SCIENCE

27 July 1973

Vol. 181, No. 4097

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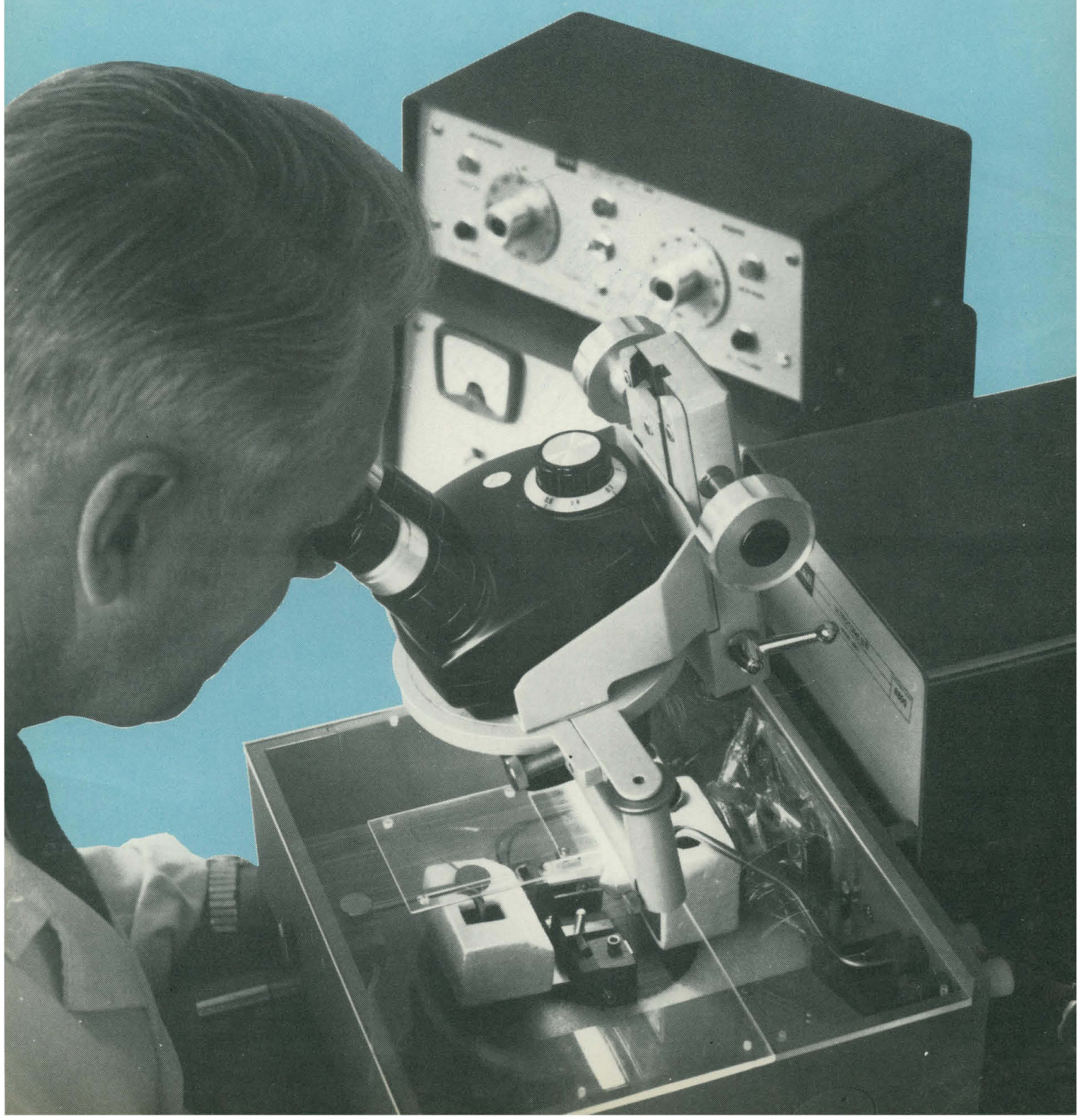

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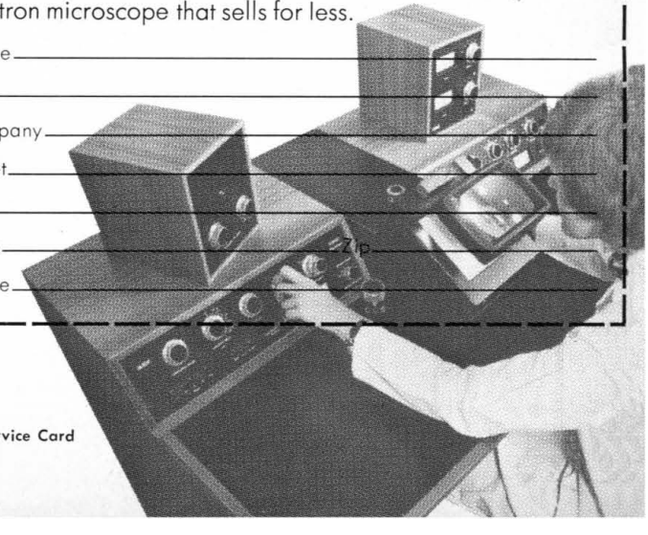

