

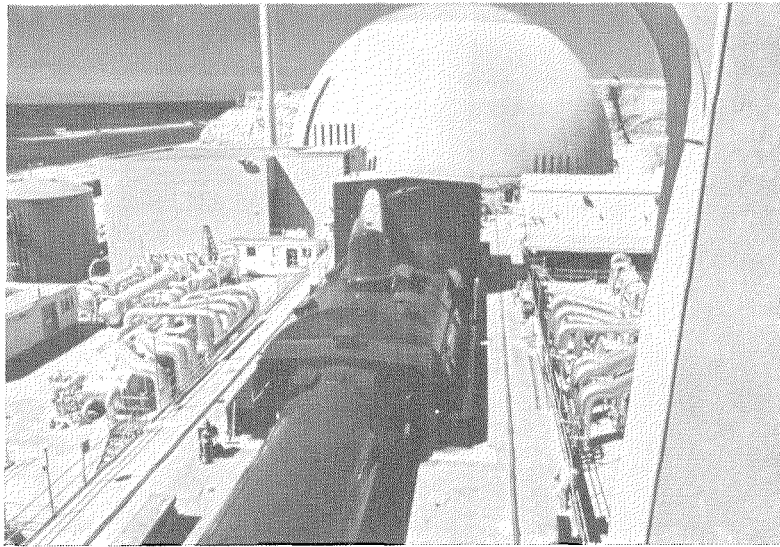
FEBRUARY 1969

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E&S

ENGINEERING AND SCIENCE

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FEBRUARY 1969 / VOLUME XXXII / NUMBER 5

Confessions of a Genial Abbot 8

by Robert A. Huttenback

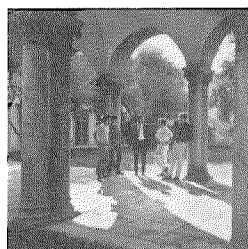
Research Notes 13

South Africa: Are There Silver Linings? 16

by Edwin S. Munger

Arie J. Haagen-Smit

Caltech's Crusader for Clean Air 21



On The Cover

Robert Huttenback in a characteristic setting—surrounded by Caltech undergraduates. For the past 11 years, as Master of Student Houses, Huttenback has counseled, comforted, and entertained Caltech students. Now, as he takes on a new assignment as Dean of Students, he reviews his experiences as the “genial abbot” of the student houses in the first of a series of articles, starting on page 8.

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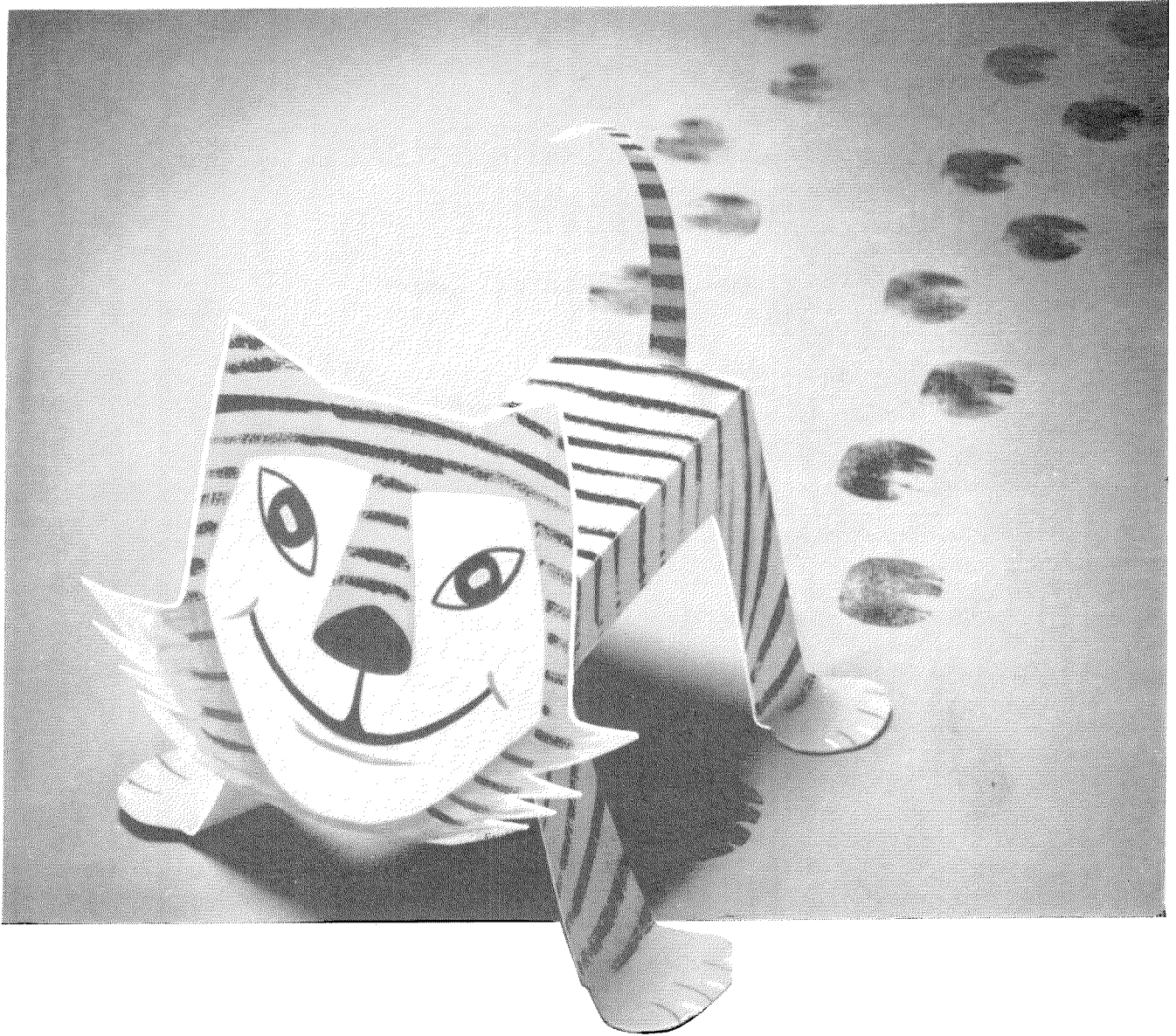
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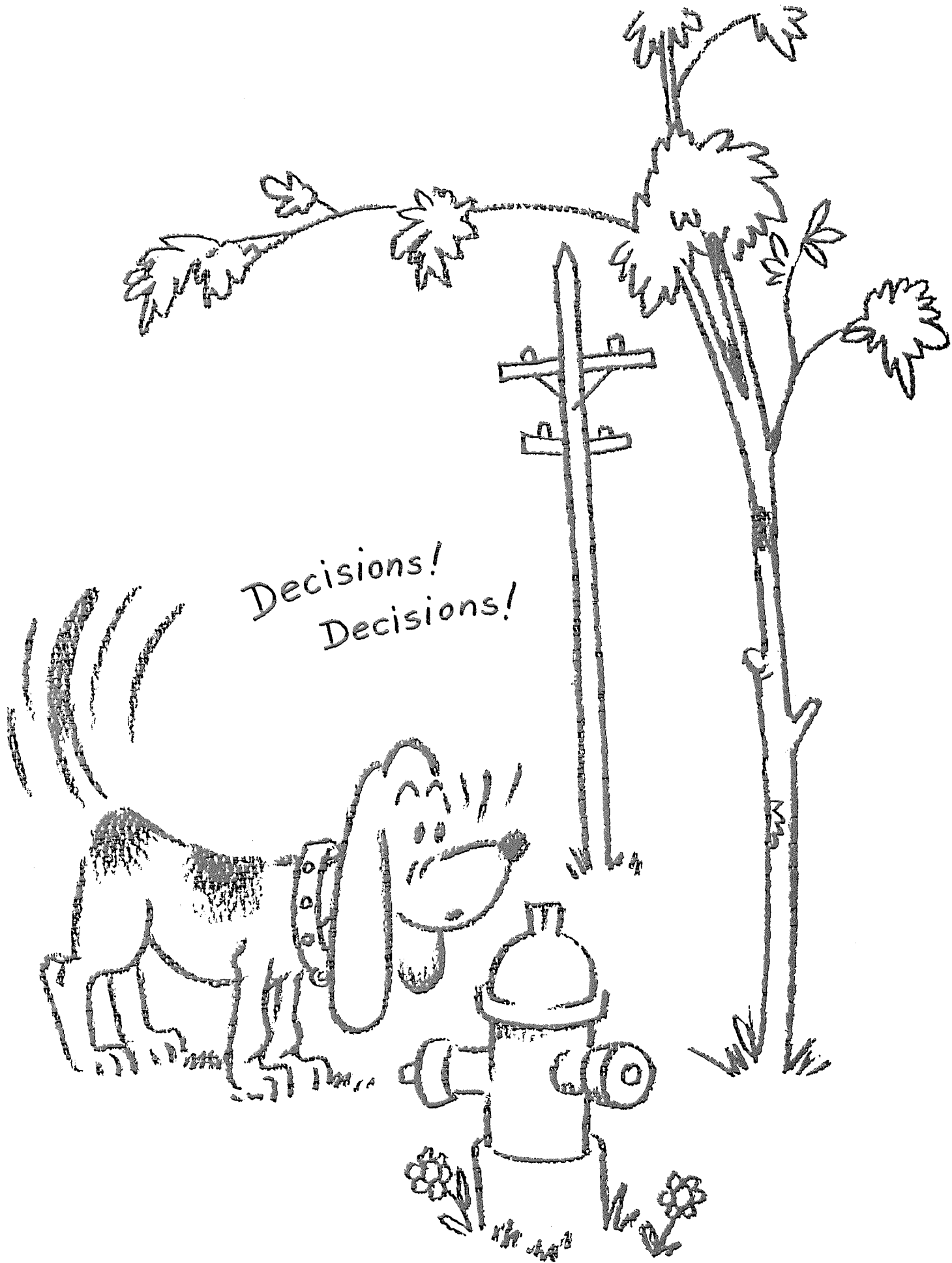
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CONFESSIONS OF A GENIAL ABBOT

By ROBERT A. HUTTENBACK

The telegram from Dr. Lee DuBridge offering me the jobs of Master of Student Houses and lecturer in history at the California Institute of Technology reached me on a searingly hot day in 1957 in Delhi. I was overjoyed, for it had been my ambition to work at Caltech ever since I had heard Dr. DuBridge speak about the Institute while I was still an undergraduate at UCLA. I accepted the proffered position without hesitation and thus insured the continuation of a career at the Institute that had commenced on something less than a lofty intellectual plane.

It began, in fact, while I was still a senior at UCLA in 1950 and became coach of the soccer team at Caltech—a team that managed to win the league championship for three years. In mid-1953 I added the duties of freshman baseball coach, and we had two quite successful seasons, due largely to the enthusiasm of the players and a lack of baseball knowledge on my part that encouraged me to do the unorthodox.

In 1956 my wife and I went to England on a Fulbright Fellowship, and in the following year we travelled to India and Pakistan under the sponsorship of the Ford Foundation. We were just beginning to wonder how we would butter our bread next when Dr. DuBridge's welcome telegram caught up with us.

Despite my very real enthusiasm, I was not sure of what lay ahead. I knew that the master had charge of the four student houses and that he was provided with a residence known as Arden House. Whether he was supposed to be a saintly spiritual and intellectual guide or a deputy-sheriff-in-residence was not clear, but I presumed that it was evident from my past career at the Institute that my credentials were somewhat better for the latter.

