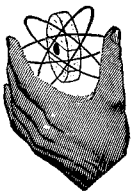
—Doug Anderson.

SR / Research

SCIENCE & HUMANITY



RESEARCH IN AMERICA

WHO SHOULD GOVERN MEDICINE?

FOR the first time in a half-century, prominent and powerful members of the medical fraternity are openly joined in a struggle to restore the traditional concept of the physician—the concept that the physician, like the lawyer, is an agent of society, licensed by society to serve society before serving himself.

The American Medical Association for the last generation has followed a different precept, derived from the dubious notion that the individual doctor possesses an identity separate from and superior to that of the social agent designated by his license to practice.

Through sheer size and inertia, the AMA very probably could throw back any direct frontal attack that might be made upon it. So the forces dedicated to social responsibility have instead adopted a strategy of envelopment. Without challenging the AMA as a power in the narrow area of its chosen competence—defense of the economic and political status of the average doctor—the rebels plan to surround it with other institutions designed to encourage the doctor's participation in intellectual and cultural life.

If the AMA reacts with a counter-enveloping maneuver, even more will be accomplished than is now anticipated by the rebels. For such an operation could succeed only through a sweeping shift in AMA philosophy. Nevertheless, the shift could be quite comfortably accommodated within AMA's original charter, which authorized acceptance of delegates from all large hospitals and all recognized medical schools.

The key to the revolutionists' opening strategy is the medical college, which, in its present form, is also something of an anachronism. The medical college is insulated from the university to which it belongs. The insular quality is reflected in the organizational structure of the American Association of Medical Colleges, which is in reality a private club for medical college deans. Precisely because of its exclusive character, however, this dean's club has remarkable possibilities as a lever for radical change.

Simply by voting to raise the number of medical students enrolled in their schools, the deans who run the club can break the chain of circumstance that has left the American people short of doctors for many years past.

Simply by voting to assume responsibility in their schools for training of hospital interns and resident physicians, the deans can raise the level of medical competence everywhere and ultimately provide a national standard for minimum care to replace the local standard physicians are now guided by.

Simply by voting to accept an obligation to keep doctors up-to-date on significant research after entering private practice, the deans can assure that no patient, because of place of residence, will be deprived of access to the best medical knowledge.

Simply by voting to share their governing power in the AAMC with the presidents of their universities and representatives of their faculties, the deans can bring more scientific and humanistic disciplines of thought to bear on the study of medicine, inviting a new social perspective that would go beyond treatment of disease to prevention of disease and finally to sane environmental control of water and air pollution.