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SCIENCE

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Eelgrass doll made by Ramona Casanova, El Desemboque, Sonora, Mexico, April 1972. Eelgrass and cloth, 31 centimeters long. See page 355. [Photograph by Helga Teiwes-French, Arizona State Museum]

Still Specifications

Kenneth Hickman, Ian White, and Egon Stark, in their article "A distilling system for purer water" (6 Apr., p. 15), make the important point that purer distilled water is necessary for scientific research and describe an elegant methodology for obtaining high-quality water. However, the solution is impractical for most of us because we are not in a position to construct or test such equipment. Having worked on the design of high-purity glass stills and other types of water purification equipment for many years, I would like to add a practical postscript to the article by Hickman *et al.*

An effective still cannot be constructed by simply linking a number of stages together. A still is a system in which many stages are interdependent, and a great deal of empirical testing and redesign lie between the best theoretical concept and an operating model. For example, a seemingly minor detail, such as selecting a vertical, rather than a horizontal, orientation of boiler heater elements, can dramatically alter the effectiveness of a still (*1*).

From a practical standpoint, the greatest potential for improving the quality of water purification equipment no longer lies with the inventor or engineer, but with those leaders in the scientific community who are contemplating means of specifying performance. Still specifications must reflect the broad spectrum of still performance, and they must permit duplication and verification under controlled conditions, or no amount of innovation will cut through the current stagnation resulting from an uninformed market. The widely accepted "tap water" test is no test at all, since tap water represents such a hopelessly complex and variable matrix that duplication of test conditions is impossible, and specifications cannot be challenged in a scientific manner. The use of standards which cannot be verified and the use of vague expressions such as *triple distilled, pyrogen-free, ultrapure,* and so forth has led to widespread product misrepresentation.

Water purification equipment should be tested with a set of binary solutions made from carefully defined pure water and containing sufficient solute to swamp background effects. The impurities should be selected so that information is obtained about the weaknesses as well as the strengths of a given type of equipment, and they should be amenable to convenient measurement. Ideally, a broad set of tests could be established which would also permit comparison of the relative efficacies of differing methods of water purification, that is, deionization versus distillation, or versus reverse osmosis. I have applied this type of testing in a comparison of six popular, commercial, all-glass laboratory water stills, and the results showed extraordinary, and often unexpected, differences between the designs (*2*). Obviously, this type of testing may not always tell the whole story, but it would represent a first step.

The burden of developing meaningful specifications lies with the scientific community, not with the industrial community. Industry has long been aware that the profit margins for estab-

lishing pioneering standards in the absence of consumer demand are slim. Standards acceptable to an industry are very likely to reflect an element of "standards fixing."

ERICH L. GIBBS
Ultrascience, Inc.,
Evanston, Illinois 60201

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1. E. L. Gibbs, *Glass Laboratory Water Stills (Design and Performance)*, part A, *Introduction and Discussion of Design Features* (Ultrascience, Evanston, Ill., 1972).
2. ———, *In Vitro* **8**, 37 (1972).

Gibbs's letter treats two related subjects: the alleged impracticality of our prototype still and the present state of the art of testing and appraising water stills and the products thereof. We concur with most of his suggestions as well as others in the literature (*1*) for improving the latter but do not feel competent to offer additions or corrections.

Concerning the prototype still, we wrote in the last sentence of the caption for our figure 4, "Our purpose has been less to provide an engineered design of *commercial proportions* than to demonstrate the utility of a *system* for providing improved water" (italics added). Our reasons for offering it in that state of development were linked to our interpretation of the applicable patent regulations ". . . that all information, uses, products, processes, patents, and other developments resulting from such research developed by Government expenditure will . . . be available to the general public" (*2*).

One can scarcely quarrel with the application of such a ruling to public funds and the world's chief operating fluid. Unfortunately, the common good is not always best served by this arrangement. If proprietary rights may not be acquired, there ensues little protection for a firm otherwise willing to market an invention.

