side. The pattern of anomalies on the west side of the ridge is virtually a mirror image of the pattern on the east side. These anomalies are apparently also caused by the reversals of the earth's field. Molten rock rises from the mantle along the mid-ocean ridges, cools, and acquires the imprint of the magnetic field at the time of cooling. More molten material forces the cooled material to one side and literally pushes the sea floor apart. As the sea floor spreads, the continents are carried along on plates in the Earth's crust. Whether these plates are pushed by the outward motion of the sea floor from the mid-ocean ridges or pulled by down-going slabs at the continental edges or dragged by convective currents in the mantle is still not perfectly understood.

—*Seismology, the study of earthquakes.* The earthquakes of the world are concentrated in belts or bands. These belts follow the mid-ocean ridges, the margins of some continents, and the deep trenches of the oceans. Detailed studies of the oceanic trenches, especially the Tonga Trench in the Pacific, show that the depth of earthquakes gets progressively greater as the trench is approached, reaching down to 700 kilometers. This suggests that, as the crustal plates move away from the ocean ridges, they are also drawn down underneath the margins of the continents or in the deep trenches of the oceans and reabsorbed into the mantle.

—*The results of the Deep Sea Drilling Project.* If the magnetic stratigraphy and the concept of plate tectonics are correct, there should be no part of the oceanic crust that is more than about 200 million years old, and this part of the crust should be close to the continents and the trenches. Drilling across the mid-Atlantic Ridge and the Pacific has confirmed this. For example, the volcanic basement close to the mid-Atlantic Ridge is only a few million years old, but close to the eastern margin of the United States, for example, the volcanic rocks of the oceanic crust are about 160 million years old.

This new unifying concept of global structure and tec-

tonic processes provides a framework for new thinking and research into the mechanisms that shape the Earth. The discovery of the Earth's free oscillations in the early 1960s and their use to infer the deep structure of the Earth has been woven into this framework. This discovery revealed in more detail than heretofore that there exists a partially molten zone beneath the crustal plates and that the movement of material within this zone must play a key role in driving the plates.

Within this framework has arisen a deep understanding of earthquake phenomena which is of the greatest practical importance. First of all, the concentration of seismicity at the boundaries between plates explains the global pattern. There is much more in addition. By combining laboratory experiments on the fracture of rocks with field data, earthquake faults can be described in terms of empirical fracture mechanics, and the radiation pattern of seismic waves can be predicted theoretically. Precursory phenomena prior to earthquakes have been detected, and respectable seismologists around the world have now joined astrologers, mystics, and religious zealots in earthquake prediction. Put your bets on the seismologists; they may bring home a windfall of untold benefit to human society within the next decade.

Many problems remain in the earth sciences. The details of the crustal driving mechanism are still obscure. Evidence that the crustal plates are being pulled, not pushed, apart comes from the myriads of cracks and fissures in the ocean floor investigated by the deep-sea research submersible, the *Alvin*, and its French counterparts. Much is still to be learned about vertical, as contrasted to horizontal, movements of the Earth's crust. The NSF has supplied instruments and ships and other facilities in the past; it will continue to do so in the future of this exciting and dynamic field. Coming up is the International Phase of Ocean Drilling (IPOD) which will carry out deep sampling of the oceanic basement below the overlying sediments. More will be learned about the potentially rich deposits of iron, manganese, copper and chromium which are thought to reside on and in the ocean floor, and eventually drills may be able to puncture the Earth's crust, reaching into the mantle itself.

The Earth is not all land and sea; it has an atmosphere which supplies the breath of life and shields us from the dangerous portions of the Sun's spectrum and from the direct action of solar and cosmic high energy particles. Atmospheric science includes research on phenomena in the lower atmosphere where most weather, climate and pollution effects are determined; in the middle atmosphere where incoming solar energy is directly absorbed and complex physical and chemical interactions occur; and in the high atmosphere where interactions with the solar wind and with solar outbursts of X-rays, ultraviolet light and penetrating particles are paramount. An important factor in the forward thrust of atmospheric research was the creation in 1960 of NCAR, the National Center for Atmospheric Research. NCAR studies everything from raindrops and hail in the atmosphere to spots on the Sun, in a wide-ranging research program. It also provides balloon, aviation and computing facilities for scientists.

The United States has committed itself to support of GARP, the Global Atmospheric Research Program. The NSF's commitment has been to stimulate and intensify research in large-scale atmospheric circulation patterns designed to achieve a capability in long-range weather prediction. In 1974 one of the largest and most complex international scientific experiments ever undertaken was carried out by GARP's Atlantic Tropical Experiment (GATE).

The tropics are unique, for it is there that most of the heat received from the Sun is stored in the oceans. The absorbed solar energy is transferred into the lowest layers of the atmosphere as latent heat in water vapor evaporated from the oceans. Within this atmospheric boundary layer, the latent heat is realized as sensible heat, principally through sporadic cumulus cloud development. The clouds subsequently become organized as parts of larger scale systems, thereby distributing this energy into the middle latitudes. The study and understanding of these complex processes is the principal aim of GATE. Analysis and interpretation of GATE data will continue for many years. The largest share of that responsibility in the United States will be assumed by the academic community. The NSF is committed to ensuring that this culminating phase is successfully accomplished.

Molecular science

Three thousand million years ago Earth gave birth to life in its simplest form, a molecule that could replicate itself by using building blocks formed by random photochemistry in some aboriginal soup. Within the last million years or so those simple molecules have organized to form a living organism that can understand the molecules themselves and how the molecules build one gene, the unit of heredity, the key to replication and reproduction. This miracle of understanding has come into being over the last hundred years or so, but it is research in the last 25 years which has brought forth a dramatic and coherent picture of the fine structure of the gene, the genetic code, and the control of gene expression. A great synthesis of knowledge has resulted which has conceptually bridged the long-mysterious gulf between the world of the living and the nonliving. This synthesis has led to realization of the continuity between inanimate and animate matter, based on the understanding of the potential for life, inherent in molecular organization.

Developments in molecular biology have been international in origin, and in the United States there have been a number of supporting agencies. Many critical advances were made by NSF grantees. In retrospect it is fitting that the first NSF grant was in biology. The story of the double helix model for DNA (deoxyribonucleic acid), the genetic material, was already known in the infancy of the NSF, and it was also known that genes are arranged linearly on the chromosome. Early work supported by the NSF provided the first proof that mutations within a gene also form a linear array, and that mutations probably involved a single DNA nucleotide. This work laid the basis in part for the further development of molecular genetics.

In another grant program, the building blocks of DNA were put together into a predetermined sequence of groups of three, each of which is a code word. This collection of synthetic genes was then used to make a second molecule called messenger RNA, which, in turn, directs the synthesis of a proteinlike chain. This new chain was then broken down into its individual building blocks, one by one, and each was identified. By identifying each of the building blocks of the new protein, it was possible to break the code

of the original DNA and confirm that three nucleotides make one code word and specify a particular amino acid. It was also possible to establish the direction in which information of the messenger RNA is read, that punctuation between code words is unnecessary, and that code words cannot overlap. How is a particular amino acid positioned properly in the chain? The middleman in this process has been identified as another kind of nucleic acid, transfer RNA. There are different species of transfer RNA, each of which can recognize only one amino acid and a proper code word on messenger RNA. The primary structure of transfer RNA was determined by investigators working on an NSF-supported grant. Other work led to the realization that not all cells read a genetic message in exactly the same way and thence to the identification of the *stop* signals, which mark the spot at which synthesis of proteins stops.

Environmental science

The NSF has played the leading role in initiating comprehensive studies of extensive ecosystems. Although one view of ecology has always been synthetic and holistic, it was apparent in the early 1960s that most studies were not sufficiently comprehensive and quantitative to achieve more than a generally descriptive level. After years of modest support of systematic biology, the NSF took a major initiative in supporting the Biome Programs generated under the International Biological Program. The investment in systematic biology began to pay off.