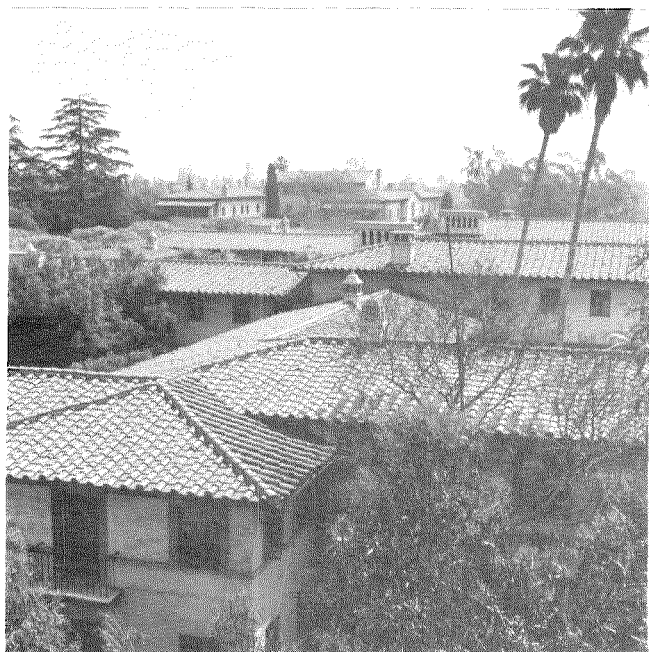
A statement of the "Qualifications and Responsi-

bilities of the Master of the Student Houses" was forwarded to me in Delhi. It said that the master "must have a real interest in youth and its problems—particularly the problem of the formulation of a new attitude toward life which is the inevitable consequence of the maturation which takes place in the college years. And above all he must be willing to spend time, time talking and listening to students . . ." At home the master was to maintain "an atmosphere of adult and friendly hospitality."

My wife and I moved into Arden House in mid-August. I immediately went looking for my new office, nervously wondering if I would measure up to my predecessors in the eyes of my new secretary, Mrs. Ned Hale, who had also been secretary to all the previous masters. I was directed from the courtyard of one of the student houses toward an unlit stairwell that led into a vast and dank basement at the end of which I could discern a dim light. Following the gleam, I found my office, desk nestled beneath a web of overhead pipes. No view of the outside world would ever distract me! And no visitors would ever drop in on their way to anyplace else! As for Mrs. Hale, she was as apprehensive about me as I had been about her. I quickly found that she was a warmly human woman with a great fund of good sense, that she was prepared to be tolerant of my foibles, and that she liked lagging coins down the hall to see who bought the coffee.

One of my first duties was to make student house room assignments. There were only four student houses then and, consequently, room for only about one-half of the entering class. We used a strange, but in its own way fair, system for deciding which boys were to be assigned the rooms on campus. We determined how far each freshman was from home, and starting with those who had come the greatest distance we went down the list until we had no

As Robert Huttenback moves from Master of Student Houses to his new position as Dean of Students, he looks back on his colorful 11-year career as spiritual counselor, intellectual guide, and sheriff-in-residence to Caltech undergraduates.



"There were only four undergraduate houses in 1958."

more beds. Parents, whose sons were leaving home in most cases for the first time, were not overly pleased to have them start life at the prestigious California Institute of Technology by renting a room in town. My first week was therefore filled with irate telephone calls, and my explanation of our wonderfully fair system did little to quench the fire within many parental breasts.

Another call I had that first week—at dawn—was from a freshman who is now a prominent faculty member at another institution.

"Mr. Huttenback?" he asked.

"Yes," I replied.

"I have just been ill in my wash basin," the voice explained.

"Are you all right?" I asked worriedly.

"Of course," the voice assured me. "I just thought you would want to know!"

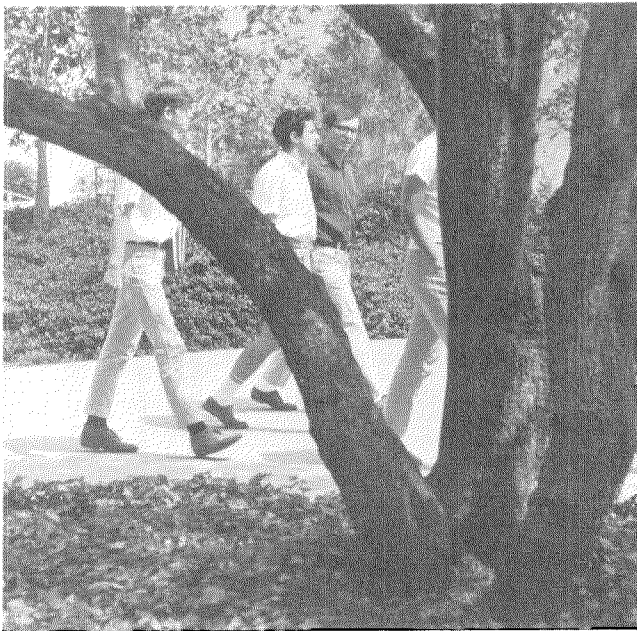
Was *this* how it was going to be?

What kind of a young man aspired to a Caltech degree in 1958? Certainly he was much less sophisticated than most of his intellectual confreres who chose Harvard, Amherst, or Swarthmore, for example. He tended to come from a blue-collar, ambitious, and upwardly mobile family. He had almost invariably been the brightest boy in his high school class, and, although a good achiever in all subjects, he had focused his attention largely on science. Despite statements in the catalog that the Institute placed a heavy emphasis on the humanities, he was surprised to find that he was actually expected to spend about a quarter of his time in nonscientific areas and to perform well in them.

As I look back on those days, I remember being struck by the tremendous ebullience of the freshmen and the eagerness with which they approached the prospect of gaining a science or engineering education. It was also evident that scholastic achievement had been their forte in high school, a fact that, along with their lack of attainment in athletics, made them tend toward intellectual arrogance. They were bright, and they knew it.

All of this made the process of erosion that took place in the first few weeks of school rather alarming. A certain amount of disillusionment is normal for students entering college and faced with the realities of what is demanded to achieve excellence, but far too many of our freshmen soon lost nearly all the enthusiasm with which they had arrived.

Some of the reasons lay rooted in the nature of the faculty, which was strongly research oriented. This did not mean that they took their teaching duties lightly; quite the contrary. But they taught as research scholars teaching students who were also



"He was less sophisticated than his confreres at Harvard."

to become research scholars. The knowledge explosion, particularly in science, placed the professor in a dilemma to which he responded by trying to teach more and more in less and less time. He tended to believe that the study of science demanded almost monastic isolation and complete dedication.

In May 1934 a committee on campus life and interests had issued a report which had asserted:

In the judgment of the Committee the attributes which are not sufficiently developed among students at the Institute, but which ought to be encouraged, are self-confidence, social adaptability, ability to express one's self, the capacity to live and work with others, and an appreciation of the value of personality. On the other hand he (the Caltech student) lacks an adequate appreciation of their material worth and is deficient in his desire to possess them.

These words could just as well have been written in 1958—or 1968.

In 1958 Caltech had a quasi-rushing system in which all the freshmen who had received house room assignments were entertained in turn by the four student houses. This differed from a fraternity rushing system only in that each of these freshmen got into *some* house. At the end of ten days the freshmen listed the houses in order of their personal preference; the house members, meanwhile, devoted endless time to preparing dossiers on the freshmen and ranking them in order of desirability. Then all the house presidents and resident associates assembled in Arden House one evening to divide up the flesh. Preferences were matched if



"They were bright—and they knew it."

possible, and, if impossible, a flip of a coin or a hand of cards determined a boy's fate.

As soon as the new students had moved into their permanent campus homes, initiation replaced rotation. The former had attempted to seduce the freshmen into choosing a particular house; the latter was designed to integrate them into it by forcing them to participate in various stunts, for which I was supposed to give prior approval—an Institute requirement that reminded me of the early 19th century law requiring Indians to obtain a license from the East India Company whenever they wished to burn a widow alive. I found the system rather repugnant, not because I felt that all of life should be serious and without nonsense, but because I questioned condoning a ritualized system that permitted one group to chastize another. However, effective change at this level necessitates student involvement, and I foresaw many years of debate and slow change.

As luck would have it, a major incident marred my first days at Caltech. On the Wednesday night



"I was struck by the tremendous ebullience of the freshmen."

of initiation I was playing soccer on the field adjacent to the campus; the students were devoting the early evening hours to a mammoth water fight. Happily, I was far enough away to hear only the noise. Suddenly, a small sports car came speeding across the field; it was filled with boys obviously in an advanced state of alarm. Apparently the sophomore pledgemaster of Fleming House had become involved in an altercation with his Ricketts House counterpart. The young man from Fleming suddenly seemed to go berserk, and, loudly shouting abuse, ran to his room with the avowed purpose of obtaining a gun and shooting his adversary. It was at this point that I was summoned.

When I arrived on the scene, a number of Fleming boys had already taken charge. They were commiserating with the young man and at the same time trying to fill him so full of alcohol that he would be rendered senseless. Finally, sleep felled the overwrought lad, and we were able to enter his room and remove what was essentially an arsenal. Not only did we find a large number of guns and ammunition, but what was more alarming, a considerable supply of fulminate of mercury—enough, I was informed, to blow up much of the campus.

I discovered that the boy had just concluded a

medical leave of absence from the Institute based on psychological difficulties. Had his return to the campus been approved by the Institute psychologist? The answer was no. The Institute had no such procedure. Besides, Caltech's psychiatric staff consisted only of an able local psychiatrist who was willing to work part time for the Health Center. At this time, the California Institute, like many other institutions throughout the country, felt that a mature, well-intentioned adult—i.e., a dean or interested faculty member—could straighten out almost any boy. This method was clearly a failure in the case of this young man. Eventually we had to remove him to the psychiatric wing of the county hospital.

We at the Institute now had the opportunity—indeed the duty—to reflect upon our condition, for we had come very close to presiding over a tragedy. The visit to the Caltech campus of the noted psychologist Abraham Maslow—a three-day visit sponsored by the Caltech YMCA through their "Leaders of America" program—in November 1958 helped to highlight our dilemma. Students flocked to listen to and talk with him—so much so that he had hardly any time to sleep. One student described the all-consuming interest in Professor Maslow in a letter to the *California Tech*:

Dr. Abraham Maslow was virtually unknown before he arrived on campus last week. Yet from nine in the morning until one the next morning he was besieged (as few have been before) by students desiring to discuss psychology in general and psychological problems in particular.

Why? Perhaps it was his unusual warm personality, or his penetrating insight into the nature of the healthy human being. But I suggest that by far the most important factor was that students were curious about themselves and how their problems could be solved. Repeatedly he was asked whether it was possible to psychoanalyze yourself. (Answer: Only one percent can.)

To my mind, therefore, Dr. Maslow's visit underlined the widely felt need for a more adequate counseling program at Caltech. . .

Maslow's visit did in fact start a train of events which culminated in the appointment of an Institute psychologist. No one could have been happier about this than I.

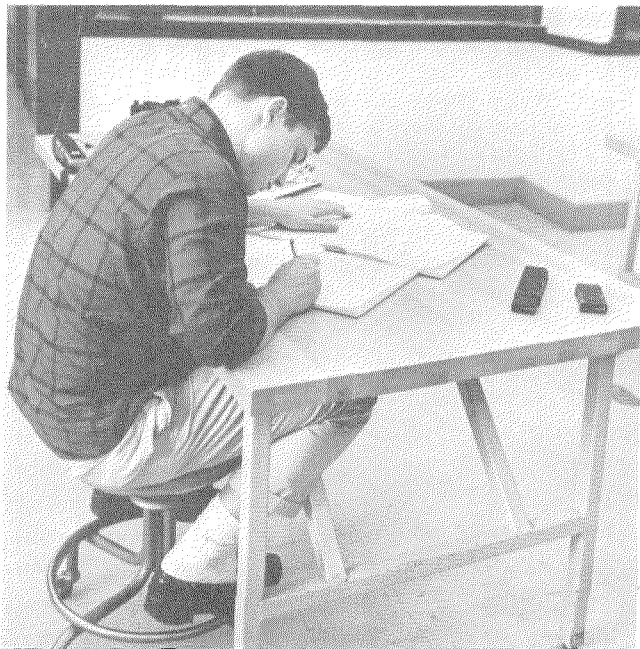
Speaking of student problems brings to mind problem parents. I remember far too many parents whose pressure on their children at Caltech amounted to persecution. In a decade as Master of the Student Houses I have encountered far more parents who have interfered with their sons' progress than parents who were an active support. One lad was

called at 6 a.m. every Sunday by his mother in Boston (she evidently never understood that there was a time difference), who regularly berated him for not getting better grades and for not having attended Harvard as had his brothers!

Mid-terms in November brought with them the first specter of failure for some boys who had never received a B grade in high school, much less a C, D, or F. Fortunately, some of their frustration was relieved by the labor of preparing for the annual inter-house dance, which transforms the student houses into fantastic, exotic, and often artistic wonderlands.