With this opinion in mind, we pursued two interrelated themes: one, some suggestions to manufacturers and installers of distilling equipment; the other, the prototype still which a handyman-mechanic, "Admirable Crichton" of many laboratories, could put together from common bits and pieces (that is how we made ours). Since describing the still in *Science*, we have added four thermal switches (*3*) which allow the still to operate without attention. This it has done for the past 6 months, with the specific resistance of the product water hovering between 93 and 97 percent of the calculated specific resistance of pure water. The prototype still is thus eminently practical for any laboratory that cares to put it together. The main purpose of our article—to outline a methodology for producing purer water—appears to have been served, if we judge by the letters and requests for reprints received (from 16 countries and 31 American states) in the past 2 months.

Now, for two further disclaimers; in figure 12 of our article there are four points, Δ, which lie above the calculated curve for pure water. The points, selected from the literature, are to show how admittedly impure water would compare with our results. We have apologized to C. G. Malmberg (*4*) for omitting mention that the preparation of ultrapure water was not the prime concern of his work.

The second disclaimer concerns a recheck of sterility done in May 1973. Bacterial contamination was found in 13 of 40 tubes of Trypticase soy broth

inoculated with product water and incubated at 37°C for 48 hours. Reference to the daily log showed that air had entered on three occasions when power failure (endemic) had shut down the still, and, during one such failure, a glassblowing adjustment had been made. Although the still restarted without aid upon restoration of current, it is evident that a means for instant in-process resterilization should now be devised.

Perhaps the most important point, as Gibbs observes, and our inquirers have emphasized, is the worldwide need for convenient sources of highest-quality water that has been exposed. Credit for ventilating the matter remains with M. S. Favero, L. A. Carson, W. W. Bond, and N. J. Petersen (*5*).

KENNETH HICKMAN
WILLIAM KAYSER
Distillation Research Laboratory, Rochester Institute of Technology, Rochester, New York 14614
EGON STARK
Department of Biology, Rochester Institute of Technology, Rochester 14623
IAN WHITE
Department of Chemical Engineering, University of Pennsylvania, Philadelphia 19174

References and Notes

1. R. C. Hughes, P. C. Murau, G. Gundersen, *Anal. Chem.* **43**, 691 (1971).
2. *Saline Water Conversion Act of 1971* (PL 92-60, 92nd Congress, 1971), section 6(d).
3. Details can be supplied upon request with a stamped, self-addressed envelope.
4. C. G. Malmberg, *J. Res. Nat. Bur. Stand. Sect. A* **69**, 39 (1965).
5. M. S. Favero, L. A. Carson, W. W. Bond, N. J. Petersen, *Science* **173**, 836 (1971).
6. This work was supported by the Office of Saline Water under grants 14-30-2572 and 14-30-2964.

The Case of Nina Strokata

At the 1973 annual meetings of the American Society for Microbiology, held during the second week of May in Miami Beach, Florida, hundreds of American microbiologists signed a petition in defense of Nina Strokata, a Ukrainian microbiologist who has been sentenced to 4 years imprisonment because of her refusal to denounce her husband, a writer. Among the signers of the petition were university department chairmen, heads of medical, industrial, and governmental laboratories, university professors, clinicians, scientists from various laboratories, and students. Also among the signers were scientists from Belgium, Canada, France, Germany, India, Iran, Israel, Pakistan, Portugal, and Sweden.

The petition was presented to the Commission of Human Rights of the United Nations on 17 May 1973. Addressed to the Honorable Kurt Waldheim, Secretary-General of the United Nations, the petition describes the plight of Nina Strokata and states

> We microbiologists are compelled to urge the government of the USSR, a signatory of the Universal Declaration of Human Rights, to review the case of Nina Strokata immediately. We request that the Soviet government allow the presence of representatives of international microbiologists, journalists and the United Nations at an open trial where Nina Strokata would have a chance to defend herself according to Articles 10 and 11 of the Universal Declaration of Human Rights.
>
> We urge, therefore, that the Commission of Human Rights of the United Nations demand the implementation of these rights in the case of Nina Strokata.

This petition was not sponsored by any scientific or political organization, but was initiated by a handful of microbiologists who were familiar with Nina Strokata's case. It may be of interest to all scientists, not just to microbiologists, that international cooperation among scientific groups is a fact and entails many aspects of their professional lives.

A. A. ZWARUN
7 Dell Court, Baltimore, Maryland 21207

Postscript

B. Grzimek (Letters, 22 June, p. 1232) rightfully condemns the crew of R.V. *Searcher* for writing the ship's name on the rocks of Tagus Cove in Galápagos National Park, but their adolescent action is far from the only example of a scientific expedition's failure to respect the beauty and wildness of these islands. Scientists, although seemingly in the best position to recognize the importance and vulnerability of the Galápagos Islands, have often set a poor example of behavior there. Grzimek does not point out, however, that the *Searcher* sank to the bottom of the sea (with no loss of life) shortly after leaving her graffiti at Tagus Cove. Vessels bound for Galápagos in the future are invited to draw a moral from this tale.