While it cannot be said that the attempt to construct a total system model has been successful, there has been considerable success in modeling component parts. In addition, the elements required for describing and understanding these systems have become much more sharply defined. Initial emphasis has been primarily on energy (or carbon) flow, water flow, and nutrient flow. The requirement for completely balancing these has forced attention to elements that had been largely ignored in the past; the importance of below-ground processes, and the large role played by decomposers as compared with grazers. In both forests and grasslands, more than half of the energy flow from photosynthesis is used below ground in root systems. The importance of roots is no surprise, but the magnitude of the

energy flow to support the system has been, and it is now clear that total system models will require much more attention to below-ground processes than had been suspected.

In a similar way, there had been a rather general expectation that a substantial part of the carbon captured by plants was subsequently consumed by insects and grazing animals. These "consumers" turn out to be quantitatively a rather minor factor, and the major pathway for processing the carbon input is through "decomposers." Since the flow of nutrients is closely related to the flow of carbon, the functioning of the decomposer system is critical in returning nutrients to the soil and making them available for new plant growth.

The models developed in these studies have found surprisingly early application to a variety of land management problems, simply because they are the first tools available for making reasonable projections of the consequences of management alternatives. Most important, however, it is clear that a new era has been initiated in which ecology will be more adventurous, more quantitative, and will direct more attention to the construction of models for understanding and predicting the behavior of total systems.

Our immediate environment is the land, the sea, and the air; but the deep core of the Earth produces a magnetic field around us which deflects penetrating particles from the far reaches of the galaxy. Our environment is the universe. One of the most important trends during the life of the NSF has been the developing recognition, shared by scientists and the general public alike, that the environment is in fact a single entity, a gigantic system. Environmental science is the study of all natural processes, their interactions with each other and with man. The National Science Board and the staff of the Foundation have been well aware of the many important problems such as the removal of sulfur from smoke, the recycling of industrial wastes, and the protection of open spaces—and of the technological and institutional changes needed to change them—but they have also been greatly concerned about the advances required in the science of environmental systems if the basic knowledge and understanding needed to help resolve problems of public interest are to be provided.

Astronomical science

And now we lift our eyes from Earth to the heavens—to the planets, the Sun, the stars and the interstellar medium surrounding them, the galaxies, and the vast reaches of space and time. It goes without saying that in astronomical science in the past 25 years it has been the space adventure from Sputnik to Apollo that has captured the popular fancy. It goes without saying, too, that the U.S. National Aeronautics and Space Administration (NASA) has played the primary role in this incredible human venture.

Over this same period there has been a veritable explosion in astronomical science, and here the NSF has played in many ways the leading role. Visual astronomy is thousands of years old, and optical astronomy is 366 years old. Radio astronomy is 44 years old but it has only been in the last 25 years that radio astronomy has become a mature science. Witness the development of very long baseline interferometry, which gives us exquisite small details of the structure of enormous radio sources. This same 25 years has witnessed fullscale extension of optical astronomy into the infrared and ultraviolet and the birth of microwave and molecular astronomy, X-ray astronomy, gamma-ray astronomy, and neutrino astronomy. In addition, cosmic ray studies, no longer in the forefront of elementary particle physics, have become an integral and important part of astronomical science. We can now "listen" to the "music" of the spheres over many octaves and not just within one. The celestial message is borne not only by photons, but also by neutrinos and by energetic nucleons and nuclei.

In order to observe and detect over a wide range of radiation and particle energies, it is necessary to have observatories equipped with large telescopes or other detectors and sophisticated auxiliary instrumentation. Very early in the life of the NSF it became clear that national centers of research were necessary to meet national needs for research in astronomy and the atmospheric sciences requiring facilities, equipment, staffing, and operational support that are beyond the capabilities of private or state institutions and that could not appropriately be provided to a single institution to the exclusion of others. Unlike many federally sponsored research laboratories, the NSF-

supported National Research Centers do not perform specific research tasks assigned by or for the direct benefit of the government. They are maintained for the purpose of making available to all qualified scientists—including their own staffs—the facilities, equipment, skilled personnel, support, and other resources required for the performance of independent research of the scientists' own choosing. This has all run parallel to NSF support of so-called users' groups at the national accelerator centers built by the Atomic Energy Commission.

The NSF supports four astronomy centers, including the Cerro Tololo Inter-American Observatory near Santiago, and one atmospheric research center. Our view of the universe has widened and deepened with astronomical discovery after discovery in the past quarter century. Secrets were wrung from observations of the interstellar clouds of gas and dust that permeate our galaxy. In 1951 astrochemistry came into being. The interstellar medium is of the utmost importance to us not only because it is the site of the formation of stars like our sun, but also because it contains the simpler organic molecules whose further buildup on planets may lead eventually to the development of life. Are other galaxies seeded with the building blocks of living organisms, and does this mean that other civilization share the universe with us?

As one turns to luminous objects, the list of surprises goes on with the discovery of the galactic X-ray source in Scorpius in 1960, the discovery of quasars in 1963, and the discovery of pulsars in 1967. Quasars represent the violent transformation of as much as one million solar rest masses into energy in the form of magnetic fields and relativistic electrons. Is it annihilation energy, nuclear energy, gravitational energy? We still do not know, and I for one believe that the solution of this celestial energy crisis, when it comes, will tell us something about energy generation and energy transformation of potential application to our terrestrial energy problems.

Quasars, pulsars, neutron stars, black holes—what more surprises could there be? Astronomical evidence, such as it is, favors the idea of an "open" universe. The answers are not all in yet, but the conceptual framework is there.

Social science and applied science

Author William Manchester once wrote, "Research, of course, is no substitute for wisdom." The "of course" is quite right. But let there be no misunderstanding. If we are to avoid the destruction of nature and the degradation of mankind we must learn how to transform research into wisdom. Social science and applied science in different ways strive toward this goal.

Social science was not included in the mandatory language of the NSF Act in 1950, but research in the social sciences has been assisted since 1953, beginning with sub-areas close to the mathematical, physical, and biological programs. The close bonds between the social and natural sciences have been since then one of the hallmarks of NSF activities. One comment must suffice. The NSF's stimulation of research in economic theory, econometrics and social indicators—including related work in sociology and social psychology—over the years provides a good part of the base upon which energy policies will be erected in these times of energy crisis.

Engineering science has been part of the NSF program from the beginning. Engineering science has aimed to increase the understanding of the principles and concepts that are common to and underlie a wide variety of technological problems. It supported the finite element method in structural engineering and, across the board, it supported research on tungsten carbide as a substitute catalyst for platinum. In the mid-1960s it initiated a concerted research effort to apply systems analysis and operation research to the efficient allocation of urban police forces. This work led to the development of a general methodology for the dispatching and deployment of police patrol forces and for evaluating the consequences of technological and administrative innovations. There are immediate applications to fire and emergency ambulance services.

Materials research has been an NSF function since the beginning, and the program was considerably augmented in 1971. Fundamental observations have been supported on the quantized nature of magnetic flux surrounded by a superconducting ring. These observations led in part to the development of superconducting interference devices,

which have become of considerable technological importance. In another area, developments point toward high strength polymers which may possess an electric modulus as high as that of steel and a greater tensile strength, while at the same time weighing less than 20 percent as much as steel.

Expanding on the work in the social and applied sciences, the Research Applied to National Needs (RANN) program was developed in response to an amendment to the NSF Act of 1968. Interdisciplinary Research Relevant to Problems of Society (IRRPOS) was begun in 1969, and it was then only necessary to sharpen and focus research on selected environmental and social problems and on opportunities for future technological development in order to respond to the legitimate demands of a society for which the fruits of research had been, speaking without prejudice, a mixed blessing. Basic to the concept of RANN from the beginning was the eventual transfer of programs to mission-oriented agencies of the federal government and to industry. Again one example must suffice. Between 1971 and 1974, RANN led in the effort to define a solar-energy research program to more fully understand and exploit this inexhaustible resource with which we are blessed. The payoff came with the formation of the Energy Research and Development Agency (ERDA) to which RANN was able to transfer funds, staff, and knowhow. At the same time RANN was able to continue with concentration on innovative, long-range, high-risk, high-payoff projects in solar energy research. In such ways NSF is indeed responding to national needs.