Usually the dance is a triumphal display of engineering ingenuity, it being one of the few times when the students in this highly theoretical institution can do anything applied and practical. However, I recall a magnificent 18th century man-of-war built in the flooded Blacker House courtyard. The deck was the dance floor, and as the festivities commenced, a character in a pirate costume shouted, "Avast, Ricketts House," and fired a broadside from a bank of artificial cannon. The dance floor and the pirate disappeared in a cloud of dust and smoke as the deck collapsed. Another time I watched in disbelief as hundreds of gallons of water flowed from the Ricketts courtyard, through a defective flower bed, into the basement below.

If Caltech's football fortunes are at a perpetually low ebb, there is one form of competitive endeavor



"It was evident that scholastic achievement was their forte."

at which the denizens of the student houses are pre-eminent. This is the so-called crew race. Ten men on each team line up with pint beer mugs poised a fist length from the point of their chins. At a designated signal the first man in line begins to drink his beer; when he is through, the second man begins, and so on down the line until all ten men have consumed their portion. The crew that finishes first is, of course, the winner, but of greater importance is the time it takes. No good crew man ever swallows; rather, by a form of epiglotal implosion, he manages to open his gullet and pour the liquid down. It may not be esthetically pleasing, but it is the one "athletic" event at which I have never heard of a Caltech team losing. The record for ten men is, I believe, about 12 seconds.

The annual senior ditch day is always scheduled for a time close to the end of the academic year. The seniors in each house leave for the beach, having first by intricate electronic and other defenses secured their rooms from invasion by underclassmen. Rooms are not to be entered by brute force, and yet by evening even the most complex locking mechanism has been mastered, and a souvenir is always left behind—a huge meteorological balloon filled with water, a solid bank of newspaper balls, or the lock reset with a new tripping mechanism.

In one case, a boy who had always boasted of his prowess with the opposite sex but who was suspected of gross exaggeration returned to find his room subtly illuminated by candlelight, a bottle of wine on the table, and a sparsely clad girl lying on the bed. No sooner had he entered than the door was silently locked behind him. A hidden mike broadcast his growing alarm and desperation to the rest of the house. He finally escaped through the window. Another lad was able, with difficulty, to discern a bucket of water barely visible over his door. He carefully took it down and poured it in the sink; unfortunately, the elbow pipe was missing.

The only effective defense I have heard of was devised by a young man who purchased a number of used books, tore them up, and left them on the floor of his room after having first upset his bed and perpetrated other superficial damage. When his confreres opened the door and saw that a vandal had preceded them and committed the unpardonable *sin of destroying books*, they were so ashamed and chagrined that they cleaned up the mess.

(First in a series of articles by Robert Huttenback)

Research Notes

Reports on recent developments in seismology, computer programming, and information science at Caltech.

PREDICTING CREEP

Caltech seismologists have now successfully predicted ground movement along a major earthquake fault—thus coming one step closer to the prediction of large earthquakes. Max Wyss, a graduate research assistant in geophysics, and Stewart W. Smith, associate professor of geophysics, have discovered that episodes of movement along a restless section of California's San Andreas fault occur at regular intervals. The motion they are studying is called "creep," the gradual movement that may occur along a fault, usually over a period of several days—not the sudden, violent displacement associated with earthquakes.

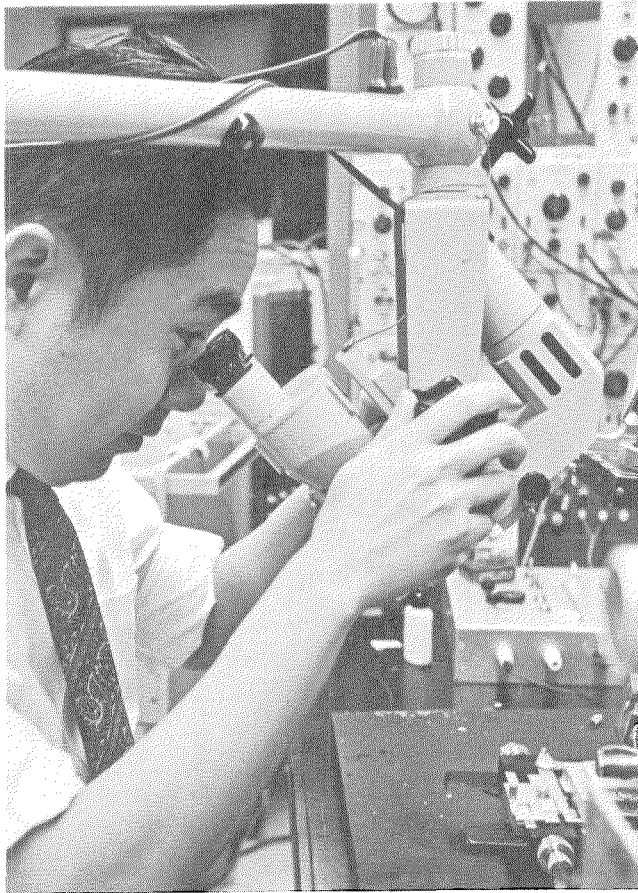
Wyss predicted early last summer that the section of the San Andreas fault near the town of Parkfield would show creep on August 15. It actually occurred within a week of the time specified. Calculations also indicated that creep would occur again around Christmas Day. This prediction was only accurate to within three weeks due to a small error in a field report. The creep occurred in the first week of December. The seismologists have now forecast that the fault will move again about April 8.

The San Andreas fault is a deep fracture in the earth's crust that extends diagonally 600 miles across California from the Mendocino County coast southeast into the Gulf of California. Land on the west side of this crack has been moving north in relation to the eastern side at about two inches per year for millions of years. The stress created by this movement—and the sudden release of such stress when rock layers break and slip—results in earthquakes.

The creep that Wyss and Smith are observing began with an earthquake of 5.6 magnitude two years ago. Since then the western side of the fault has moved north 25 centimeters in relation to the eastern side. This movement has become very regular—about two millimeters every few months. In the Parkfield area the fault is an extremely weak, low-friction surface, much weaker than the surrounding rock. This can explain the high concentration of seismic activity along the narrow zone.

In monitoring the earthquake that occurred near Parkfield in 1966 it was observed that, after the main shock, slow slippage of the fault began to occur. Slippage along the fault during the tremor must have been much greater below than at the surface. All the evidence points to a buried fault that underwent a considerable amount of slip. Little or no slip occurred in the surface layer during the earthquake, but substantial slippage occurred over the next few months. This suggests a causal relationship between the earthquake and the creep that followed it. Since the main shock didn't cause immediate slippage on the surface, the layer between the deep region and the surface became highly stressed. The response at the surface has been fault creep.

Wyss and Smith have noted not only that the creep episodes occur at very regular intervals but that each interval is a precise amount of time longer than the preceding one. The amount of creep in each episode is less than one-tenth of an inch and accumulates over a period of up to five days. This amazing regularity makes it possible to predict with confidence the occurrence of creep.



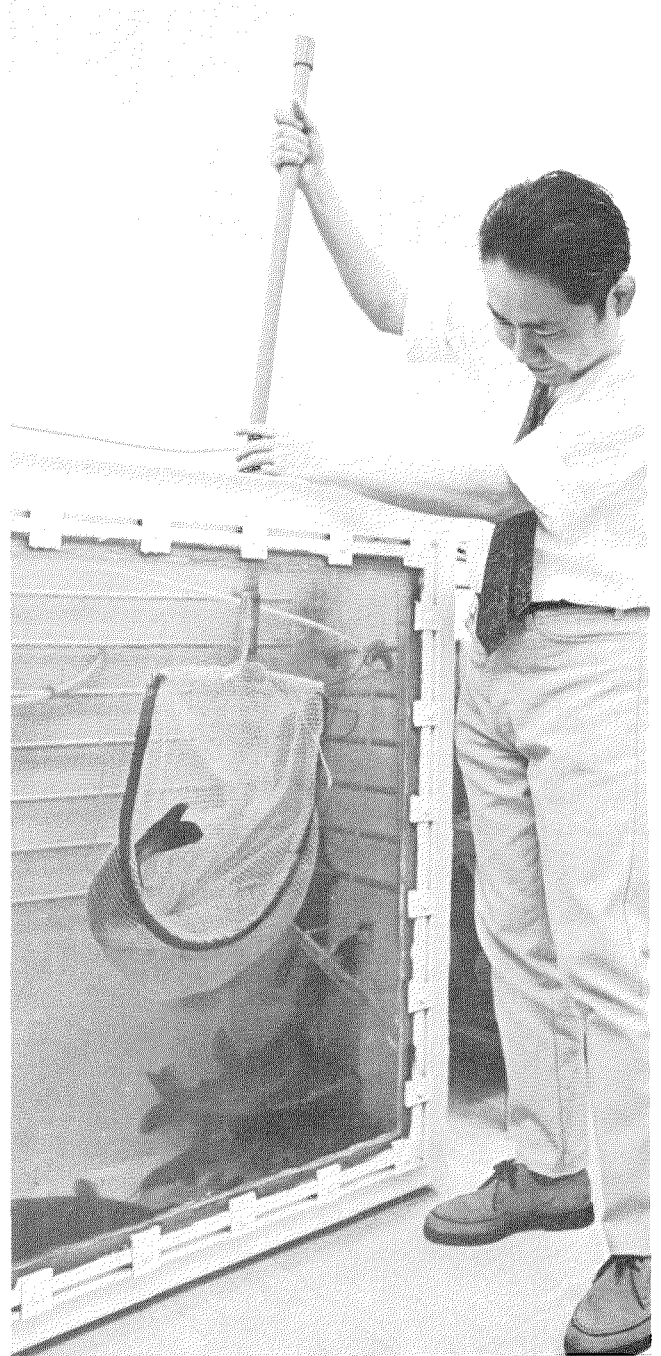
Ken-Ichi Naka tests the catfish eye for reaction to light.

THE EYE OF THE CATFISH

The study of living nervous systems through the use of high speed digital computers is one of the major research projects in Caltech's information science program. Because the visual system is the most important subset of the entire nervous system, a primary emphasis of the study is the examination of visual systems of various creatures—flies, frogs, crayfish, pigeons, and humans. Now a new subject has been added to this list—the common catfish—which is ideal for this research because it has a relatively simple eye.

In these experiments Ken-Ichi Naka, research associate in biology and applied science, removes the iris from the eye of the fish and implants submicroscopic glass probes (1/50 of a micron in diameter) into the retina. Then, by flashing lights at the eye, he tests the responses of the different types of retinal cells to various light intensities, patterns, and colors. The information is transmitted to the computer as the experiment proceeds and is stored for future analysis.

There are three major layers of sensory cells be-



Naka's office equipment includes a unique feature—an aquarium stocked with research subjects.

tween the retina and the optic nerve, which connects with the brain; the rod-and-cone, the S-cell (horizontal-cell), and the ganglion layers. Naka is especially interested in the horizontal cells, which lie between the other two. The evidence he has found indicates that these S-cells are intermediaries between the rod-cone cells and the ganglion cells, and modify the responses of the other cells according to the light conditions. He has discovered that

the voltage potential of the S-cells (which are relatively large compared to the other sensory cells) varies according to the intensity of light that is flashed to them from the retina through the rod-cone cell layer. The S-cells, connected to the other layers by hundreds of neurons, communicate basic information to the ganglion layer—information about average light levels, movement, patterns, and other light conditions.

In this way these cells act as a warning signal to the other cells about changes in brightness, allowing the other cells to adapt their receptor sensitivity. This is a function similar to that of the iris; however, the S-cells respond much more quickly than those of the iris.

The next step in Naka's studies will be to observe two layers of sensory cells simultaneously in order to learn how the S-cells modify the signals from the rods and cones. Eventually he intends to probe several points of sensory systems simultaneously.

THE COMPUTER LEARNS ENGLISH

It used to be that the only people who could communicate with computers were those who had mastered a special language like FORTRAN or CITRAN. Now Frederick Thompson, professor of philosophy and applied science at Caltech, is breaking this communications barrier with a new system that makes it possible for everyone from businessmen to high school students to talk to computers in ordinary English.