TOM SIMKIN
Charles Darwin Foundation for the Galápagos Islands and *Department of Mineral Sciences, Smithsonian Institution, Washington, D.C. 20560*

Psychophysical Literature

Reports and articles issued by the Harvard Psycho-Acoustic Laboratory and Laboratory of Psychophysics are available on request as supplies permit. Preference will be given to foreign laboratories and libraries.

GERALDINE STEVENS
Room 984, 33 Kirkland Street, Cambridge, Massachusetts 02138

The University and R & D

The article by John D. McCrone and Margery E. Hoppin discussing research contract solicitation by the federal government (9 Mar., p. 975) suggests, although it does not mention, a question that is of profound importance in these times of research-support evaluation: What is the proper role of the university in publicly supported research?

The traditional role of the university as source of fundamental new knowledge, growing from its responsibility for storing and diffusing existing knowledge, seems unassailable. I question, however, the unlimited extrapolation of this role to the application of existing knowledge through applied research and development (R & D).

McCrone and Hoppin competently discuss the fact that present practice in applied research support displays a continuing trend toward more dependence on contracts (which by definition require explicitly stated performance) and less dependence on grants (which make performance requirements implicit). I cannot quarrel with this trend; it increases both the objectivity with which researchers and institutions are chosen by funding organizations and the probability that useful results will be produced.

My quarrel is with the changing nature of the institutions themselves, with the growing emphasis upon the acquisition of services "business" rather than upon the acquisition of knowledge, upon services to "customers" rather than to humanity.

This change apparently assumed serious proportions during and after World War II, when the federal government determined that new information, methods, and devices were needed and correctly concluded that (with few exceptions) only institutions of higher learning had the intellectual resources to provide applied research and development services that were organized and disciplined.

During the last three decades, competent R & D organizations have developed in the private enterprise sector. Thus one basic and valid motivation for seeking R & D services from universities has vanished. During the same period, however, many universities have spawned "office of research" (O/R) subsidiaries which compete with R & D vendors and which do not resemble at all the popular image of the university research team as a group of scholars earnestly probing at the boundaries of human knowledge.

A typical O/R group consists mainly of ad hoc employees hired for, and only for, the purpose of working on contract R & D activities, usually under the titular supervision (rather than, alas, under the intellectual leadership) of a member of the faculty. Some faculty members may work on the "project," usually on a part-time basis, and seldom with any real intellectual involvement in terms of their academic department responsibilities.

Should the universities be in the marketing business, retailing services in competition with privately financed vendors of comparable services? As an officer of such a vendor, I have found universities to be among the most aggressive competitors for the acquisition of R & D contracts. As a consultant to government agencies taking part in the evaluation of R & D organizations and their work, I have found that an ad hoc university O/R group is sometimes inferior in performance, and not necessarily lower in cost, in comparison with its commercial competitors.

The well-known financial squeeze of a few years ago placed many educational institutions in serious straits. In some cases the financial pressure was generated by the need to support academic overhead organizations which were overexpanded during the frenetic 1960's.

It is not evident that a proper answer is to support universities from the sale of applied R & D services performed by either faculty members or nonfaculty. In particular, the notion that universities must find ways to support ad hoc extra-academic business organizations, some of which may well have completed their proper missions, seems not worthy of public support.

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An Era of Global Scarcity

Not so many years ago, the United States was embarrassed by surplus food, exported petroleum, enjoyed leadership in mass production, and took pride in the expression, "sound as a dollar." A comfortable era has passed. Indeed, it would be all too easy to lose perspective and to panic. That would be foolish. Many of the current troubles will seem less worrisome before the year is out. Moreover, in having problems we are not alone.

If we extrapolate present trends, we can see that most lands are more likely candidates for turmoil and extreme misery than are we. The peoples of the world are demanding more food, more energy, more raw materials, and more goods. We have entered an era of scarcity.

The United States is remarkably blessed in a number of fundamental ways. It has great human and material resources. Our people are well educated, energetic, and disciplined. They respond to movements that are in the long-term interest of society—population control, environmental protection, and conservation. Few nations, if any, enjoy as good a long-term potential for production of food, energy, and raw materials. In the light of our present population and current rates of reproduction, the situation compared to that of most countries is excellent.

The advanced countries are vulnerable in one or more respects. For example, Japan has been enjoying a great boom. However, Japan must import food, fossil fuels, and raw materials. The sudden ban on shipments of soybeans from the United States is a tiny foretaste of what Japan is likely to face in the future.