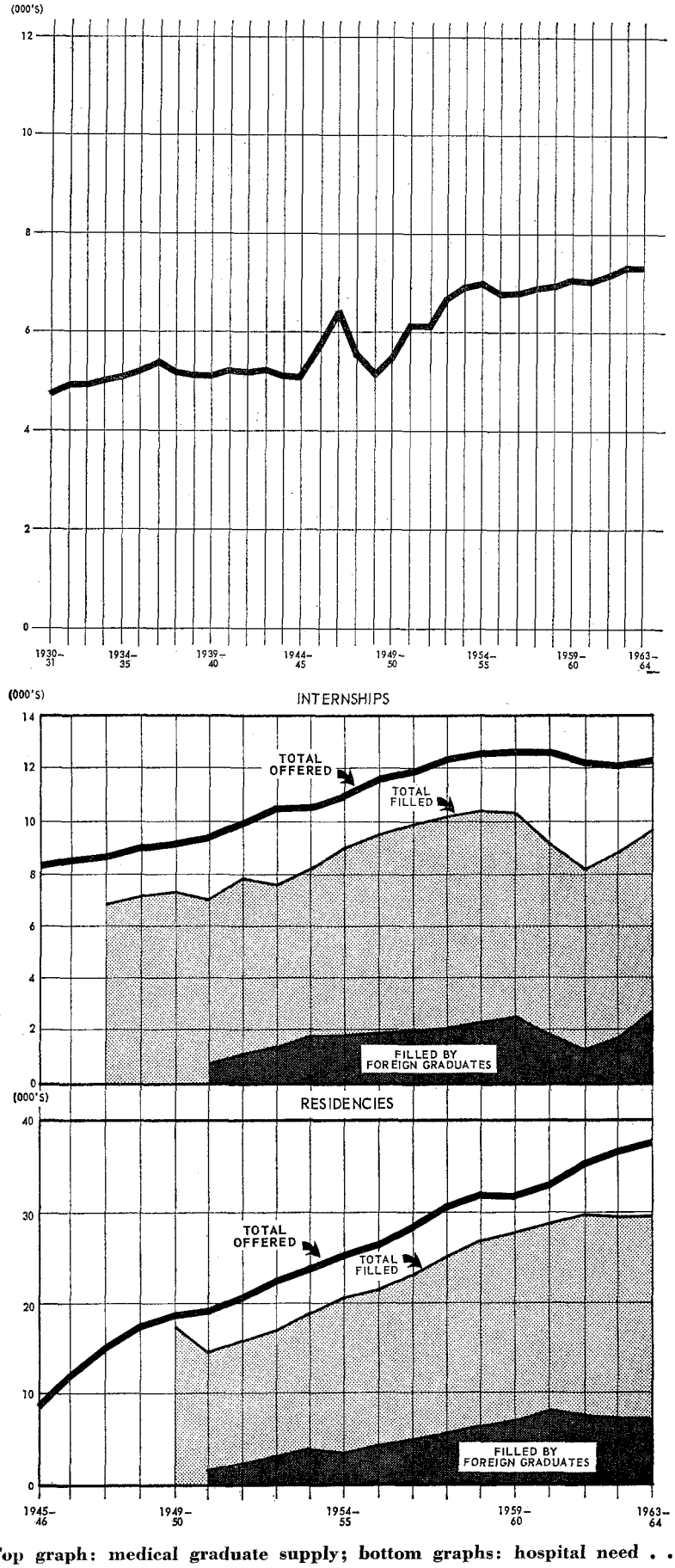
IT is not impossible that before these words reach print the deans already will have acted along the revolutionary lines just described. An intent to act had been declared in principle before the manifesto of the revolutionists was sent to newspapers throughout the country on May 22. But reforms of such scope are a long time in the making, and cannot hope for fruition without the understanding and support of the people, whose taxes pay three-fourths of the cost of every medical diploma. So a constructive purpose may be served in identifying here the major forces that are now in play.

IT is customary to begin discussion of this subject by referring to a famous report written by Dr. Abraham Flexner for the Carnegie Foundation for the Advancement of Teaching in 1910. Most people who talk about this report have never read it. At the time it was published the AAMC was several decades old. The practice of medicine, long a professional calling in Europe, was then still a trade in America. Men became doctors here through a course of apprenticeship. Those who were good were often very, very good; those who were bad were charlatans. In medical schools generally, pursuit of money took precedence over application of knowledge to the alleviation of human suffering. Dr. Flexner proposed to clean house by placing responsibility for medical education in the universities and concentrating on the quality rather than on the numbers of new physicians turned out. Under the impact of his findings, half of the medical schools were shaken out of existence. That result was therapeutic; but along with it went a philosophy of sharply restricting the future flow into the nation's reservoir of medical practitioners.

This philosophy—so often attributed to the AMA now—dominated medicine long after the conditions giving birth to it disappeared. It continues to dominate even in these times of inadequate medical facilities. In assessing blame for the present unhappy situation we do well to remember the good purpose in which it originated.

Although the Flexner report is always spoken of as though it accomplished all its ends, the truth is that Dr. Flexner's most profound proposal was never executed. The universities to which the

The Doctor Shortage



Top graph: medical graduate supply; bottom graphs: hospital need . . .

medical colleges are attached have not yet accepted responsibility for medical teaching. Worse than that, the medical colleges themselves have never established clear goals.

Ad hoc projects of one sort and another have been undertaken by AAMC. Many of these have served to consolidate a splintered situation. But they are not related to each other in any conscious pattern nor are they deliberately pointed in any common direction. That the fragments can be seen to fit the design of a mosaic is very largely due to one man, Dr. Ward Darley, who first became active in AAMC in 1948, when he was dean of medicine at the University of Colorado. In 1952, Dr. Darley was elected AAMC's president; in 1956, he was chosen its executive director.

As his experience lengthened and deepened, Dr. Darley saw ever more clearly that the AAMC simply was not organized to govern medical education. Several years ago he drafted a memorandum urging that AAMC's membership be broadened to take in all the elements in the training of a doctor. He argued the necessity for a single positive voice for medicine. His own role in the transformation could not be great, he knew, because the pain of arthritis, which had harassed him for years, was growing too sharp; he would have to retire soon.