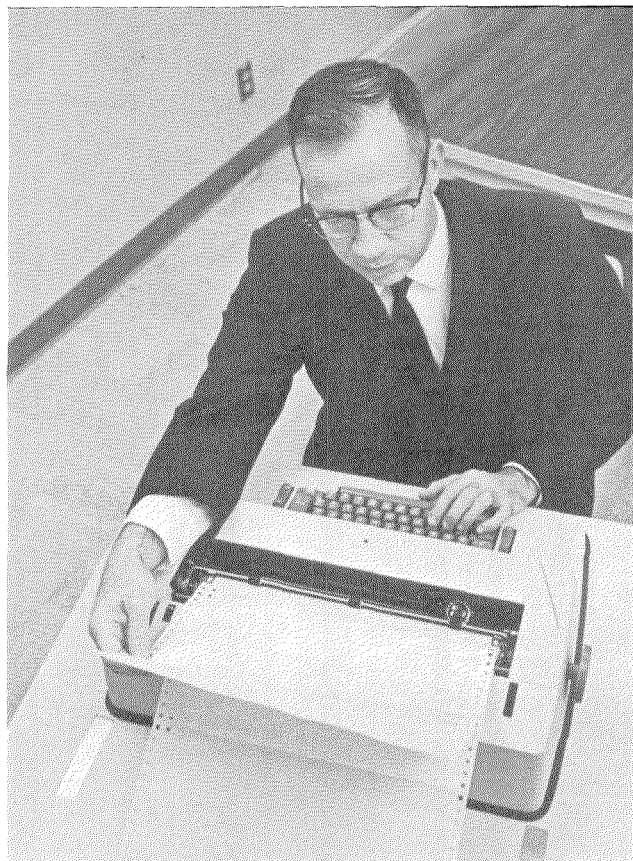
Dr. Thompson and his colleagues in the project—Peter C. Lockemann, senior research fellow in engineering; and Bozena H. Dostert, lecturer in humanities and an associate scientist in information science—call the new system the Rapidly Extensible Language (REL) system. As in other systems, communication with the computer is through ordinary electric typewriters tied to the computer over the telephone lines. But in the REL system the user simply types his questions to the computer in English. REL understands almost all English constructions, including verbs, tenses, and subordinate clauses. Of course the ability of the machine to answer still depends upon what information is stored in its memory. If it doesn't have the answer, it informs you of that fact.

One of the most important aspects of REL is its ability to rapidly extend the informational capabilities of the computer. In other systems new information must be processed from cards and tapes at the

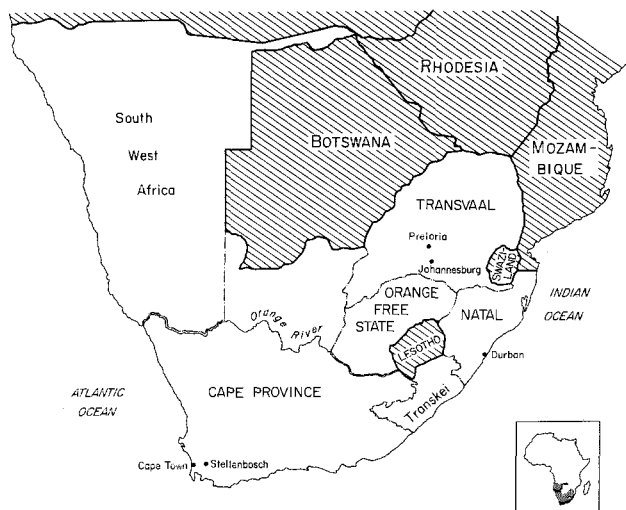
computing center in order to be available. In the REL system the computer can be provided, directly from the console, with new facts and definitions of new concepts which can be used immediately—and stored for future use as well.

To demonstrate his new system Dr. Thompson is using some 60 basic facts about 144 countries of the world—including population, gross national product, working-age population, life expectancy, defense expenditures, unemployment, number of physicians, and TV and radio distribution. From this data base a myriad of questions can be answered—questions as complex as, "What underdeveloped American nations have a ratio of industrial employment to working-age population of less than one-tenth?"

Vast archives of social and economic data that is now available in forms readily understood by computers could, through the REL system, be obtained by anyone who can ask a question in the English language. With REL other bodies of data—voting records of congressmen, census figures, stock market records, sports statistics—would be as accessible as the services of the public library.



Frederick Thompson experiments with his new Rapidly Extensible Language system on the computer console.



South Africa: Are The

*An analysis of conten
possibility of a relati*

South Africa is possibly the most controversial of countries. Its defenders acclaim its political stability; others ask at what price in civil rights. Its economic boom is the pride of its advocates; its economic inequality is the target of its critics. Separate Development of ethnic groups is presented on one hand as an enlightened solution to racial tensions; on the other hand it is condemned as racist and unworkable.

South Africa's critics not only damn the present situation as unjust, they show even greater concern over the dangers of today's policies projected into tomorrow. Lord Caradon, Britain's Ambassador to the United Nations, has long pointed to southern Africa as a time bomb with a shortening fuse. Former U.N. Ambassador Arthur Goldberg sees South Africa as a racist cancer which could infect the whole planet and lead to World War III.

Such alarming predictions are not my conclusions, however. Contemporary domestic developments and trends in foreign policy point to the possibility of a relatively peaceful transition to a more just South Africa.

Essential to our understanding of the situation is some acquaintance with Prime Minister John Vorster. When he succeeded H. F. Verwoerd two years ago, Vorster was considered a man of iron by his party, and with reason. He had been jailed for alleged subversion for two years during World War II; he had broken up the Communist party, defeated widespread sabotage rings, and instituted preventive detention, bannings, and exit permits. No

doubt he would continue to defend Dr. Verwoerd's "granite stand."

Vorster's ascension to power dismayed all the varying shades of opposition in South Africa and the world outside, which had observed the procession of Nationalist prime ministers, each successively further to the right, since the party came to power in 1948. The logical culmination seemed to be Vorster, who had the toughest image of any cabinet minister. *The New York Times* dismally concluded that "the South African Nationalists in fear have turned over the reins of government to the most extreme, most ruthless, most totalitarian of their party leaders."

Today the hard image of Vorster within South Africa has been tempered by the moderation, pragmatism, and outward-looking flexibility he has displayed in his two years of office. This reversal has rankled the right-wing politicians. In August 1968 the antagonism within the National party between the *verligtes* (enlightened) and the *verkramptes* (cramped or narrow ones) burst into an open struggle in which the Prime Minister resolutely fell in with the "enlightened" and used his power to dismiss *verkrampte* cabinet minister Albert Hertzog.

What are the differences between *verligtes* and *verkramptes*? In general the *verligte* elements favor immigration including Catholics, Greeks, and Portuguese; participating in integrated sports abroad; receiving black diplomats in South Africa; programs to encourage the exchange of people with other countries, friendship with English-speaking South Africans, a feeling of comradeship toward "our brown Afrikaners" (Coloured people); the

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Are There Silver Linings?

Temporary domestic developments and trends that point to the likely peaceful transition to a more just South Africa.

By EDWIN S. MUNGER

policy of Separate Homelands compared with *baasskap* (boss-ship); and more open discussion and debate of issues rather than decisions made by closed groups. The *verkrampes* fear change, including television and ecumenical movements among churches, and, in a good many instances, are inclined toward a conspiracy theory of history. John Vorster defines being *verlig* as "using one's common sense in a modern world" and in solving local problems in an international context.

What is causing change in South Africa is not, as often believed, the rise of *verligtes* in opposition to the Government, but the movement of the National party to a *verligte* position on key issues, leaving those who have long stood for *baasskap* outside the party or a minority within it.

After 1948, when the National party came to power, its opponents and overseas critics kept predicting it would split, and possibly the progressive elements would join with the United party. To view the developments of 1968 as portending a hoped-for split is to misread present political dynamics. The *verligtes* now control most key party positions, and it is they who may be joined by progressive elements in the United party. Meanwhile the conservative whites of both parties criticize Vorster for being too radical.

The most dramatic changes of the last two decades were made within the National party during 1968, and the effects are seen in Afrikaans universities, literature, and press. Students at Stellenbosch University are actively seeking contacts with English-speaking universities for the first time. Within the "Akademie," fountainhead of Afrikaans cultural

efforts, a struggle between its *verligte* board of distinguished Afrikaner scientists, lawyers, and businessmen, and a *verkrampste* staff has ended with the resignation of the latter. A similar struggle had a similar outcome at the new Randse Afrikaanse Universiteit in Johannesburg. Despite the key role of right-wingers in founding the university, the faculty is 10 to 1 *verlig*. The enlightened spirit finds expression in the whole *sestiger* (men of the sixties) literary movement and the emergence of the Afrikaner novel from rural sentimentality to involvement in the dynamism of urban life at home and abroad.

Changes in news media have both fostered and reflected the strength of the *verligtes*. The Cape-

NED MUNGER, professor of geography at Caltech, is a specialist on Africa—particularly on Africa south of the Sahara. In the last 22 years he has made 28 trips to that continent, has lived there a total of 10 years, has written 7 books and 300 articles on the subject, and has collected a private library of more than 12,000 books and documents on Africa.

Dr. Munger took his first trip to Africa in 1947 (financed by his Army poker winnings); his second in 1949 as the first Fulbright Fellow to Uganda. From 1951 to 1960 he was an American Universities Field Staff member—during which time he lived a year each in Ghana, Nigeria, Kenya, and South Africa—while at the same time serving on the faculty of the University of Chicago. He came to Caltech in 1961.



based *Nasionale Pers* has been successful with its Transvaal Sunday paper, *Die Beeld*, whose moderate approach on many issues would have been very unpopular three years ago. Even the English-language press has shifted from steady condemnation to occasional support of the Prime Minister. These developments are conspicuous to South Africans but not to the outside world, which is unaware of any reason to make a reassessment.

NO CHANGE IN TWENTY YEARS

But however striking have been the recent political changes within the National party and Afrikanerdom, they have not been transmitted to levels affecting the average African. Political opportunities legally available to the Bantu-speaking peoples within the so-called white areas have not increased in the last 20 years, and they have further declined in the last few years. Arrests and convictions of members of the illegal African National Congress and the Pan African Congress continue. Robert Sobukwe, the one African political leader who has served his sentence under the law, remains in detention. The Communist party and nearly all of its front organizations are banned and their underground activities crushed. A new proclamation in the *Government Gazette* bans meetings of more than ten people in African areas without special permission, except sports and religious gatherings.

Most members of the Government, including the Prime Minister, resist any relaxation of such draconic control on the grounds that it would invite another freedom struggle (as from 1948 to 1966) in which the Communist party would again manipulate and agitate black nationalists and labor movements to violent action. Most white National party members believe that Africans seeking political rights are communists. Banning of white activists has been no less severe, since it was predominantly white groups that were responsible for the sabotage of property and killings. Restrictions have even been extended to the legally acceptable Progressive party, barring it from operating across color lines.

If you ask a cabinet minister bluntly what legislation has been passed in recent years that offers the Bantu more and not less opportunity, he is hard pressed to give examples. He mentions the new town councils for Soweto, a huge complex of black suburbs southwest of Johannesburg, and elsewhere, and provisions whereby white capital can be invested in the Bantustans. Finally he resorts to de-

scribing a "new spirit of administration."

It is true that there are more African police in sole charge of African areas, a new politeness toward Africans by government officials, and the concession allowing Africans to buy liquor. But the hard, legal facts of African life in the urban areas of South Africa and on the white-owned farms do not present either a new or a creditable picture.

The administration is concentrating its efforts on promoting separate development of "nations" (as ethnic groups are often referred to in southern Africa). In the Prime Minister's initial speech, he specifically mentioned the Coloured, Indian, and Bantu peoples in a way "not to indicate political equality but equality as human beings," to quote an Afrikaner foreign editor.

The showcase of Separate Development is the Transkei. Its present autonomy was hastened by two years in advance of the planned date through the influence of Dag Hammarskjold upon Prime Minister Verwoerd. An application for its admission to the United Nations may be made surprisingly soon. The African Minister of Agriculture complains privately that his white officials are being replaced by Transkei Africans too rapidly to maintain efficiency. Transkeian Chief Minister Matanzima who, before he took office, described his people to the author as "the victims of the white man for 300 years," often presses fresh demands on the Government for more territory and autonomy.

Overall, however, the program of Separate Homelands has not made much headway and will require massive exertion if it is to provide separate freedoms for those Africans—perhaps half of the total population—who might eventually live within enlarged Bantustans.