This has been one man's account of the return on the U.S. investment in a foundation for research. There have been failures as well as triumphs, but those are for others to record. Research has enriched our lives and nurtured our livelihood but it has also brought inevitable problems which, it is hoped, in these next years it can help to ameliorate. All in all it has been a 25-year success story with, best of all, rich promise for the future. We will fulfill that promise only if we succeed in transforming research into wisdom in the compassionate use of knowledge in the affairs of man. □

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MOVIES ABOUT MOVIES

HOLLYWOOD LOOKS AT ITSELF

By EDGAR H. DE LESSEPS

In "Sunset Boulevard," considered by many critics the finest movie about movies, Gloria Swanson plays a forgotten star of the silent screen, pathetically grotesque in her illusory world, hoping for a comeback that never comes. William Holden plays her young lover whose morality outlives him. Together, in her decadent mansion, they watch the fading star's old movies frayed with time.

Swanson complains about the "idiot producers" who introduced sound. At one point she jumps up, her face bone white in the flickering light of the movie projector, stabs a defiant finger at the screen, and exclaims with irrepressible theatricality:

"Still wonderful, isn't it? And no dialogue. We didn't need dialogue. We had faces. There just aren't any faces like that any more."

Faces! They were what counted in Hollywood's Golden Age of the 30s and 40s. Today, primarily because of the demise of the old studio system and the movie tycoons, who made it work, stars are minimal, so minimal they have to be called Superstars.

But American moviegoers miss the old screen idols; they miss the romantic patina that surrounded them, that set them apart from the larger-than-life images on the then 20-foot (six-meter)

screen. They miss the way they were because, in another time, another place, that was the way they were. That's what they miss.

In all this, nostalgia is the common denominator. It suffuses not only the over-40 age group but the young film fans, those born after the Hollywood star system collapsed. It is one of the forces that has prompted filmmakers—both for theater and television—to turn out a stream of movies about movies: about the old stars and the milieu that made them stars. This was Hollywood, Babylon of the West.

This introspection within the film industry has produced:

—"Gable and Lombard," with newcomers James Brolin and Jill Clayburgh in the love story of Clark Gable, revered as the "King" of Hollywood, and Carole Lombard. Offscreen they were husband and wife.

—"W. C. Fields and Me," with Rod Steiger as the misanthropic comic.

And television is running made-for-TV movies:

—"The Sex Symbol," with Connie Stevens as a Marilyn Monroe prototype.

—"The Legend of Valentino," with Franco Nero as the Latin lover of silent films, shadowed now and then with un-

dertones of homosexuality.

—"The Black Dahlia," a tight, well-wrought account of the infamous 1940s murder—still unsolved—of an aspiring young actress.

—"James Dean: Portrait of a Friend," an explicit look at the brief career of one of the brightest talents of the 50s.

And there's more. Hollywood's delving into its own past, its fascination with itself, has even resurrected two animal stars. "King Kong," the fictional ape who, clutching the dainty Fay Wray in his hairy hand, scaled New York City's Empire State Building, is back in a remake of the 1933 shocker. And Rin Tin Tin, who was a real dog, is satirically revived in "Won Ton Ton, the Dog Who Saved Hollywood."

Of course, movies about movies are nothing new. Treatments of the theme are cyclical. Hollywood has looked at itself time and again and, in so doing, has turned out some successful motion pictures, some of them even great. For example: "Singin' in the Rain," with Gene Kelly directing and singing and dancing, poked fun at Hollywood's transition between silence and sound; many film enthusiasts vow it's the best movie musical ever made. In George Cukor's "A Star is Born" Judy Garland and James Mason played unlucky lov-

ers at opposite ends of the Hollywood ladder to fame—she at the bottom, he at the top—who ironically exchange places with each other; acting reigned, with Garland's ascendance into film fame equated only by Mason's descent into suicidal despair. Billy Wilder's "Sunset Boulevard" may well be the most memorable dance macabre of Hollywood ghosts, with Swanson giving a once-in-a-lifetime performance. And Preston Sturges' "Sullivan's Travels," with Joel McCrea as a film director, offered trenchant satire on the industry's less impressive grapplings with "social significance."

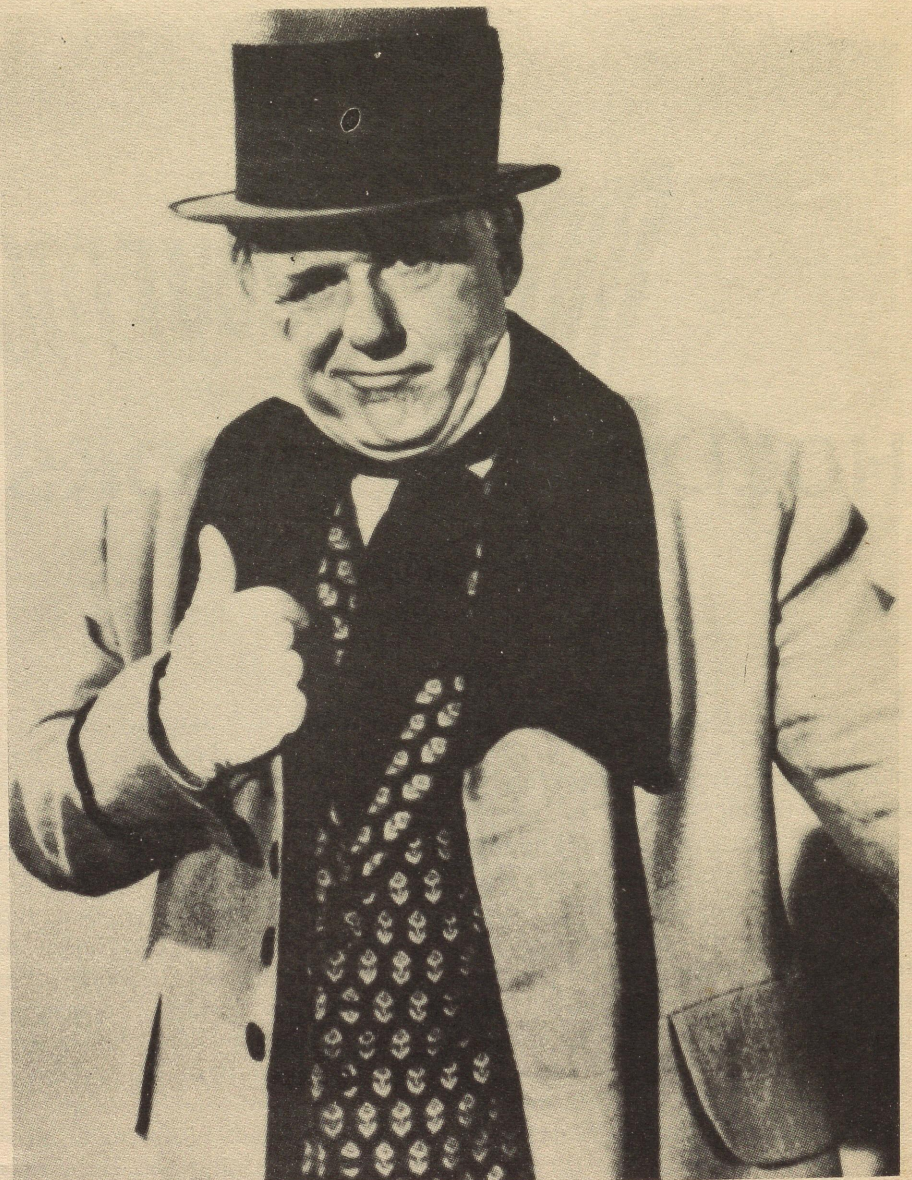
Hollywood—the purveyor of universal dreams—dominated all these movies, and audiences loved them. There were songs and laughter and tears. And powerful characterizations, so vital to any good movie.

There is, of course, reason for vacillation of the cycle. At times of international economic stress, American films generally try to give an antidote—glamour, escapism or adventure. Witness the high-society comedies and Busby Berkeley's outrageously overstaged musicals and the swashbuckling romances of the 30s, and the strong emphasis on westerns and science fiction films in the mid-50s, a period of self-searching much like today. And what about today? Well, once again, Hollywood has come up with an antidote—this time another look into its own mirror.