At its annual meeting near the close of 1963, AAMC voted to begin the study Dr. Darley had proposed. As chief inquirer it named a man of exceptional qualifications—Dr. Lowell T. Coggeshall, a trustee of the University of Chicago, the university's vice-president for special assignments, Frederick H. Rawson professor of medicine on the staff of the University of Chicago Medical Center, a member of the National Academy of Sciences and of the American Philosophical Society. On an advisory panel were these seven prominent colleagues:

Dr. William M. Hubbard, dean of the University of Michigan Medical School at Ann Arbor;

Dr. Michael DeBakey, professor of surgery at Baylor University College of Medicine at Houston, Texas;

Dr. John E. Deitrick, dean of the Cornell University Medical Center at New York City;

Dr. Clark Kerr, president of the University of California at Berkeley;

Dr. George A. Perera, professor of medicine and associate dean of the College of Physicians and Surgeons of Columbia University at New York City;

Dr. Robert C. Berson, dean of the South Texas Medical School of the University of Texas at San Antonio;

and Dr. Darley.

For a year the panelists explored, without finding much that had not been set forth earlier in a prophetic volume

titled, "Medical Education and Practice—Relationships and Responsibilities in a Changing Society." This was the official record of AAMC's Tenth Teaching Institute at Colorado Springs in 1962. In it were clearly delineated all the lineaments of the American medical dilemma.

The practice of medicine in this country depends on licensure of physicians. Licenses are granted by official boards of the fifty states. Members of the boards are appointed by the Governors of the states. The licensing criteria the boards adopt obviously influence the curricula of the medical schools. Yet medical school or university professors rarely hold board appointments. The academic influence is felt only indirectly: through license examinations drafted by the National Board of Medical Examiners (a self-perpetuating private corporation) and through AAMC accreditation (jointly with AMA) of medical schools whose diplomas are required of all candidates for licensure.

Incompetence for licensure should be discovered during the one-year hospital internship (a form of apprenticeship) that immediately follows completion of study for the M.D. degree, or during the two-to-five-year hospital residency that follows internship. But neither interns nor residents are at present the responsibility of the university or of the medical school. The qualifications of interns and residents are judged by the doctors who staff the hospitals. At university hospitals, of course, the staffs and the medical school faculties are made up of essentially the same people. But only 227 of the 7,138 hospitals registered by the American Hospital Association have major relationship to a medical school.

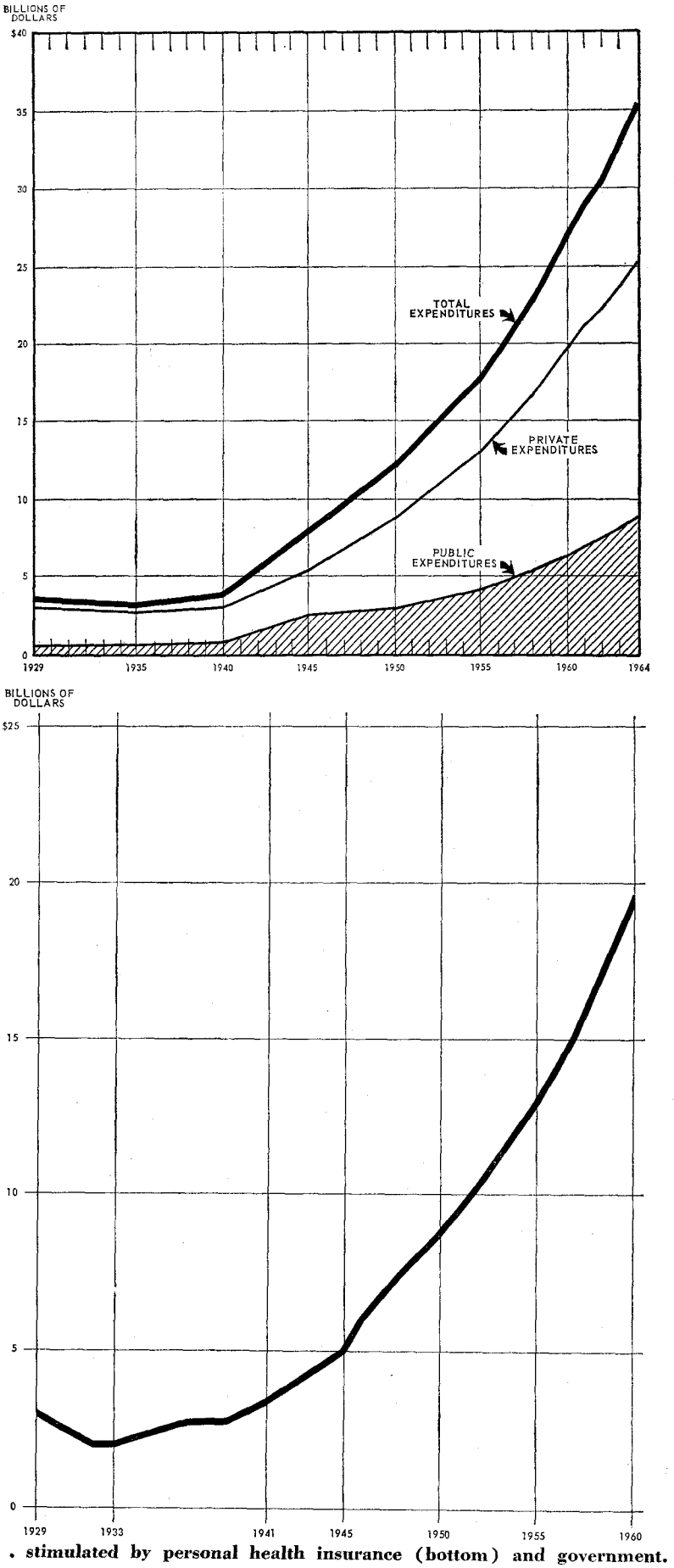
Fortunately, a kind of half-blind chance operates at this point to guard the unwitting patient from excessive abuse. Each candidate for internship draws up a list of the hospitals where he would prefer to work, in the order of his preference. At the same time, each hospital draws up a list of the intern candidates it would prefer to receive, in the order of the hospital's preference. The two lists are then matched against each other in a computer, and the choices of men for available places are thus determined.