But the coming problems of scarcities in the advanced countries are small in comparison to those in store for some of the lesser-developed countries. Most are without adequate potential for production of food, energy, or a variety of raw materials; they lack sufficient scientists and engineers and have not acted decisively to control population growth.

A country of particular interest is Mexico. There was born the Green Revolution. Over the course of 25 years, grain production doubled. But at the same time, the population also doubled. Last year, Mexico imported substantial amounts of feed grain. The country has considerable mineral resources, but its energy reserves are small. Currently it is importing oil, and its coal seams are few, thin, and deep. What about the human resources? The visitor to Mexico seeking answers to that question is likely to depart puzzled. The Mexicans clearly have the capacity for excellence. We have nothing that approaches their anthropological museum. Other aspects of Mexico City—for example, the metro—compare favorably with those of cities in advanced countries. The streets are clean and safe; the populace is alert and energetic. An observer, however, cannot escape the impact of two aspects of unchecked growth—babies and automobiles. During the past year the Mexican government has quietly begun to open birth control clinics. The effects, if any, are not evident. If something is not done quickly about automobile parking and traffic, Mexico City will come honking to a standstill.

The city is only a minor part of the country. Within a few kilometers of the city, the population lives under conditions much like those of 100 years ago, with a disregard for sanitation, but with Coca Cola signs and transistor radios everywhere.

Much of the world is aware of our standard of living and of our gadgets. They yearn for both, while the population explosion continues. We are soon going to witness dramatic and miserable confrontations of aspirations, expectations, and limitations.—PHILIP H. ABELSON

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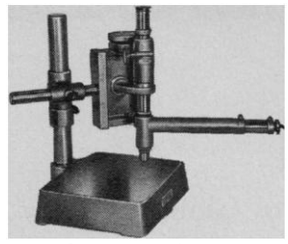

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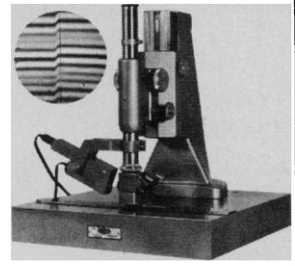

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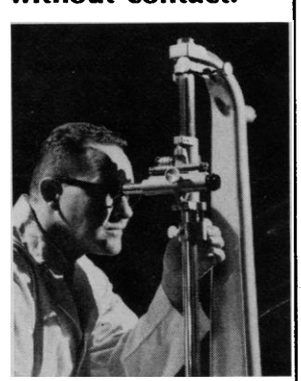

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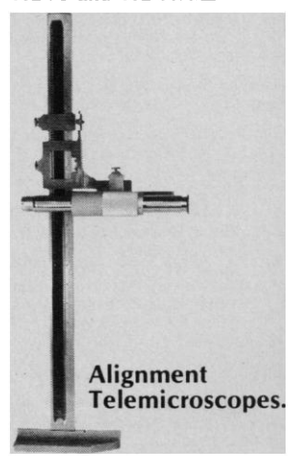

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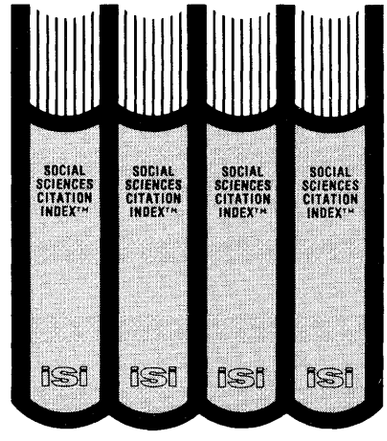