Some observers of the film industry, though, see the current cycle of movies-on-Hollywood as a reaction against the often humorless social consciousness movement of the 1960s. Arthur Knight, film critic and teacher, recalls showing some rather gentle films of the 1930s to his students in the 1960s, a decade when students were ostensibly militant and tough. When a movie ended, Knight remembers, young women wiped away tears; young men asked: "Why don't they make movies like that any more?"

The vanguard of the present cycle: "The Day of the Locust" and "The Wild Party," both offering for the most part glimpses of Hollywood from outside the studios with a large dollop of sleaziness.

The unique specimen in the current



crop is perhaps Mel Brooks' innovative if uneven comedy, "Silent Movie." It has only one word of spoken dialogue, sound effects and a lilting musical accompaniment, and it all works in Hollywood's true silent tradition of rippling humanity. Moreover, "That's Entertainment, Part 2," a distinctive and irresistible sequel, illumines the lineup. Like its progenitor, "That's Entertainment" (1974), the second round unreels a bounty of magical clips from Metro-Goldwyn-Mayer (MGM) Studio's old goodies. this time, however, mixing comedies and dramas with musicals; the star parade shimmers with, among others, Gene Kelly and Fred Astaire, the Marx Brothers

and Marie Dressler, Spencer Tracy and Katharine Hepburn.

"The Last Tycoon" is bursting with promise. This is American writer F. Scott Fitzgerald's unfinished novel about tinsel town, where he died. It is also bursting with talent: Robert De Niro ("Taxi Driver") plays a Hollywood producer, whose prototype was MGM's ingenious Irving Thalberg, responsible for many, many of the studio's hits in the 1930s; Sam Spiegel ("Lawrence of Arabia") produces, Elia Kazan ("A Streetcar Named Desire") directs, playwright Harold Pinter is screenwriter. Other players are Jeanne Moreau, Jack Nicholson, Robert Mitchum, Tony Curtis and Ray Mil-



LEFT—W.C. Fields slips a ring onto Mae West's finger in the 1930 classic "My Little Chickadee". FAR LEFT—In the 1976 movie "W.C. Fields and Me", actor Rod Steiger recreates the misanthropic comedian.

land. On television, Fitzgerald is represented in a film called "Fitzgerald in Hollywood," recounting two intervals in his life. Jason Miller ("The Exorcist") is Fitzgerald, Tuesday Weld is his wife Zelda, and Julia Foster is columnist Sheilah Graham, who was linked romantically with the writer in his final years.

The cinematic garland extends with "Hearts of the West," a charming comedy with Jeff Bridges as an Iowa farm youth who fortuitously becomes a star in second-rate western movies. Peter Bogdanovich directs Burt Reynolds and Ryan O'Neal in "Nickelodeon," a screwball comedy about primitive Hollywood, before D. W. Griffith made

"The Birth of a Nation." Reynolds also plays "The Stuntman," a contemporary story. There are, in various stages of production, film biographies of Errol Flynn, Bruce Lee, and two rival projects of Tom Mix, the cowboy star; "Actor," a television drama of Paul Muni's life; "Barrymore," another TV biography with Kirk Douglas; "Newsreel," about a soldier-of-fortune cameraman in the 1930s, and "Network," directed by Sidney Lumet, with a Paddy Chayefsky script taking a "serio-comic" look at what makes TV run.

Some motion picture executives believe this wave of Hollywood mania will interest and attract moviegoers and

overflow box office coffers. Jack Valenti, president of the Motion Picture Association of America, says: "Movies are attracting big audiences again. The fact is that people badly need some light in their lives—and good stories about fascinating characters provide that . . ."

"America has a great need for the movies. People are looking for giants—heroes who can be emulated—and the movies happen to be full of actors who at least play that role well."

But some executives, shaking their heads, question the size of the public appetite for such fare, whatever the quality of the individual product.



William Holden and Gloria Swanson watch old silent movies in Billy Wilder's "Sunset Boulevard", considered by many film experts to be the best Hollywood movie about Hollywood.

American Film magazine, published by the American Film Institute, dissects the issue: "Today's filmmakers, having passed through the down-with-Hollywood attitude fashionable in the 1960s into an envious longing for old-time Hollywood's energy and exuberance, are faced with the problem of creating believable fables for skepti-

cal modern audiences without denying the still-potent, romantic lure of Hollywood."

Old Hollywood was, paradoxically, a new game, and experimentation was the name of the game. The New Hollywood, though, is more cautious, more circumspect. Production costs today are astronomical—few quality pictures cost less than \$5 million—so far fewer films are made. And sophisticated moviegoers, like the moviemakers themselves, choose their films with great selectivity.

The New Hollywood, then, is throwing the dice less often, and when it does the stakes are much higher. The film

that scores high artistically but bombs at the box office is the winner that takes nothing: an anachronism in today's profit-oriented industry. The film that scores high at the box office but without artistic merit is the winner that takes all. Some films, of course, fall into that exceedingly rare category of being both artistic and commercial hits: these are the true winners.

Based on historical judgment, then, the movies about Hollywood in the current cycle probably will produce less winners than losers. But as one studio executive discerns: "That's the price moviegoers have always paid for works of film art." □

Books Considered

HOLLYWOOD'S HOLLYWOOD: THE MOVIES ABOUT THE MOVIES

BY RUDY BEHLMER AND TONY THOMAS
(The Citadel Press; \$19.95)

HOLLYWOOD BABYLON

BY KENNETH ANGER
(Straight Arrow Books; \$14.95)

THE HOLLYWOOD POSSE

BY DIANA SERRA CARY
(Houghton Mifflin; \$8.95)

GROWING UP IN HOLLYWOOD

BY ROBERT PARRISH
(Harcourt Brace Jovanovich; \$10)

REVITALIZE HOLLYWOOD

BY SHELDON DAVIDOW
(Revitalize Hollywood Committee; n.p.)

Reviewed by William Hughes

Although movie-making has become a world-wide industry, no other film center has taken on that peculiar connotation of vision and venality that we associate with Hollywood. Perhaps that is because Hollywood is such a uniquely American phenomenon, created out of the fusion of three powerful strains in our national culture; the westering impulse, the dream of success, and the quest for a new life in an ideal community. Myths, both potent and petty, spring from such deep-seated sources, and Hollywood inevitably became a kind of El Dorado of the popular imagination—the source and subject of much American mythology.

The Hollywood myth has been exploited by real estate hucksters, studio publicists, fan magazines, and gossip columnists. Over the years it fed on the scandal and glamour of the movie business. Meanwhile, the myth and the money attracted, and often disappointed, generations of seekers and cynics. Sensing the public's fascination

with the motion picture colony, the studios ground out hundreds of movies about Hollywood and movie-making. These films are refractions of the myth, and they have been conveniently catalogued for us by Rudy Behlmer and Tony Thomas in *Hollywood's Hollywood*.

Some of these movies about the movies, including *Sullivan's Travels*, *A Star is Born*, *The Big Knife*, *The Bad and the Beautiful*, *Singin' In the Rain*, and Hart and Kaufman's recently rediscovered *Once In a Lifetime*, are among the most interesting products of the studio era. Such pictures, reinforced by the Hollywood publicity mills, shaped the public's perception of the movie capital as a tinselled dream town.

A few films, like *The Big Knife*, accentuated the darker side of Hollywood life, but even these exposes traded on the unique glamour of their setting. (The characters may be miserable, but see how they live—a roomful of Rouaults!) And most of the low-budget pot-boilers which purported to

depict Hollywood in its more work-a-day aspects relied on comparable, though less subtle, stratagems.

Hollywood, to explore just one example, is about a girl from the Midwest who comes to Hollywood looking for work at the studios. As she goes about finding a job, shopping, and even catching a bus, she encounters dozens of famous movie personalities. She doesn't recognize them, but of course the audience does. The effect is inescapable. Where else but Hollywood could an ordinary working girl hope to meet the likes of Charlie Chaplin, Mary Pickford, Will Rogers, Gloria Swanson (to name just a few of the stars who make cameo appearances)? Many other stories about Hollywood, Behlmer and Thomas remind us, followed the same pattern.