A similar matching occurs at the outset of the resident physician phase of the doctor's career.

The matching process has made one thing clear: A large majority of medical students prefer to work in university hospitals. Why?

The chief reason seems to be that hospitals attached to medical schools are closely oriented to research. And research these days is a magic word. To those with genuine talent, it promises intellectual excitement and personal op-

Medical Costs—Who Pays?



. . . stimulated by personal health insurance (bottom) and government.

portunity to advance the frontiers of learning. To pedestrian minds, research orientation connotes easy money. Beginning pay for residents runs to $10,000 and more a year.

Specialization is the rule in the university hospital. It leads to team practice. Judging from the enthusiasm with which patients whose bills are paid by health insurance flock to hospital clinics and emergency rooms for treatment their parents would have sought in the family doctor's office, people generally like the impression of confident skill the team conveys.

As long as he has a hospital affiliation of his own, the private physician isn't distressed by the competition of the university hospital. There, however, is an irritating rub. For hospital affiliations in the past were almost always part-time responsibilities. Since 1950, there has been an accelerating change toward full-time staffing of all hospitals.

HOW is the private practitioner to keep himself professionally alert if the hospital is closed to him?

This is an intricate conundrum, the answer to which will have to be worked out along with the answer to an interlocking puzzle: How is the full-time medical school faculty member to retain his clinical skill without patients of his own, and what ceiling should be imposed on his fees if he is allowed to treat private patients? And should health insurance pay interns and residents?

Only the medical profession itself can decide what is fair all around. But laymen can at least be aware enough of the realities to appraise the private physician's fear of injury apart from the injury he actually suffers. Up to now the hurt has been almost wholly emotional because the demand for medical service has far exceeded the supply.

It is in this area of supply and demand that the layman can most effectively intervene. He has argued consistently in favor of greater numbers of doctors. What consideration has he given to the cost of obtaining those numbers? How is the bill to be paid? There are four sources of money: (1) the federal government, (2) the state governments, (3) private endowment, and (4) fees collected from patients. What would be a fair proportion among them?

If the university, as an institution, is to be responsible for maintaining proportion (which is what the Coggeshall panel decided would be the most workable solution commensurate with intellectual excellence), how is the assignment to be carried out within President Lyndon B. Johnson's concept of "The Great Society"? One of the members of the Coggeshall panel, Dr. Michael De Bakey, an accomplished Texas surgeon, chaired a special commission that drafted for the President "a national program to conquer heart disease, cancer, and stroke." The program called for billions of dollars of government spending on specialized institutes to be scattered through the country, preferably on university campuses. Dr. De Bakey says he sees no conflict between this proposal and the more revolutionary design advanced by the Coggeshall panel. Others fear that injection of specialized institutes into the university structure will further aggravate the amorphous tendencies produced by proliferation of research projects individually valuable to specialists on the faculty but not integrated into the university's own image of itself.