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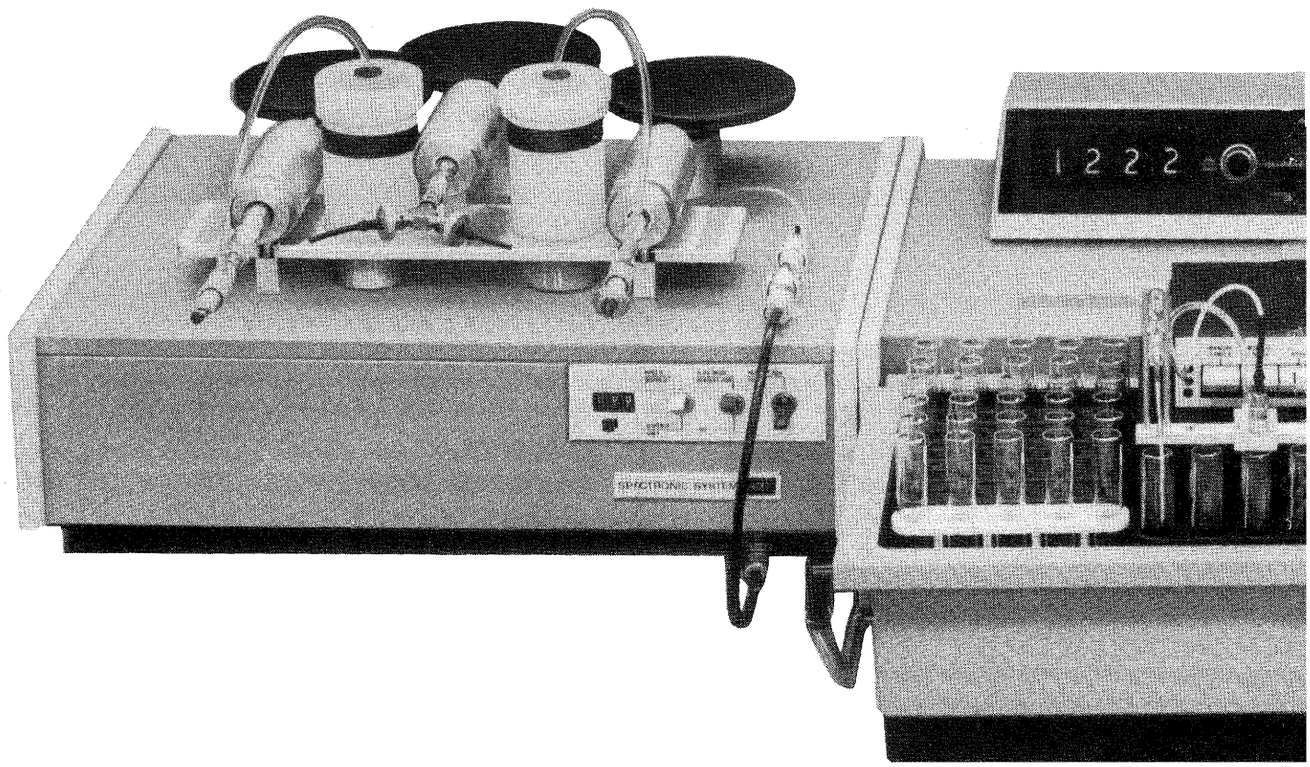

Automation where you need it

Pipetting with the 400-4 is a pushbutton operation. Reagents and substrates are added automatically. Prepared samples are mixed automatically. They are incubated at the time interval you set, analyzed for the length of time you choose—again, automatically. Final data, for up to 360 samples per hour, is printed out with complete sample identification, automatically.

Total temperature regulation

Because you require maximum linearity in kinetic studies, we have provided for temperature control throughout the entire operation. This applies from the start of incubation all the way through to the point of analysis. Also, this system gives you a wider range of temperature control than you will find in any other system.

Unmatched flexibility

There are many important options already built in. You can do colorimetric studies or kinetic studies, either manually or automatically. You have a wide choice in reagents, including making your own from bulk chemicals. You select precisely the lag time that is critical to your method—from a range of 8 seconds to 45 minutes. And when you use the system as shown you get direct readings in Transmittance, Absorbance or Concentration—with both the digital readout and a tape printout.

Other important benefits

Cross contamination is never a problem. The hand probe is purged by reagent flow-thru following each sample aspiration. And an exclusive vacuum scrubber cleans the dipper tube after each sample aspiration.

The glassware you will use, for the most is standard—the kind you either already have on hand or can get readily. This keeps costs down and eliminates concern over availability.

Over 4 years ago we exhibited the first engineering model of the 400-4. We listened and evaluated comments and suggestions from people who used all the components together, as a system. Then we incorporated all the constructive ideas into an updated system. This in turn was put to the test in actual use for over 2 years. The results of such rigorous field testing are very excellent. All the components that go into the system work together, flawlessly. They were designed to be a total system and that is what they are. And we now can assure you of reliability that you can completely depend on.

We have a number of methods already available, and have more on the way.

Choice for you

You can start off with the Spectronic 100 Spectrophotometer and do a substantial amount of highly accurate work. Then when you are ready you can easily add on in order to achieve the degree of automation you require. You can add the Data Processor, Automatic Sampler, and Diluter/Pipetter—one at a time, or in combination. When you have all four, you have the complete system, the precision 400-4, from Bausch & Lomb.