What are we to make of the 200 or so films Hollywood has made about itself? The authors offer us little analysis and few conclusions. They are nostalgia merchants, not critics or historians. Typically they treat classics and pot-boilers with equal amounts of strained

reverence. Still, *Hollywood's Hollywood*, with its repetitious but straightforward plot summaries, does allow readers to venture their own judgments on this narcissistic genre.

Not unexpectedly, these movies give us the movie business as the movie-makers wanted us to perceive it—in soft focus. Except for surface details, Hollywood's portrayal of itself seems even less trustworthy than its treatment of life in the rest of America. Many of these movies are about the price of success. The theme seems quite consciously calculated to justify the lofty status of the movie people themselves (See what we had to sacrifice for all this!). Having aroused the awe and the envy of the audience, the plot consoles the public by leaving it with a sense of relief at not having to bear the heavy burdens of such success.

But even the most self-conscious documents sometimes reveal covert attitudes. There is discernible in these films a powerful strain of hostility directed at the people who buy the tickets. Individually they are portrayed as simpletons; collectively they are a dreaded affliction—the “locusts” of Nathanael West. In this respect, the movie-makers' contempt for their audience seems to parallel prostitutes' contempt for their clients. Writers, in particular, frequently expressed such feelings. This attitude, natural enough for creative people caught up in a mass production system, suggests a sense of artistic self-loathing—perhaps for having sold out to the tastes of the masses.

What I take to be Hollywood's ambivalence towards itself and its audience has its mirror image in Kenneth Anger's *Hollywood Babylon*. Here many of the familiar elements of Hollywood mythology have been warped into a predictable counter-myth. Concocted to satisfy the locust's need to believe the worst about the celebrities they have enshrined, it constitutes ano-

other form of vicarious self-contempt.

Mixing glitter and gore, *Hollywood Babylon* is an illustrated catalog of atrocity and innuendo. Kenneth Anger rehashes every sex and dope scandal, from Fatty Arbuckle to Robert Mitchum. He exhumes every stale chronicle of self-destruction, Wallace Reid and John Gilbert, Judy Garland and Marilyn Monroe. And for ghoulish good measure he treats us to a series of revolting photographs, typified by a picture of the bullet-riddled face of Bugsy Siegel. For the reader, the effect is rather like being taken on a guided tour whose itinerary includes only warehouses and slaughter-houses.

Hollywood Babylon is a loathsome book. The publisher proffers this dose of harsh reality as an antidote for our tendency to over-sentimentalize the old Hollywood, but Anger's “facts” too often consist of misleading photos and titillating, but unsubstantiated, headlines. As exposé this is nothing more than nostalgia laced with squalor. It only adds to the miasma of gossip and sensationalism that has always obscured our perception of Hollywood.

Many American writers, including some of the best, have tried to demystify Hollywood and the movie business. The anti-Hollywood novel, for instance, has been a staple of our literature ever since the 1930s, as Leslie Fielder pointed out in *Waiting For The End*. But those fictions, usually written by embittered novelists (like Fitzgerald) who failed to make the grade as screenwriters, give us a uniformly jaundiced view of their subject. Indeed, they now constitute one of the main sources of the Hollywood myth, just as the disillusioned writer is one of its familiar stereotypes.

Still, the town has had its acute observers. They are not usually to be found among the seekers—people who came to Hollywood looking for some kind of artificial paradise—nor among

those writers who were outsiders craving to be insiders. Usually the best accounts are by visitors who weren't dependent upon Hollywood. Like ethnologists they could view the scene with detachment, their unique perspectives enabling them to detect patterns of behavior taken for granted by the natives. Above all, the best reporters generally managed to avoid all the love-hate commonplaces so typical of most Hollywood literature. One thinks particularly of Otis Ferguson and Edmund Wilson, writers whose occasional dispatches from Hollywood are models of good sense and shrewd perception. Wilson's observation, for instance, that Hollywood was, for writers, very much a mill town, both anticipates and explains the anti-Hollywood novel.

Of course, there are details of community life that no visitor, however prescient, is likely to grasp. For a more intimate sense of the life of a place we must rely on the aborigines, not the ethnologists. In the case of Hollywood, these are the people who grew up there, and for whom tinsel-town was not the focus of some extravagant fantasy, but an ordinary universe.

Among the best accounts of Hollywood life, from an aboriginal perspective, are recent reminiscences by Robert Parrish and Dianna Serra Cary—both former child actors, for whom Hollywood was merely a home town. For them the glamour of the town would not obscure the unique network of things and relations from which a place takes on its distinctive character. As Edmund Carpenter has written: “When natives talk about their own world, they speak about how things smell, taste, feel, sound” Both Parrish and Cary are keenly alert to the everyday details that shaped their experience of Hollywood life. Parrish puts the whole enterprise in perspective when he writes:

I suppose if I had lived in Scranton,

Pennsylvania, I might have wanted to be a coal miner, or in Pittsburgh, a steelworker. As it was I lived in a factory town and the factories produced movies . . . People went to work early and came home late, and the assembly line at each of the big studios turned out one feature film per week, more than five hundred films per year.

Growing Up in Hollywood is an autobiographical account of a worker in this factory, his rise from unskilled worker (extra, "dupe-negative measurer," cutter) to master craftsman (Academy Award winning editor of *Body and Soul*) to upper management (director). Parrish is an honest, unpretentious and engaging writer who makes the movie world seem commonplace—as it must have been for him.

Still, much of the appeal of this book—as it was with so many of the movies about Hollywood—is that it is about what seems to the rest of us to be a rather special world. One wonders how many people would bother to read the corresponding account of a steel-worker's climb from mill hand to manager. What steelworker could match Parrish's witty account of being hired by the Los Angeles DA to spy on Mae West's bodyguards; or his behind-the-scenes report on the making of *Body and Soul*; or his life-size characterization of the all too legendary John Ford?

Parrish is best known as a fine editor who became an ordinary assignment director. No *auteur*, he was simply an honest workman in the old Hollywood tradition. At that time apprenticeship meant more than university degrees. Once when Parrish wanted to watch John Ford in action, the director ordered him off the set: "Get back to the cutting room. That's where you learn about directing." We shouldn't be surprised, then, that Parrish has so little to

say about the "art of the cinema" or the mystique of the director.

Like so many Hollywood memoirs, this one is anecdotal, not analytical. Yet in this case the anecdotes go beyond mere gossip; they manage to convey something of the work ethic of the real Hollywood pros—their deep respect for experience, craftsmanship, and detail, qualities that for so many years made the Hollywood product superior to its foreign competition. *Growing Up in Hollywood* also conveys something of the *esprit de corps* that characterized the best of the studio production units. (The finest directors of that era—John Ford and Frank Capra, for example—recognized this creative component and exploited it by repeatedly drawing on a regular "stock company" of actors, writers, and technicians.) It is evident from the tenor of his book that Parrish is a likeable fellow and a good team man. Those attributes, perhaps more than his talents, explain his success in the studio system. Certainly they account for his close working relations with so many Hollywood artists and craftsmen, friendships which he delineates with great skill, warmth and good humor.

Parrish also witnessed something of the intellectual life that had once caused Thomas Mann to remark that Hollywood was more intellectually stimulating and cosmopolitan than Paris or Munich had ever been. Of course, Mann was not beyond believing that his presence alone was enough to make any place a center of culture, and he would become disenchanted with this place soon enough. But, through the 1940s and early 1950s, as Parrish attests, the home of Salka Viertel, an expatriate German screenwriter, was a salon for Huxley, Isherwood, Mann, Brecht, Hans Eisler and other refugee intellectuals. Parrish is too generous of spirit to remind us that it was two particularly vicious variations of Hol-

lywood gossip - mongering — the HUAC hearings and the blacklist — that broke up this coterie.

The Hollywood Posse tells of another group of exiles—that small band of displaced ranch hands who caught on in Hollywood as riding extras, doubles, and stunt men. With the passing of the cattle frontier, their westering impulse had brought them to the edge of the continent at about the same time the movie-makers arrived from the East.