There is such a thing as expecting too much of research, and, as Dr. Stewart G. Wolf, Jr., professor of medicine at the University of Oklahoma Medical Center, has written, "It is therefore pertinent to ask what may reasonably be required . . . over the coming years. The naïve and thoughtless may ask for freedom from illness and indefinitely postponed death, conditions we can confidently omit from any realistic anticipation. Death, after all, is a part of life, a necessary condition to biological or even social evolution. A greater number of people may live long, as the scourges of youth and middle age are mitigated, but there is little likelihood that more than the occasional hearty human will come near to spanning a century."

Among the findings of the Coggeshall panel, none is more final in its implications than this one: "It is not likely that America will ever be able to produce all the physicians that the nation would like to have."

Team medicine will have to suffice, whether or not it is acceptable to everyone. With helpers variously skilled, a single physician can extend his reach and multiply his hands. The problems of training helpers will be many and complex but not insurmountable. Hardest to teach will be dedication and mercy.

THERE is now in limited circulation a confidential memorandum written to his staff by the president of the board of trustees of a great American university after his return from a three-week stay in a hospital. Here are two particularly pertinent paragraphs from it:

"On my first night, after my doctor had said, 'We just want you to rest,' I received a total of twenty separate and distinct visitations—at 7:30, 8:30, 9:00, 9:25, 9:55, 10:20, 11:25, 12:30, 1:05, 2:00, 2:35, 3:30, 5:00, 6:00, 6:15, 7:00, 7:30, 7:45, 8:00, and 8:15. (I can fix the times because, after the third of these courtesy calls, I began a diary.)

"Miraculously, since there were so many people who kept looking in on me, I was entirely overlooked at lunch one day and at dinner on another. I was also unable to raise my doctor from one Monday at 7 p.m. until Wednesday at 9 p.m.; as a matter of fact, I didn't raise him then; it was his assistant who showed up exactly fifty hours after I sent out my first S.O.S. He said he was sorry. After that, I had another doctor, and he brought in two more (all very good ones). But even they couldn't bluff their way through the free and easy spirit of old Haphazard. In an important test that called for the siphoning of some of my blood at five one-hour intervals, the technicians forgot the last two and only came to extract a final sample after I telephoned them."

Below are a few corroborating observations *SR*'s science editor made of team medicine involving one patient in a university hospital during one week:

ON the night of the patient's arrival in the hospital, the dosage of pain medication prescribed by a family doctor who had treated the patient for a year was reduced without the patient's knowledge. As soon as the diminution in dosage was discovered by the professor in charge of the case, the family doctor's original prescription was reinstated. By that time, unfortunately, a whole night had passed. The patient was thoroughly frightened by the experience and worried over the prospect of repetition in the subsequent weeks of treatment that was planned.

Later, a pain-killing shot (prescribed every three hours) was delayed for three hours because someone failed to check her memory against the records.

Another pain-killing shot was delayed for a shorter period because someone else who had the keys to the drug cabinet took them with her when she went downstairs for a coffee break.

The side effects of chemotherapy had been understated to the patient in advance, with distressing consequences when they appeared in full force. The patient understandably misinterpreted favorable reaction unfavorably.

Some of the finest medical and surgical specialists in the world were summoned to the patient's bedside to help in diagnosis and treatment. But none of their findings was promptly communicated in plain, simple lay language.

Everything might have been clarified afterward in the patient's mind—if the patient had not grown too tired of it to wake on a glorious Sunday morning.

It was an AMA official, Dr. Lindsay E. Beaton, who said that the title of physician "most of all . . . carries accountability, not only for the future of a great profession but for the very lives of our fellow sufferers from the human condition. . . . If we fail, we fail mankind."

—JOHN LEAR,
Science Editor.

IS SCIENCE BIG ENOUGH TO COPE WITH SOCIETY?