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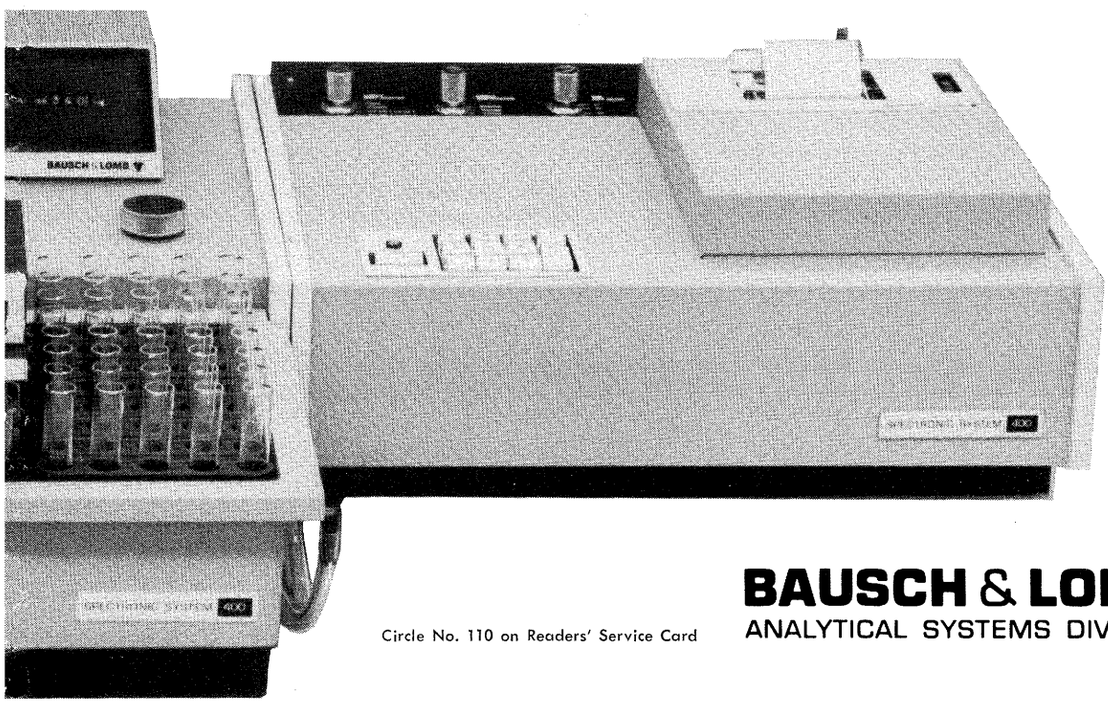

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BAUSCH & LOMB
ANALYTICAL SYSTEMS DIVISION

MEETINGS

Prostaglandins

The prostaglandins (PG's) are a family of lipid acids, originally discovered in semen and seminal vesicles; they have since been shown to be associated with most mammalian tissues. Their physiological roles are not yet clearly defined, but it seems unlikely that they are hormones in the classical sense. Instead, they may be "local hormones," formed within tissues in response to some stimulus; they then exert their effects locally. Their potency and activity in many apparently unrelated biological systems, coupled with ready availability in research quantities, has resulted in much new information about these agents.

Schering AG, Berlin, sponsored an international conference on the prostaglandins in Vienna on 24 to 28 September 1972. Except for reports of analytical methods, the conference emphasized the biological and clinical aspects of the prostaglandins. Among nearly a hundred scheduled presentations and three round-table discussions, nearly every facet of the known activities of prostaglandins was considered.

Analytical methods suitable for determining prostaglandin in plasma or tissue must be sufficiently sensitive to detect a few nanograms. Until recently, only biological assays in which isolated smooth muscle was used were sufficiently sensitive. For some of the natural prostaglandins there are now radioimmunoassays and a chemical mass spectrometric method. Because of their simplicity, radioimmune methods are most suitable for general use, but are limited by specificity of the antibodies. The antibodies against $PGF_{2\alpha}$ are the most specific. The chemical method is specific but complex, requiring combined vapor phase chromatography and mass spectrometry, with the use of deuterated prostaglandins as internal standards and multiple-scanning techniques coupled with on-line computer control. Its greatest utility will probably be to check other analytical methods.

It was pointed out that the concentration of natural prostaglandins in plasma may not always be the most relevant value. Prostaglandins formed in tissues may be converted to a 15-keto metabolite before reaching the bloodstream. Indeed, amounts of this metabolite in the blood are much higher than those of the parent prostaglandin. Both mass spectrometric and radioimmunoassays for 15-keto $PGF_{2\alpha}$ were described.

Until the recent discovery of PGA_2 esters in the sea whip (*Plexaura homomalla*), prostaglandins have been reported only in association with vertebrates. A number of insects and marine invertebrates were surveyed for biosynthetic potential. The gills of carp and lobster were especially active in converting precursor unsaturated fatty acids to prostaglandins. If we assume that these enzymes function to form prostaglandins in the living animal, these findings suggest not only that prostaglandins may play a role in salt and water transport (as has been suggested for the mammalian kidney) but also that prostaglandins may have some fundamental physiological roles throughout the animal kingdom.