It has always been understood that Hollywood recycled in celluloid the frontier myths. Now Diana Cary's memoir reminds us that Hollywood was itself a part of the frontier tradition. And given the movie industry's role in shaping an image of America for both domestic and foreign consumption, this association suggests a new dimension of meaning for Frederick Jackson Turner's statement that "the frontier is the line of the most rapid and effective Americanization."

The Hollywood Posse, like Turner's study of the frontier, is about an ending. As Diana Cary puts it, "the cowboys' Hollywood . . . constituted a sort of unofficial Burial Ground of the Elephants for old-time Western figures." (Pawnee Bill, Charles Russell, and Wyatt Earp were among the great westerners who settled in Hollywood.) Capturing as it does the mood of frontiersmen witnessing the closing of their era, Cary's memoir invites comparison with another elegy for the last generation of pioneers, John Steinbeck's "A Leader of the People."

The story of these uprooted westerners deserves to be told, not simply as a nostalgic footnote to movie history, but as a chapter in the history of the American frontier. That is what Diana Cary has done and she is well suited to tell this tale. Her father, an early member of the "Hollywood posse," was a former ranch-hand who alternated be-

tween jobs as a riding extra and unsuccessful efforts to operate a ranch of his own. Like Robert Parrish, Cary grew up in Hollywood and worked in the movies, first as a child star ("Baby Peggy"), then as an extra. In recent years she has been a magazine writer specializing in Western Americana. Her clear-eyed tribute to the Gower Gulch cowboys combines the insider's awareness of detail with a genuine feeling of affection for these men with whom she shared a unique way of life. Those qualities give Cary's narrative its authenticity, whether she is explaining the mechanics of the Running W stunt, documenting the callous sacrifice of men and animals for exciting visual effect, or recounting the impact of the Depression on Hollywood extras.

The Hollywood cowboys were bound together by their lingo and by an informal code of honor that carried over from their days on the range. The author includes a fascinating chapter on the Hollywood usage of old range terms like "gunsil," "scissorbills," "barflies," and "calf money." And there really was, Cary claims, a "Code of the West" based on honesty, loyalty, courage, and generosity. It was the cowboys' secret weapon in the Hollywood "world of egocentric, cynical and crafty barbarians." The cowboys' adherence to the code enabled them to retain a sense of personal dignity even though, as extras, they were near the bottom of the social and economic order.

But Hollywood remained a dream town, even for the studio proletariat. As one of Cary's down-and-out neighbors said, "In Hollywood there's always one chance in a million that something really big will happen to you." And although nothing really big happened to them, Cary's self-reliant cow-

boys fell for that "prefabricated fantasy called Hollywood," too. It was the only place left where they could "go on playing cowboy for the rest of their lives."

Today the Gower Gulch ranchhands have been succeeded by the midnight cowboys of the Sunset Strip, and it is the Hollywood counter-myth, typified by Kenneth Anger's seamy vision, that seems to prevail. Hollywood has become a community beset by all the familiar urban ills: a large transient population, declining property values, soaring crime rates, and a high turnover of shoddy, short-term business ventures (massage parlors and other sex-for-sale enterprises).

Recently a group of Hollywood citizens confronted these problems and produced a report full of practical measures for revitalizing their community. But even pragmatists need dreams; these civic reformers were unwilling to disavow the Hollywood myth altogether. As their report puts it "the Hollywood of the myth and mirage can provide the central theme and rallying point for creating today's and tomorrow's community."

An unlikely inspiration, for by now the Hollywood myth, always shallow, has become tainted. In an age without great visions we seem all too willing to settle for paltry dreams. D.H. Lawrence had our number, all right, when he observed that Americans "prefer their truth safely swaddled in an ark of bulrushes, and deposited among the reeds" waiting to be rediscovered. "Well," he went on, "it's high time that someone came to lift out the swaddled infant of truth that America spawned sometime back. The child must be growing pretty thin, from neglect." In Hollywood the truth is well hidden—the reeds grow taller and thicker there. □

William Hughes is a co-author of *The Historian and Film* (Cambridge Univ. Press).

Q: FOR WHOM DO YOU WRITE?

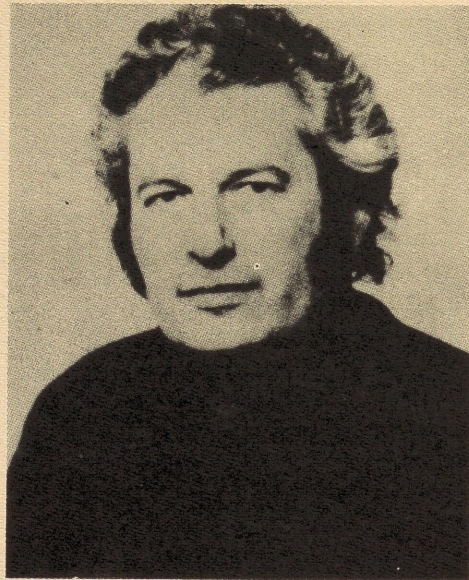
A: I WRITE FOR MYSELF

American author Joseph Heller drew worldwide acclaim with the publication in 1961 of his sardonic but uproariously funny first novel, *Catch-22*. With the passage of years, it has become one of the most widely read antiwar books of all time and has been published in 27 languages. It portrays the terrible air battles of World War II as pathos mixed with madness, driving Heller's bombardier antihero to demand, for reasons of insanity, his own removal from combat. Higher authorities turn him down, insisting he has to be sane to know that he is not sane. Heller's phrase "Catch-22," for such a circular argument, has crept into the vernacular as a globally understood shorthand for the ultimate and inescapable bureaucratic trap.

Heller labored for more than a decade to produce his second book, *Something Happened*, which appeared in 1974. Highly praised by most critics, it has been read by millions around the world. Like *Catch-22*, it is packed with tragi-comedy, but the two books are markedly different. *Something Happened* depicts the interminable troubles and frustrations of a lower level corporate executive, Bob Slocum, as he copes with his job and the various members of his family, with whom he has little rapport. Once again, Heller has apparently succeeded in striking a common nerve among his readers who find empathetic association with the story.

Heller was interviewed for this magazine recently in New York by Michael J. Bandler, a Washington, D.C.-based writer specializing in the arts.

JOSEPH HELLER INTERVIEW



Joseph Heller

Q: American novelist Saul Bellow recently divided writers into two categories—great public writers and small public writers. Great public writers, he said, are those novelists and poets who express social concern and who write for a general readership. Would you say you fall into that category?

A: Yes, by his definition, I would, just as he does.

Q: For whom, particularly, do you write?

A: I write for myself. I think I write for an audience that will like what I like. In each case, it's been a much larger audience than I anticipated. I thought *Catch-22* would be read only by people with a high degree of education in literature, because of so many literary references and allusions and parodies in it. If anybody would have told me it would be read by high school and junior high school kids, I would have said it would be impossible. The audience for *Something Happened* doesn't surprise me. The experience with *Catch-22* convinced me there is a tremendous audience of people interested in good books, particularly books whose subject matters touch on their own experiences.

Q: How do you react to criticism? Do you think you've been treated fairly?

A: The only type of review that really bothers me is the glibly malicious review, not an unfavorable review. I only got one with

Something Happened, and two with *Catch-22*, as I remember. They hurt your feelings. They are wounding. I knew *Time* magazine's review of *Something Happened* wasn't going to be good, but it wasn't upsetting, because by that time my publisher had in the office so many reviews that were good. The *Time* review was not what I would consider an unfair review. My wife did, but wives are that way. They're unforgiving. The description of the book was accurate, and the response was the reviewer's and that of the book review editor. I can understand somebody finding it long and not being particularly impressed by what happened.

But I also have been lucky. I may be speaking so favorably about reviews because generally I've been treated very well. And I found that almost all the reviews were informative and respectful and represented a lot of work on the part of the reviewer. I usually learn a lot about my books. I feel that readers, collectively, are better judges of what is most effective in the book than the author is. I remember one reviewer used the words "tenderness and irony" in discussing *Something Happened*, and I didn't realize until then that Bob Slocum's main characteristic was too acute a sensitivity to other people's pain, and to his own. He suffers more than anyone else in the book, and it emanates from an uncontrollable sympathy and compassion.