PAYOFFS FROM THE BOOMING ECONOMY

The South African economy as a whole is in dire need of skilled labor and supervisory talent and cannot grow if it is saddled with an uneducated and untrained black proletariat. Everywhere employers complain about the lack of skilled labor, regardless of pigmentation, and everywhere regulations are circumvented. But much economic progress can be made legally. An example is the recent gains by Africans through the extension of the principle of equal pay for equal work. The increase in wages paid by industry and the movement of Africans into skilled jobs—on the Durban docks, in textile factories, in defense plants—are measurable facts.

In Soweto, living standards have improved visibly. The terrible shanties and burlap-sack shelters of the 1940's and 1950's have been replaced with modest but substantial housing. A recent private survey indicates that in the last five years the average length of residence in Soweto has increased from 5.8 to 8.2 years, and income from \$81 to \$100 a month. (House rent is \$10 a month.)

The booming economy has produced material and social payoffs, as seen in the larger number of well-dressed Africans and a new economic mobility. The change from white to Coloured postmen is an undeniable fact to housewives in affected white areas. To make up for the growing shortage of white drivers, the Johannesburg bus line may or may not decide to hire "non-whites," but the economic pressure to do so is offsetting the fear of white bus drivers that they will lose social status if "non-whites" perform the same tasks.

A CRUCIAL QUESTION

A crucial question is how the present political structure will adapt itself to these changes. Will it facilitate the liberalizing social trends that are resulting from a booming economy? At first the South African Government may implement only measures to improve facilities in African areas and broaden social privileges, but without showing any inclination to make radical political and social changes. The new African town councils, for example, will continue as long as they do not lead to political confrontations.

The prospect for African representation in a central legislature is dim. The United party proposes eight African representatives, but this would clearly be an inequitable stopgap. What is essential is to find a mechanism whereby decisions affecting a man's home, his child's school, and his conditions of work are brought within his political competence. What is most likely under present National party rule is that the Bantu will participate in decisions affecting all of present-day South Africa through a multinational body in which ethnic groups might participate as separate "nations." Such a suggestion is not unimaginable to the Afrikaner, whose struggle under British colonialism has left him with a regard for self-determination which he can violate only with a sense of guilt.

There are also more immediate concerns. The separation of African families arising from the myriad of regulations has its accompanying evils: di-

voice, adultery, illegitimacy, juvenile delinquency, and the general breakdown of stable family life. A commission of the main Dutch Reformed Church once again in 1968 criticized these results of controls over the movement of Africans.

APARTHEID HAS NO IDEOLOGICAL BASIS

The doctrine of apartheid has no ideological basis. (The race-hate literature found in a few South African bookshops issues mainly from the United States and Great Britain.) Indeed, the key expression has evolved from apartheid to Separate Development and is now Separate Homelands. None of these is a defined principle or historic pronouncement derived from religious contexts.

In its relations with other African countries South Africa has demonstrated more flexibility than formerly. Most observers predicted that the South African "victory" in the South West Africa case before the World Court would lead to isolationism and an inward-looking *laager* mentality, meaning the way the whites lived behind their circle of covered wagons. Now it is clear that there was a sense of relief from the possibility of concerted world action against South Africa, and this created the psychological climate for freer discussion and has permitted the National party's new foreign policy.

The new openness is reflected in the civilities displayed toward African leaders by the administration despite murmurings among the South African electorate. One such incident was the admission of the Botswana President, Sir Seretse Khama, to the Johannesburg General Hospital, normally reserved for white patients. The hospital not only extended its medical facilities but accorded special VIP hospitality to Seretse's English wife. Protests at the National Party Congress were met resolutely by Prime Minister Vorster, who claimed he acted on his own personal responsibility and forbade anyone to make a party issue of it. The action was in marked contrast to Prime Minister Malan's reaction 20 years ago when he took umbrage at the British Government for allowing Sir Seretse's marriage.

South African diplomacy in dealing with the smaller nations on its boundaries is also liberal. Like all strong powers with militarily weak neighbors, South Africa faces the temptation to be demanding, protectionist, or exploitative. It has not succumbed to that temptation. While the important mineral developments in Botswana are under the leadership of American, British, and South African companies,

Botswana is almost completely dependent for its trade routes on South African cooperation, which has been generous.

Lesotho, wholly surrounded by South Africa, is making headway with the vital Oxbow scheme, which will dam the headwaters of the Orange River and sell power to South Africa. Recently, a hundred Afrikaner farmers voluntarily took their tractors to Lesotho to provide free deep-plowing for part of the Lesotho lowland. Malawi is receiving technical aid from South Africa plus a loan to help build the new capital. The newest non-racial country within South Africa's orbit, Swaziland, achieved independence in September 1968, ending almost three centuries of British sovereignty over some part of Africa. At the time of independence, the Prime Minister of Swaziland made clear that the kingdom values its economic ties and friendship with South Africa next to its own political freedom and non-racist policy. Anton Rupert, an outstanding businessman from the Cape Province, has sent white medical students to work in Swaziland and white surgeons to operate in Lesotho. And recently government officials invited Robert Gardner, the distinguished Ghanaian who is Secretary of the UN's Economic Commission for Africa, to meet with them in Pretoria; at the same time private South African white groups sought his advice about bettering relations with black Africa.

THORNY RELATIONS WITH RHODESIA

South Africa's association with Rhodesia continues to be thorny. Observers at a rugby match last July could not help noticing Vorster and Ian Smith engaged in animated conversation. When the next morning's newspapers conjectured that they had exchanged ideas about an Israeli-like retaliation raid against guerrilla bases in Zambia, Vorster personally telephoned leading Afrikaans editors to deny any such plan. The editors are almost unanimous in opposing the right-wing faction of Ian Smith's party. One commented, "We would be better off with a friendly black Rhodesia than with it as a white tinderbox."

This analysis of South African policies has concentrated upon the white oligarchy and particularly upon the dominant National party as a force capable of humanizing present institutions or building new ones. If it pursues that road, there are thousands of Africans, Indians, and Coloureds eager to reaffirm the belief that men divided by ethnic difference can

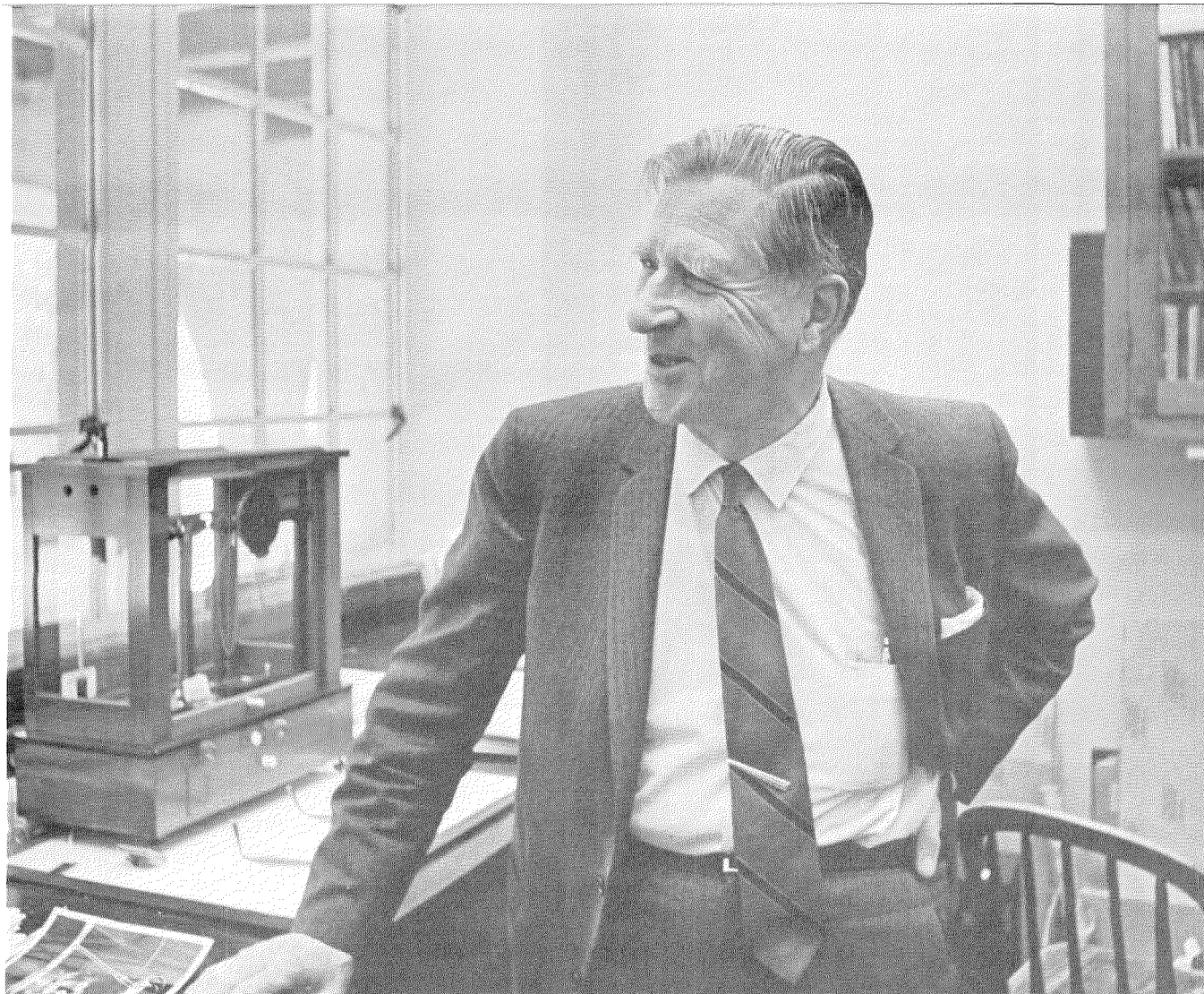
live in harmony.

Such hopes are echoed by Afrikaner Nationalist writers such as Professor Van Wyk Louw who proclaim that "mere survival as a goal is death," but that the Afrikaner's survival is a moral question based on the need to live in justice with fellow peoples. The columnist of the Johannesburg *Zionist Record*, Henry Katzew, expressed the conviction that "the Afrikaner's struggle for survival and the Black man's demand for free opportunity are not irreconcilable." Recently N.J. Olivier, a popular professor at Stellenbosch University, told an audience of all races, "We are not monsters, and I believe it will be realized that discrimination based on colour is untenable. It will take time, but we have seen many changes in South Africa, and I believe this one will come."

THE DOGMATIC AFRIKANER

If a community of nations in southern Africa is to come about, through some amelioration of the political position of the Bantu in white cities and peaceful coexistence of the peoples of southern Africa, why is not the South African Government inspired to proclaim these goals? Because the unique historical struggle of the Afrikaner has given him an approach to the future that is dogmatic and simple. His tolerance for ambiguity is exceptionally low. The Afrikaner voter demands that his leader be firm, positive, and know the answers both for now and for the distant future. A Nationalist politician who would admit publicly that his country's racial problems are far more complex than those of the United States and Great Britain, and who would state publicly that, while believing his party to be on the right road, he would welcome helpful suggestions, would risk his political survival. It has been my experience to hear Afrikaner leaders tell a group of foreigners that policy must be precisely so and so and that foreign doubts as to its success have no basis, and then in a moment turn around and express the selfsame doubts and begin discussing alternate solutions.

One would be wrong to conclude on too optimistic a note. No panaceas are in sight. The possibility is ever present that clouds of reaction will block out the new rays. Nevertheless, one can have reasonable hopes that the next decade will see an increase in social and political opportunities for Africans, Coloureds, and Asians in South Africa to match their domestic economic advances and the new flexibility shown by the Government in foreign affairs.



Arie Jan Haagen-Smit

Caltech's Crusader for Clean Air

Six thousand pounds of pineapple flown from Hawaii to Caltech in 1945 started California on the way toward a solution of its air pollution problems.

The pineapple was delivered to Arie Jan Haagen-Smit, professor of bio-organic chemistry in Caltech's biology division, to use in his flavor studies. To obtain basic information about the chemical constituents of pineapple flavor—a study he was doing for the Pineapple Research Institute of Hawaii—Haagen-Smit had to distill the essence from huge amounts of fruit. Several tons of the pineapple yielded only a few grams of the material containing the flavor—a mixture of substances which was then fractionated by physical and chemical processes to

determine its components.