Yes—If It Can Learn to Reverse Its Focus

EDITOR'S NOTE: *Can science, as a way of thought, contribute to the solution of such pervasive and persistent social problems as the one discussed in the preceding pages? It can if scientists are willing to pause in their thinking as scientists and think instead for a time as men. For science is accustomed to break problems into bits and to study each bit as though the other bits were fixed in place all the while. Men do not attempt to deal with real situations in any such fragmented fashion. Each bit of a problem interacts continuously with every other bit. Events operate as systems. It is possible to study systems with the help of computers, as the report below explains.*

By RICHARD BELLMAN

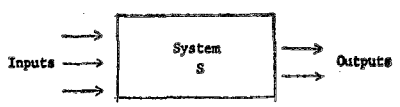
ACCORDING to many reports, an expert dowser is a handy person to have about if one is interested in locating such items as wells, buried treasure, and the like. All that is required is a stroll about the area by the expert, dowsing stick in hand. At an appropriate spot, the stick twitches convulsively. Digging commences there. Since the successes are well-documented and advertised, while the failures are ignored, it is not altogether easy to evaluate the relative efficiency of this procedure as compared, let us say, to that used by the geologist, or to one based on the use of a Ouija board. But the persistent belief in astrology, telepathy, extrasensory perception, and similar supernatural phenomena attest to the human desire to believe in magic, and, above all, to believe in magical powers of perception. There is certainly justification for such belief, considering the telephone, the camera, the X-ray machine, hypnosis, the electron microscope, and so on. It is not as easy as one might suppose to distinguish between a respectable and unrespectable belief in magic.

The most recent, and most powerful, Sorcerer's Apprentice is the digital computer. It is respectable when manned by a reputable scientist or mathematician. Unfortunately, it can also act as a very effective loudspeaker for the carnival barker and charlatan. Although it is not exactly the kind of instrument that one expects a dowser to carry about, it nevertheless is closer to a divining rod than any object hitherto created by man.

The computer permits us to carry out numerous feats of prediction, which is to say precognition, in such domains as astronomy, astrophysics, economics, and medicine, and to examine in detail many objects hidden not only from human eyes but all other instruments of observation as well.

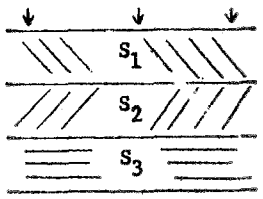
What allows this power?

To answer the question, it is necessary to examine the general nature of scientific research. To the scientist, the system under study—be it economic, biological, medical, astronomical, or atomic in origin—initially assumes the form of a "black box." By "black," we mean that nothing is known about the inner structure of the system, or "box." All that we know is what we observe going in and coming out of the "box," as diagrammed below:

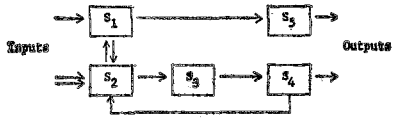


To learn about the mechanisms within S, experiments are carried out. The inputs are changed to see how the outputs change. Outputs not previously noted are next measured, and these measurements are compared to the measurements of the inputs. As more measurements become available, plausible hypotheses can be made concerning the internal structure of S.

Consider, as an example, the process of prospecting for oil. Initially, the earth from which the oil comes was the system S. Sometimes surface indications were extremely useful in deciding where to drill, but sometimes they were misleading. Eventually, as geology developed, oil men began to understand something about the different strata underground, and the system S was no longer a simple "black box" but this distinctly layered structure:



Certain strata had become known to be associated with pools of oil. To determine whether or not these strata were present, explosive charges were set off on the surface at various points. Reverberations returning to the surface at other points were measured, and the nature of these and the time they required to appear gave a reliable profile of the type of material the sound waves had passed through. Now the original "black box" S could be further decomposed from a three-layered box into a set of subsystems, with interconnections and feedbacks, so:



Suppose we want to study the properties of only one element in this complex—the little "black box" S_3. All inputs and outputs of S_3 are indirect. How then do we "observe" S_3?

We begin by noting that S_3 does not exist in isolation. It is linked by way of inputs and outputs to the other subsystems. These linkages may be expressed by means of mathematical equations, frequently quite complicated and often quite numerous. As a matter of fact, these equations are of such perplexity and prolixity that up until only a few years ago people did not even bother writing all of them down. The equations were too difficult to solve explicitly in the way one solves a quadratic equation, and they were too difficult for numerical manipulation, using a slide rule or even a desk computer. But a digital computer can solve simultaneously, in numerical terms, the tens, hundreds, and even thousands of equations that describe the