But on the subject of reviews, the one for whom a review is crucial is a

first novelist. And what's important for a first novel is not so much that the reviews be favorable, but that they be big.

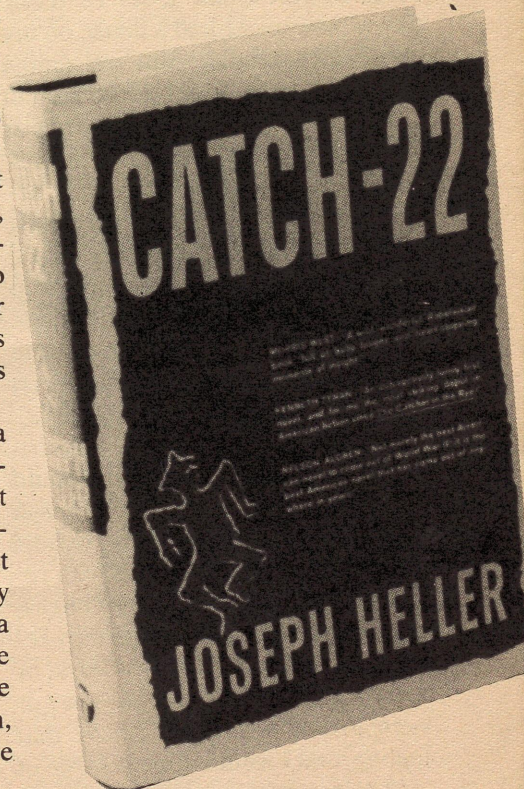
Q: *Since you mentioned it, what is the status of the first novel today, within the U.S. publishing industry?*

A: There are fewer first novels being published because fewer are being bought, by libraries or by individuals. There are two possible reasons for that: one is that the price of books is expensive; second, a reason I think makes even more sense, is that too many books are being published. In an effort to justify their organizations, publishing companies want to publish many books a year, but there are not that many readable books being written. Every year there are first novels coming out that are much more difficult to read than *Catch-22*, and not as entertaining. At the same time, publishers are cutting back on second and third novels by writers who had some small success with their first novels, because the publishers don't feel the second or third novels are good.

I think everybody who writes a novel that has merit will find a publisher for it, because despite the cost and despite the cutback in publishing first novels, my impression is that book companies still are fiercely competitive in all forms. Actually, a nonfiction writer has a better chance because so much depends on the idea. Even if there's duplication, they'll all sell, but a novel can be good and not even be reviewed.

Q: *You've earned a place as a literary superstar with just two books. How have you coped with success?*

A: It was kind of hectic for a year and a half or two years after *Catch-22*, when I became a celebrity and was invited places, and went to parties and met other writers and actors and actresses, but by the end of that period it was so familiar that it no longer was exciting. It was most valuable, though, as an indication of achievement of success, rather than anything I particularly enjoyed. I think all people, particularly those who make their efforts public, would like to succeed and would like signs of their success. But it's reached the



point now where often I don't even read interviews of myself when they're sent to me if I'm busy doing something else. And most of my closest friends aren't people you'd know of.

Q: *Do you have much social contact with other writers?*

A: No. We don't see each other much, at least I don't. There are writers on Long Island (near New York City) each summer who want to hang around with each other, but not because they're writers. Jim Jones and Irwin Shaw and Willie Morris are friends from 10 or 20 years ago, and they like to do the same things. I saw a lot of Irwin Shaw because he had a house on my block last summer. But we almost never talk literature. I don't. And in New York City, I have two friends who are novelists, but we never talk literature. We were all friends before we were novelists. My best friend is George Mandel, who was a novelist before I was, but I grew up in Coney Island with him. A close friend is Mario Puzo, but we became friends while he was writing his first book and I was writing *Catch-22*.

Many other friends who are serious about their work really would rather not see too much of each other socially—particularly writers you respect very much and who respect you. There's a feeling of uneasiness. You don't know what they really thought about your last work, or what they're going to ask you, or even if they've read it. I have that feeling, and I would think it's true of

others. Saul Bellow, Bernard Malamud, Philip Roth, John Updike all stay aloof. William Styron is a little more social with writers than others. I think he invites writers to his house. I don't think Norman Mailer hangs around with novelists particularly. And yet, for example, even though I haven't seen Philip (Roth) in about four of five years, if I wanted to have lunch or dinner with him, or if he wanted to get together with me, we could call each other up and it would be arranged in a second.

Q: *Do you read a lot?*

A: No. I don't have time. I'll read at night for an hour or so. I read as fast as I can. Normally, I'll read a review and then buy the book. Often I won't finish it. I'll get a sense that the book is good, but that there's nothing surprising in it for me. I like writers who write like I do, in one way or other—either that they're handling new material, or that they're handling old material in an unexpected, unpredictable fashion. Generally, I try to concentrate on works that are similar to what I'm doing at the time. For the book I'm writing now, I've been rereading the novels of Evelyn Waugh, because he has a pace and a tone that I like. An unfortunate consequence is that I sometimes pick up the language structure. Evelyn Waugh was English and had a kind of elegant use of adverbs, which I found myself imitating, and not doing nearly as well as he. But I'm alert enough to know what I'm doing, and so as I go

through it, I'll realize it's not my language. For *Something Happened*, I read a lot of novels of texture, particularly introspective novels, and novels or nonfiction dealing with sociology and psychosociology.

Q: *For example?*

A: Samuel Beckett, R. D. Laing, Sartre's *Nausea* again. The writing of *Something Happened* covered a long period, and I'd read about books on schizophrenia and psychosis and get them when they came out. I'm looking for ideas and I'm looking for stylistic traits to emulate. I read to supplement, and to keep me thinking.

Q: *What do you consider the trend in fiction today?*

A: Well, it's oversimplifying to talk about a trend in fiction in the United States, because we have so many levels of novels and so many audiences. The audiences occasionally overlap, sometimes by accident and sometimes intentionally. But I think the trend in the basic novel remains the same. It is a very well done, realistic novel of events, the kind that James Michener and Arthur Hailey and others do. It remains the basic novel, the one that gets the big audience. The subject matter can be anything. If you're talking about the trend among people who might be thought of as literary writers or academic writers—those who think of writing as an evolving, or at least a changing art form—then there also seems to

be more than one trend. There's the Donald Barthelme school, the school of Rudolph Wurlitzer and Robert Coover, the antinovel novelists. They're called post-moderns. Their approach to fiction is to destroy all the illusions of storytelling and to make writing writing. John Hawkes says he's done that, but he hasn't. He deals with the subconscious, with the horror. He's one of my favorite authors, somebody I reread while writing *Something Happened*. He has said in a speech that he fishes inside himself for the horror that exists there. Well, I was using horror in *Slocum* and I wanted to keep close to that, although his method is different than mine. Thomas Pynchon and John Barth do something different each time although I think if you trace Barth's work you'll find him moving toward writing as an act of writing rather than as an act of storytelling.

Q: Which do you lean toward, as a reader?

A: I enjoy all of those. The realistic novel doesn't impress me unless it's very powerful, or unless there's something very powerful in it in the way of ideas. Pynchon is realistic in form but not in content. Vonnegut is realistic the way I am, in describing individual episodes, but there's a high degree of imagination in the choice of content and in the tone that goes with it. What I try to do varies with the book. With *Catch-22*, there was a fusion of elements. Much of the inspiration for the form came from Celine's

Journey to the End of Night. John Aldridge called *Something Happened* psychological realism. That would pretty much be it. Anything in it that departs from the realistic can be justified as hallucination or fantasy.

The present book I'm working on is a little bit of a problem. It's a realistic book, and I'm just moving into an area in which much of the tone of satire is from *Catch-22*, and I don't know if it'll work together, because the plot is very simple. I don't think plot is an important element in most of the writers I like. It's necessary. In *Catch-22* if you had to describe the basic plot it wouldn't be easy. It's mutilated. It's not handled in chronological order and you don't get to the climactic point until the end. In *Something Happened* there is no climactic point. There is no climactic decision, no suspense.