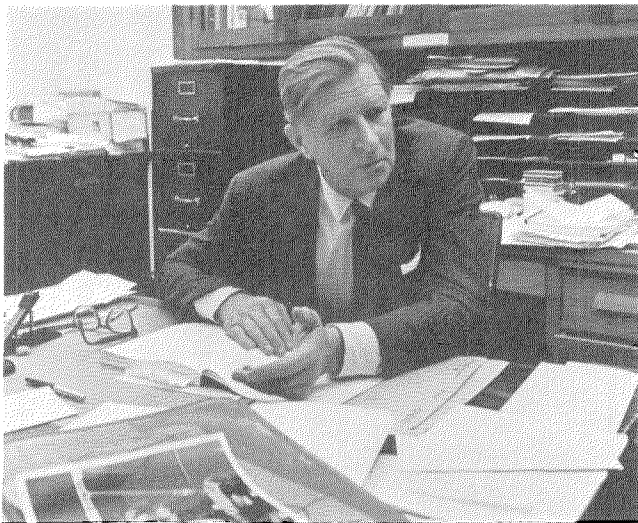
One smoggy day in 1948, when Haagen-Smit was nearing the end of this project, he decided to apply his flavor research technique to the irritating air everyone was complaining about. Starting with several hundred cubic feet of air (an equivalent of the amount a person breathes in one day) he collected a few ounces of condensed smog. This liquid was found to be mostly water containing a number of evil smelling chemicals—aldehydes, acids, and organic peroxides. Although these substances were known to be products of incomplete combustion and known to cause eye irritation, they had never before been reported as significant air pollutants.

Their discovery in smog opened up a whole new field of investigation into the problem.

As a result of this work, Haagen-Smit concluded that the organic material released into the air—mostly hydrocarbons—was oxidized through the combined action of oxides of nitrogen and sunlight. In these reactions plant-damaging, eye-irritating, and rubber-cracking materials are formed.

Continued research clearly revealed that oil refineries and automobiles were responsible for most of the hydrocarbons in the atmosphere. These results were not received with great enthusiasm by the oil and auto industries, though they eventually cooperated to reduce smog. Today, in fact, California refineries are the best controlled in the world. And today most of the automobile plants have impressive projects devoted to the study and control of auto exhaust.

Although the automobile is now considered to be the prime contributor to the hydrocarbons in air pollution, the oxides of nitrogen—the compounds which, through the energy of the light, convert the hydrocarbons to smog—must still be controlled. De-



“I’ve turned from the test tube to the telephone.”

bate on this problem has finally resulted in a program of control of its main offenders, automobiles and power plants.

“We have just started to pull a little ahead of the increase in air pollution,” Haagen-Smit says. By 1974 he estimates that 90 percent of the hydrocarbons, 75 percent of the carbon monoxides, and 75

percent of the nitric oxides from new cars will be eliminated. By 1980 about 60 percent of the total wastes from stationary and moving sources should be controlled.

“But control will always be marginal,” he says. “It’s always going to be an uphill fight.”



“We have just started to pull a little ahead of the increase in air pollution.”

He is afraid that far too many people think smog will disappear the day cars have effective pollution control devices. At best, he thinks, we can only bring pollution levels down to where we can live comfortably with them. But even this means long-range city planning—including green belts and transportation systems that get people to and from work easily and cleanly. Regrettably, he sees little evidence that this kind of planning is under way.

Haagen-Smit’s patient crusade (one friend refers to him as a combination of Old Dutch Cleanser and St. George) has finally elevated him to a position where he has some might behind his right. In 1968 Governor Reagan appointed him head of the air resources board which coordinates all air pollution control in California; he has an executive officer and staff of about 100, with offices in Sacramento, Berkeley, and Los Angeles.

“I’ve turned from the test tube to the telephone,” he says.

Haagen-Smit was born in Utrecht, Holland, in 1900, the son of a chemist. He received three degrees—his AB, AM, and PhD—from the university there and then joined the faculty. His work on the isolation and synthesis of plant hormones gave him

an international reputation among plant physiologists and brought him an invitation, in 1936, to lecture for a year at Harvard, and another invitation from Caltech's famous geneticist, Thomas Hunt Morgan, to join the Caltech biology division in 1937.

At Caltech Haagen-Smit continued his investigations of the structure, determination, and synthesis of naturally occurring compounds—returning to a project he had begun while working on his doctorate—the analysis of essential oils. From that work he moved to his flavor studies, and thus, eventually, to smog. He has been involved with smog ever since.

Much of his time in recent years has been taken up interpreting his findings and their ultimate meaning to the public, who will have to pay for smog control remedies; to special interests, who are afraid that any change in procedures will lose them profits; and to politicians, who hope to keep both groups happy.

He has a fat file of letters containing suggestions about siphoning the smog through a big tunnel cut through the mountains, or creating a system of gigantic fans to disperse it, or building a vast overhead sprinkling system to water down the air. One

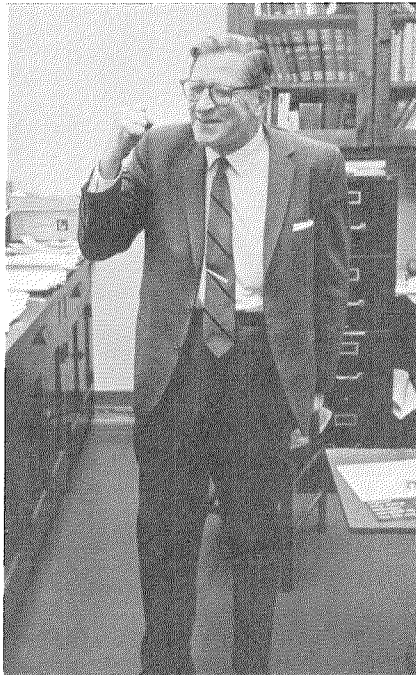


“Control will always be marginal.”

correspondent writes to explain to him that the air is turning dead and, as it does, “people are trapped into a strange, hypnotic psychiatric state.” He cites

times and places and wants Haagen-Smit to do something about it. Another writes:

“I fraugh with contempt for all academic supposed know-how. You have refused to acknowledge the fact that it is hydrogen sulphide gas which be-



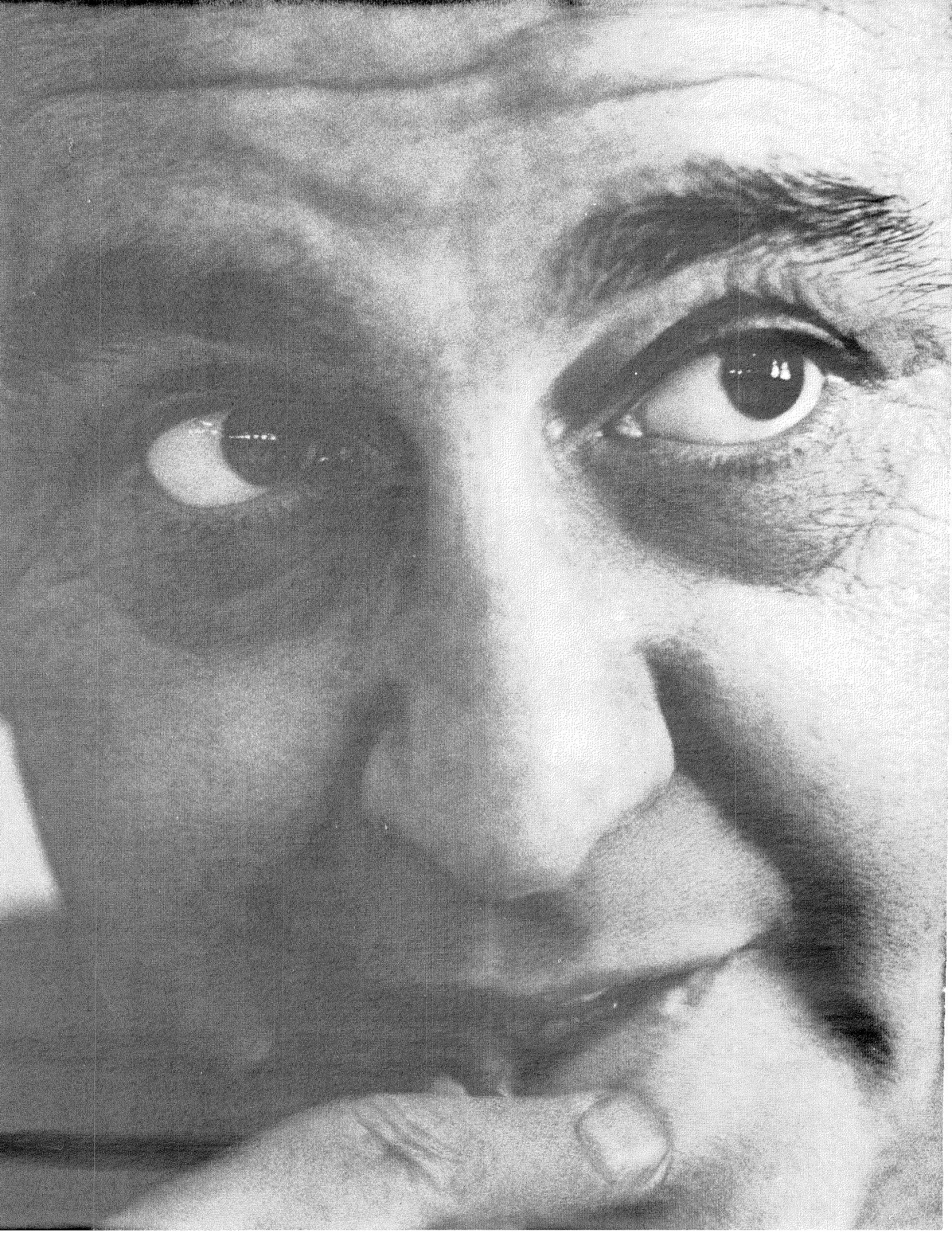
“It’s always going to be an uphill fight.”

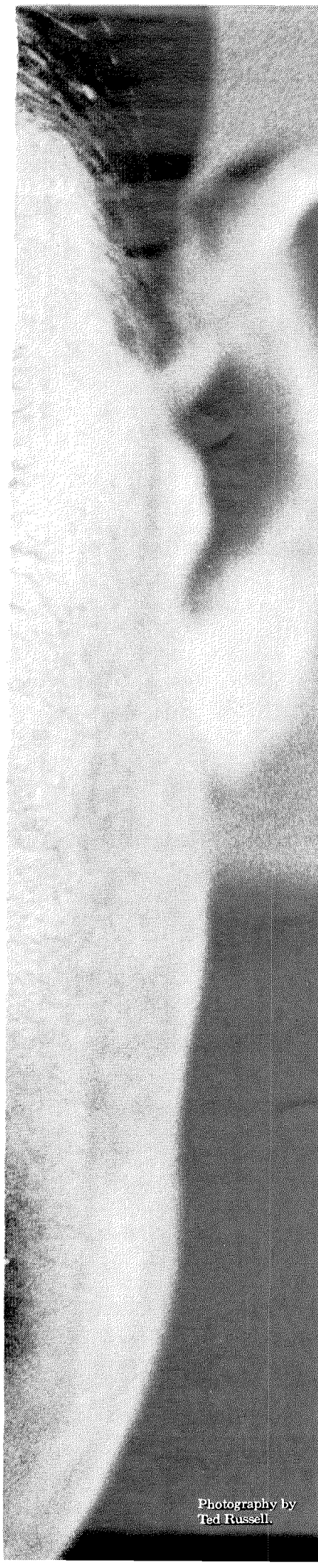
comes sulphuric acid mist. This comes from the sewer main lines and garbage . . . It is very gratifying to see you people missing the boat.”

Haagen-Smit's name has inevitably come to be bracketed with the word smog to most people, but he also continues his interest in all aspects of growing things. He is president of the board of the Los Angeles County Arboretum Foundation, and looks forward to being able to spend more time with it after his retirement from Caltech in 1971. He likes to go on long river trips with fellow Sierra Club members and is a devoted nature photographer. Since 1966 he has directed Caltech's Earhart Plant Laboratory, and is known around the campus for his surprise gifts of orchid varieties he grows there and at home. And he enthusiastically plays caretaker to several aquariums of fish and plants in the biology buildings.

But smog is still his chief concern.

“You know,” he admits, “if I look at the daily graph to see how much smog is in the air, I feel a twinge of disappointment when there's just a small amount.”





“Tell me something won't work and you've made my day..”

Cordovi, Marcel. Educated Prague, Ann Arbor, Pittsburgh, Brooklyn. Authority on materials for high temperature, nuclear and corrosive environments. VIP in market development for International Nickel.

“I mind everyone's business. Say you're building a condenser for a power plant. I want to know what metals you're considering. No! I don't think you want to use that one. Our tests show it won't stand up to those conditions. And experience tells us that the long-term economics aren't right for you either. Now, how about these?”

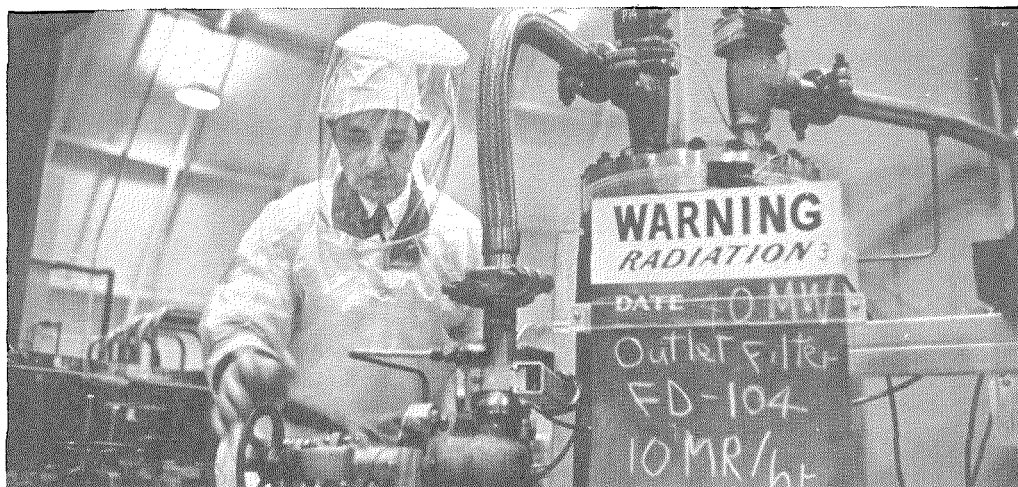
“I've got no tangible product to sell you. Only ideas. Maybe I'll convince you to use stainless steel. We don't make it. But I've improved the prospects for stainless—and for nickel—by seeding the idea...”

“Ideas have to stay young. So do we if we're to work with ideas and promote them. That's why I still teach. It's my contact with the logic and enthusiasm of youth... so that I keep on asking 'Why?' 'Why?'...”

There is only one Marcel Cordovi, but thousands of Inco men all over the world reflect his attitude: trying to solve today's problems and tomorrow's needs with nickel. Nickel to make other metals stronger, tougher, more corrosion resistant. Nickel, its contribution is quality.

INTERNATIONAL NICKEL

The International Nickel Company, Inc., New York, N.Y.
The International Nickel Company of Canada, Limited, Toronto, Ontario
International Nickel Limited, London, England



Cordovi on an inspection tour of a nuclear reactor at Brookhaven National Laboratory. He spent 10 years there as a consultant on materials for various nuclear projects.



if you think Collins Radio Company makes radios...

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Don't get us wrong. We keep our

demands reasonable enough so that our recruits can make their decisions at their own pace. But our thinking is, a man feels awfully good about even a small decision when it's *his*.

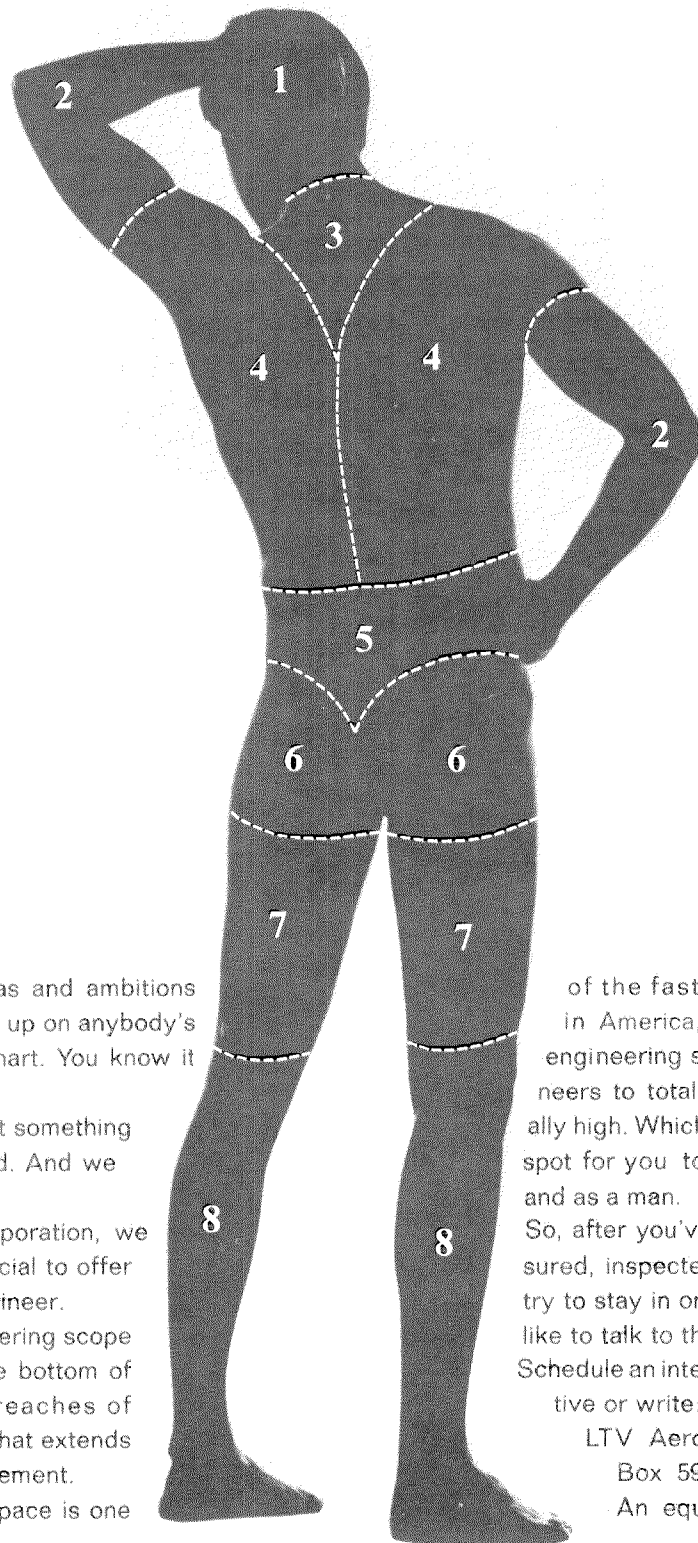
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of the fastest growing companies in America, and what we grow on is engineering strength. Our ratio of engineers to total work force is exceptionally high. Which adds up to a pretty good spot for you to be in — as an engineer, and as a man.

So, after you've been weighed and measured, inspected and all but dissected — try to stay in one piece, won't you? We'd like to talk to the whole man.

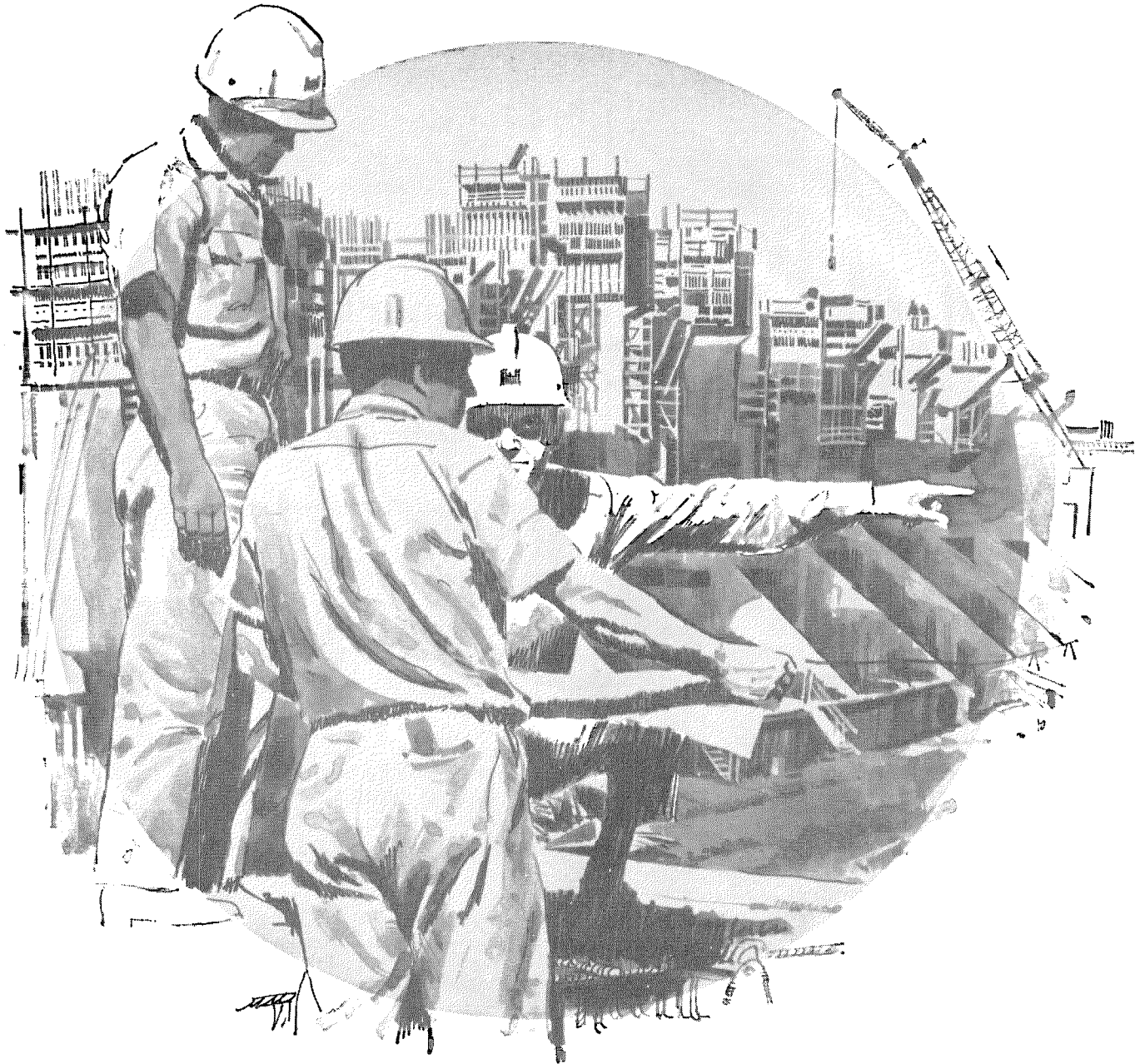
Schedule an interview with our representative or write: College Relations Office, LTV Aerospace Corporation, P.O. Box 5907, Dallas, Texas 75222. An equal opportunity employer.

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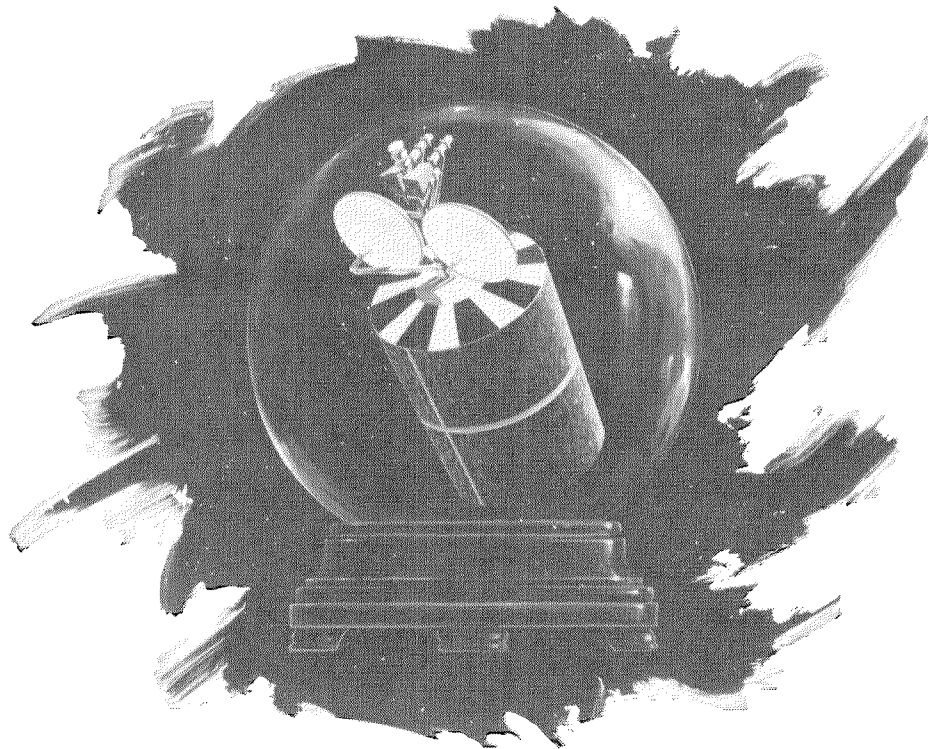
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Of all the natural resources Anaconda works with, the one that counts most is you.