Q: But there is a climax—the death of *Slocum's* son and how it happens. How did you hit upon it?

A: It came with the beginning of the book. In the first five minutes of thinking about it, I had that ending, and I had the beginning and I had the lines. That's inspiration. I don't know where it comes from; that's the imaginative part of writing and that's where I'm strongest. I'm often asked to write articles, but I never accept. One, I don't want to; two, I don't do them well. And the trouble I'm having with my new book has to do with the fact that things should be developed as a conventional narrative. It's a long time since I've

worked with that, not since I was a student writing short stories. My strength so far, as I said, is an imaginative one. The temptation here to start digressing into something funny is very strong, but I also know it's inappropriate. It would be an evasion, and it would be self-indulgent, and it would not be good for this book in which events are supposed to happen very quickly.

Let me say this: in conceiving and in writing both books that have come out, the only moments of horror I had were that I might not be able to get them done, not be able to move from one point to another. The emotional response is purely related to writing the book, to the work itself. I spoke to a convention of psychiatrists last year and this question came up, and I said that the only effect I have in writing has to do with the work itself. I can be writing the most painful thing. But if I write it quickly and I know it's good, I'm going to be very happy. I'll feel like laughing. It won't bother me.

Q: *Something Happened* is not a book, though, that a reader will enjoy.

A: Well, I would enjoy reading it. I enjoy Beckett's novels, the most pessimistic works ever. I enjoy the Biblical prophets and writings, particularly Lamentations and Jeremiaiah and Ecclesiastes. The fact that something is pessimistic doesn't mean one doesn't enjoy it.

Q: But this isn't a book you wrote to entertain.

A: No. Well, entertain in what

sense? Yes, I mean to be satisfying. One goes to tragedies. If a person weeps at a movie, he's been satisfied. He's been entertained.

Q: *Do you see it as a catharsis?*

A: No. I just see it as a highly original, powerful book that should affect readers very deeply.

Q: *I'm wondering how much of you there is in the character of Bob Slocum.*

A: I don't think there's any more of Slocum in me than in you or in anyone else. When I went to Europe in the fall of 1975, I was surprised that the same conversations, the same reactions, the same interviews took place that had taken place in the United States.

Q: *Well, there seems to be a universality to the character and the situation.*

A: I didn't know that. And it's not merely the job thing, but the family thing—the tension with children, the sense of loss people have when their children grow up. My Norwegian publisher told me that.

Q: *You have two children yourself. How old are they?*

A: They're 23 and 19. I'm through the period of pangs. My daughter's working and she's fine. What has happened is what the psychologists tell you will happen. You only can get close to them after you're separated. She's on her own, and she and my wife and I are closer together perhaps than we've been in her lifetime. My son is living in his col-

lege dormitory. There's a sense of loss, but there's also the knowledge that we're closer, that we can talk about more things now, that he will initiate more conversations than he did when he was in a state of dependency. The reversal of roles that is such a strong part in *Something Happened* came about from experiences which I had never defined or put into words. Then I read in a book on psychology about role reversal and I said, this is what's happening. It's happening to me, it's probably happening to my wife, and it's happening in my book. I was doing it in the book without even realizing what I was doing. But it was in there because without putting it into words myself. I was aware I was experiencing it in real life.

Q: *Could it have appeared in the book if you hadn't been experiencing it?*

A: Probably not. But use the past tense—if I hadn't gone through it. I was going through it when I got the idea for the book. My children were much younger. My son was five and my daughter was nine. Countless times I'd been through the experience of getting angry at one of them because they were unhappy. First, if a child is unhappy, there's pity. But right along with that is resentment because they're imposing on you, or because it's sign of failure or your own inadequacy. Carrying it to an extreme, as I do in *Something Happened*, is to give someone a retarded child, and there you have the consciousness of failure—social failure. That's not in my experience, but I

have the ability to imagine it. Also, there are people I've been in contact with who have had retarded children, and I can sense what's going on, even though they themselves often don't say anything.

Q: *Why did you place *Something Happened* totally within the first person present tense?*

A: It just felt right. Then, as I proceeded, I began writing or thinking things I realized couldn't be told in any other way. You could not get that emotional honesty—the weeping, the sudden outcries—if it were first person past tense or if it were third person. If it were third person, it would have to put distance between you and the subject. If it were first person past—a conventional form in which the narrator knows everything that's happened before he begins writing—it also wouldn't have worked. Here things are happening at different periods, and the thought associations—how one thought will lead into another—have to appear to be taking place spontaneously. Also, there are admissions made that he could have made earlier, except there are things he doesn't want to tell the reader. You see, the thoughts that occur to him have to appear to be occurring to him as he's thinking—as he's writing them down. In any other tense you wouldn't be able to do it. If it were written in the past tense, it would be told to you by a man who now has a new job. He would have to say, "In my new job I often think back to when I had three children." He

would know that his son was not there.

Q: *He has a premonition, though, as you told it.*

A: But there's a difference between a premonition and knowledge that something's already happened. He'd also be writing it more calmly. You see, in terms of style, the first person past tense is a collected literary style. You don't excuse a writer for being incoherent in the first person past. And you get a feeling the person is writing this for you to read. In the first person present as I use it, I try to get a feeling across that it's what he is thinking at the time you read it. At that moment. He has no idea what he's going to think next, what's going to cross his mind, and what he's going to be doing or feeling the next day.

Catch-22 is different. Its structure is closest to William Faulkner's, especially *Absalom, Absalom*, in which most of the big events already have taken place before the time of the book—events that aren't handled chronologically, but are treated allusively.

Q: *Do you ever regret the fact that you don't have five novels on the shelf?*

A: Not at all. I'm very satisfied with the way just about everything's gone with my books. It's worked perfectly for me, even the pace and the rate of success. I don't think it would have been as beneficial if *Catch-22* had been extraordinarily profitable at the outset. I think it

might have had a very disruptive influence on me. True, the income from it has been steady, but it wasn't what you or I might think is substantial until the movie came out. The movie stimulated what I think was an artificial sale of the paperback. But I knew even before *Something Happened* came out that I would make a lot of money from it. But I'm 52 years old now, and I've been living fairly well and won't have to change my standard of living.

I might add that I didn't have the feeling either book took particularly long to write. *Something Happened* was interrupted for a playwriting effort. I was in the book, then I left it for two years. I had had 200 or 300 pages typewritten, so when I finished the play, I went back to page one and began handwriting it just to remember what I had in. In the course of doing that, the original 200 or 300 pages became two or three times the length, and the book itself took on the texture it has now, which it probably would not have had if I had not been interrupted. My feeling is that I couldn't have started *Catch-22* any earlier than I did and have the same book, or finish it any quicker. The same is true of *Something Happened*. I couldn't have written it, let's say, in 1953. I don't have the feeling even when I'm writing that the book is taking a long time, and when it's over, I have not had the feeling that either book took as long as it did. Writing has been called a solitary form of work, but it's also a private form of work, the actual working part itself. But I've never stopped because of what

might be called a writer's block or because I don't know what to put down next. I sit down to work, and I will get done what I hope to get done almost every day. I do think it out a lot.

Q: *You are working on a new novel. Will it take as long as *Something Happened* to finish?*

A: No. I think I'll have it finished by the end of 1976.

Q: *Are you encountering any problems?*

A: No. I'm revising chapter four, which I'd written in longhand. It's going slowly, but what's going slowly is not that I don't know what to do with this chapter, but that I'm already looking ahead to the next two or three, and they're not in place. I know what the next chapter's going to be like, but there are three beyond that that concern me. I know what's going to go into each one. I have many pages of notes on them typed up, but I still don't see a very smooth order, whereas I see the ending of the book very clearly. When you reach the last third or so, there are no choices. In fact, that's pretty much what happened with the first two novels. The last fifth of *Something Happened* was written with lightning speed, without pause. I know others have produced more books than I have, but I'm not sure they've spent more time writing books. I think I've worked as long and as hard as most people do. I just produce more slowly.

Q: *Why?*

A: I don't know. □

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