By the year 2000 A.D. the world's population will have doubled. For every two Americans now, there will be one more. A growth of 50%.

And that's just a little over 30 years away. This is the problem we're facing at Anaconda.

How to provide the millions more tons of copper, aluminum, and other non-ferrous metals that will be needed to provide essential needs.

Metals for building, electrical power systems, and agricultural systems. Metals for new and better transportation, new and better roads, and communication. Metals necessary to change sea water to fresh. To help underdeveloped nations develop. Plus, a whole myriad of possibilities we haven't even dreamed of yet.

The needs are obviously immediate and urgent. And Anaconda is growing and diversifying here at home, in Latin America and Canada. In as many ways as we know how to provide these basic building blocks on which our economy grows. In ways we like to think make us one of the great natural resources of the Americas.

But metals alone don't make the company that mines and fabricates them a great natural resource.

What does it is people. And the skill, imagination, and determination they bring to their work.

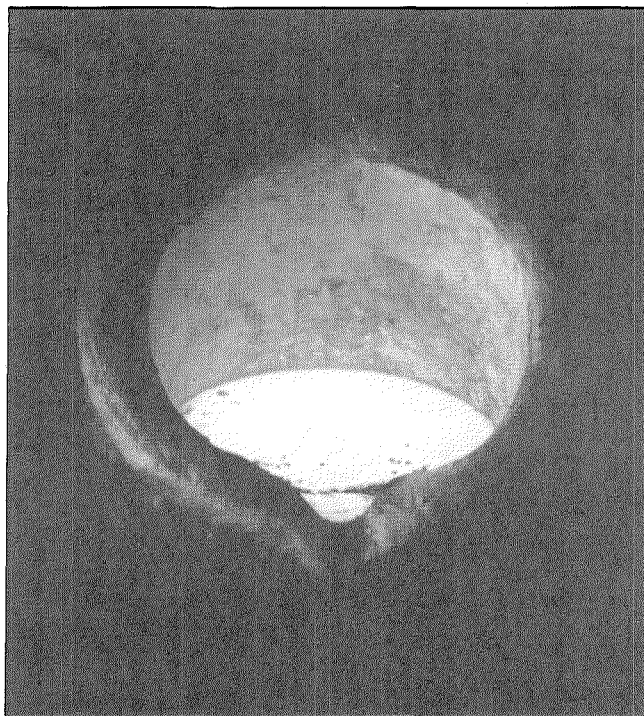
Without these qualities, metal lies hidden, useless. And can never reach the potential necessary if we are to answer these problems at all.

That is why Anaconda has a commitment. To back the creative energies of our human resources with our faith in the future, and our money, to meet the growing needs for metals.

In the last 10 years we invested \$750,000,000 for new plants and equipment. There will be another \$650,000,000 in 1968-1972. Plus, we have research on a global scale. A whole new western exploration headquarters in Salt Lake City, and an extractive metallurgical research laboratory in Tucson. Staffed with specialized scientists, geophysicists, metallurgists, mining engineers and other highly trained individuals. This is the kind of backing we give to our people.

And the people we need are numerous. Teams of earth scientists, metallurgists, mining engineers. Fabricating, marketing and financial specialists. All the sort of dedicated people that know their work is vital and important.

Anaconda. Come make a future with us.



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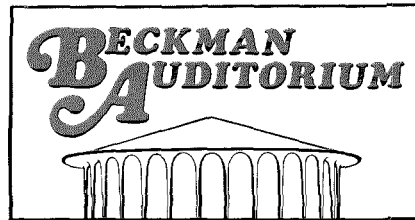
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Meetings: University Club 1319 "K" St. Luncheon first Friday of each month at noon Visiting alumni cordially invited— no reservation.	



MARCH

- Eric Goldman, professor of history, Princeton—Haynes Foundation Lectures:
 - 3 "The Hidden Prelude."
 - 6 "The Revolutionist in a Mercedes-Benz."
- 12 "New Stances, Old Problems."
- 7 *Phaedre*, in French, by Productions d'Aujourd'hui.
- 8 Caltech Interhouse Sing.

14 First Chamber Dance Quartet.

25 Burton L. White, professor, Harvard Graduate School of Education—"Early Childhood Experience and Human Competence."

APRIL

- 13 The Pasadena Symphony, Richard Lert conducting.
- 18 Caltech Band Concert.
- 25 Ali Akbar Khan, sarodist, sitarist, drummer.

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Aloha Nui!

The *big news* this month is that, after a long and careful scrutiny of the Hawaiian Islands, Commonwealth United Corporation came to the same conclusion we have held for years—that the finest land investment area in the Islands is to be found on the Big Island of Hawaii, especially on the Kona Coast.

As many of you realize, the original Hawaiian Ocean View Estates land (12,000 acres) has been sold out for some time. However, when Commonwealth United Corporation annexed Hawaiian Ocean View Estates, I was advised that a *very limited amount of really prime acreage* would be released for sale. These acres had been held back pending approval of a large price increase to bring the California prices in line with those of the other 49 states. However, in order to expedite the merger, these acres have just been released for immediate sale (and they have been going very fast!) at the original low California prices, in some cases as much as *\$1,500 less than they can be purchased in any other state including Hawaii.*

If you have been giving any thought to investing in land in Hawaii, where growth and increasing values are unmatched by any other state, please contact me without delay. In recent weeks I have had to tell some of you that there was no more land available in this outstanding subdivision; if you were among those who inquired, please call me or drop in at my office within the next few days and you may still be able to purchase some of this beautiful, verdant, ocean view acreage. And believe it or not, at this writing a few acres remain at the low \$1,440 price.

In addition, Commonwealth United Corporation has begun road construction on 4,000 acres which were being held by Hawaiian Ocean View Estates for future development. A tremendous amount of money and effort is being rushed into improving this acreage so that it may be offered to the public within two to three months. I should add that the State of Hawaii now requires that this new acreage be sold in minimum 3-acre parcels. So if you are interested in only one or two acres, *this may well be your last opportunity to purchase less than three acres.*

Please call me or watch my ads in *Engineering & Science* magazine for further information on this new and exciting development in Hawaiian real estate.

Mahado.

Victor M. Lozoya

We developed TV transmission. But a lot of engineers still don't get the picture.

Like, we'll ask a graduating engineer:
"What opportunities do you think an engineer has
if he works for the telephone company?"

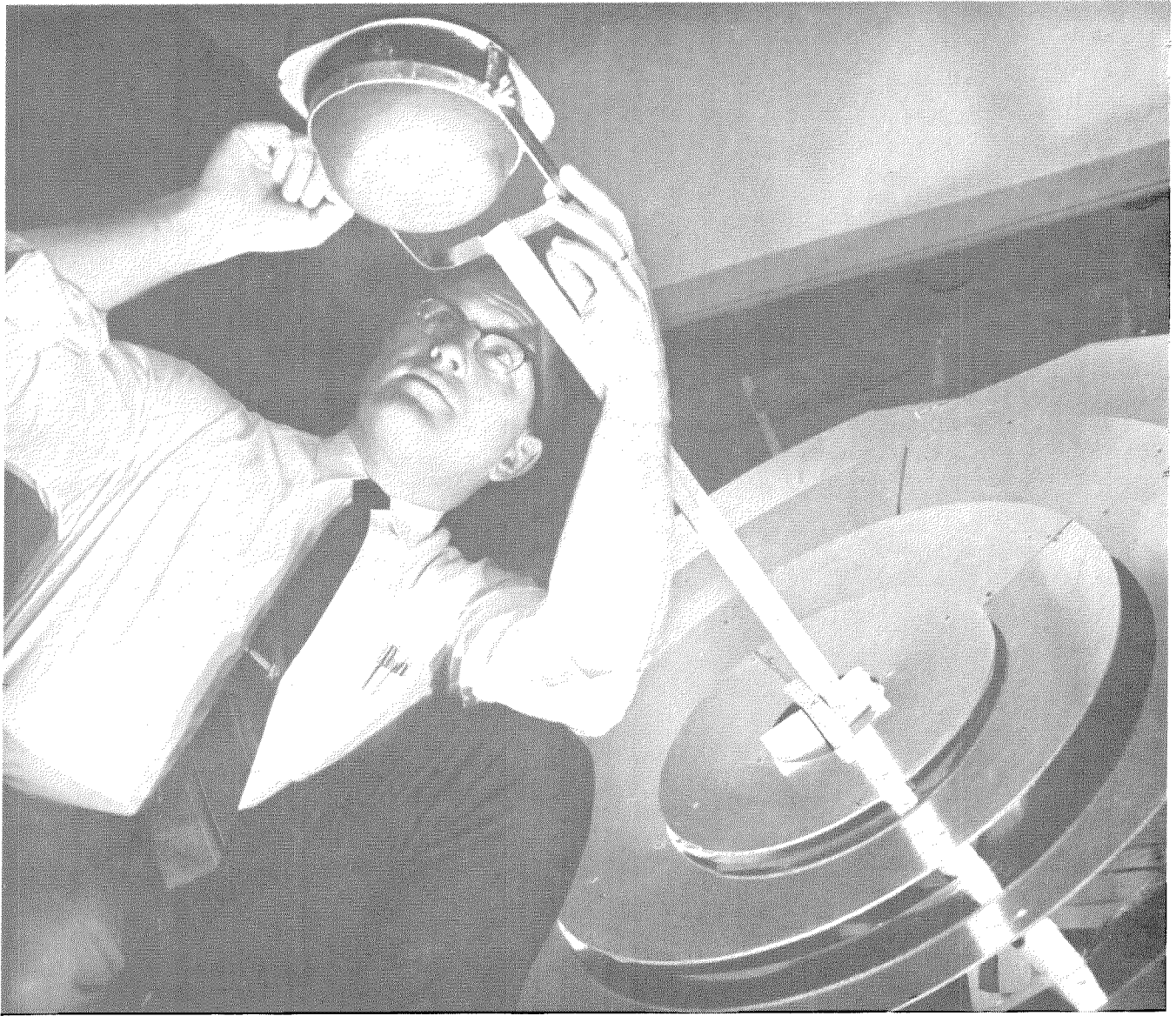
And, zap—we get a blackout!

Well, we think the company responsible for
engineering innovations such as the transistor, radio
astronomy, high fidelity and stereo recording,
magnetic tape, synthetic crystals, negative feedback,
sound motion pictures, microwave relay, electronic
switching, the solar battery and telstar deserves a
consideration that's strong and clear.

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Dan Johnson has a flair for making things.

Just ask a certain family in Marrakeck, Morocco.

A solar cooker he helped develop is now making life a little easier for them—in an area where electricity is practically unheard of.

The project was part of Dan's work with VITA (Volunteers for International Technical Assistance) which he helped found.

Dan's ideas have not always been so practical. Like the candlepowered boat he built at age 10.

But when Dan graduated as an electrical engineer from Cornell in 1955, it wasn't the future of candlepowered boats that brought him to General Electric. It was the variety of opportunity. He saw opportunities in more than 130 "small businesses" that make up General Electric. Together they make more than 200,000 different products.

At GE, Dan is working on the design for a remote control system for gas turbine powerplants. Some day it may enable his Moroccan friends to scrap their solar cooker.

Like Dan Johnson, you'll find opportunities at General Electric in R&D, design, production and technical marketing that match your qualifications and interests. Talk to our man when he visits your campus. Or write for career information to: General Electric Company, Room 801Z, 570 Lexington Avenue, New York, N. Y. 10022

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