After ovulation, the corpus luteum forms in the ovary and produces the hormone progesterone. If the ovum is not fertilized, the corpus luteum then degenerates and another reproductive cycle follows.

There is much evidence that degeneration of the corpus luteum is brought about by a luteolytic factor produced in the uterus. Because $PGF_{2\alpha}$ is a powerful luteolytic agent in rodents, it has been postulated that it may be "the" luteolysin. Proof of such a role, among other things, demands demonstration of production in the uterus, in quantities sufficient to induce luteolysis (and a concomitant fall in progesterone), and also that production be temporally related to luteolysis. In sheep and some rodents, such a role now seems well established. However, in the human the evidence is conflicting. During the menstrual cycle, luteolytic activity may be evident only at certain times, and in any event is not so obvious as in sheep and rodents. During early pregnancy, progesterone from the corpus luteum is required to maintain pregnancy, but this sustained progesterone production continues only so long as pregnancy continues. A prostaglandin-induced fall in progesterone at this time may not necessarily be luteolysis, but may only reflect placental damage secondary to direct stimulant actions of prostaglandin on the uterine muscle.

Prostaglandins E_2 and $F_{2\alpha}$ have been tried for termination of pregnancy from postcoital contraception to induction of labor at term. With respect to inducing abortion, the majority opinion was that PGE_2 or $PGF_{2\alpha}$ would have advantages

over standard methods during the second trimester. Suction curettage is, at present, the favored method during the first trimester. Those investigators who had used both PGE_2 and $PGF_{2\alpha}$ thought that there were fewer side effects (vomiting and diarrhea) with PGE_2. However, if the prostaglandin were administered directly into the uterus, either into the amniotic fluid or into the space between the uterine wall and the fetal membranes, side effects could be reduced. Indeed, incidence of side effects parallels concentrations of prostaglandins in the blood. Simultaneous administration of PGE_2 or $PGF_{2\alpha}$ with oxytocin resulted in more than an additive response, enabling the usual abortifacient dose of prostaglandin to be reduced to about 20 percent and also avoiding side effects.

One of the problems attending suction curettage is adequate dilatation of the cervix. Preliminary studies indicated that dilatation was facilitated by administration of prostaglandin the day before. Suction curettage could then be performed easily as late as the 11th to 12th week of pregnancy. Whether this facilitation is due to relaxation of cervical muscle (as observed in vitro) or to contraction of the body of the uterus is not clear.

A promising improvement in prostaglandin-induced abortions lies in intra-amniotic injection of an analog. With the natural prostaglandins, multiple injections during several hours are usually necessary. The human placenta is especially rich in a prostaglandin-metabolizing enzyme, prostaglandin 15-hydroxy dehydrogenase. The (15*S*)-15-methyl- analogs of $PGF_{2\alpha}$ or PGE_2 methyl ester have, at carbon-15, a methyl group in addition to a hydroxyl. These analogs have been reported not to be substrates for the dehydrogenase enzyme. When such an analog was injected into the amniotic fluid, abortion time was shortened, and usually only a single injection was needed. The side effects were no more than those with the natural prostaglandins.

The parenteral administration of PGE_1, PGE_2, or PGA_1 inhibits gastric secretion in man, dogs, and rats. This inhibition seems to be on the secretory process itself, and seems not to be due to secondary changes in gastric blood flow. In dogs, two synthetic prostaglandins, (15*S*)-15-methyl-PGE_2 methyl ester and 16,16-dimethyl-PGE_2 methyl ester, were found to be many times more potent and longer acting than natural PGE_2. Furthermore, the latter

analog was orally effective in dogs. An unscheduled presentation confirmed that the (15*S*)-15-methyl-PGE_2 methyl ester was orally effective in man. All prostaglandins thus far described from vertebrate sources have an asymmetric carbon atom at position 15 at which there is a hydroxyl group with the *S* configuration (sometimes, less accurately, described as "alpha"). Among many other naturally occurring optically active compounds, the so-called unnatural isomers often have much less biological activity. Such was the case with the depressor activity of (15*R*)-PGA_2, isolated from certain strains of the sea whip. It was, therefore, very surprising to learn that (15*R*)-15-methyl-PGE_2 methyl ester was also an orally effective gastric antisecretory agent in man. The (15*S*) isomer was more potent, but was associated with vomiting and diarrhea. However, at larger but fully effective doses the (15*R*) isomer was without side effects. These data suggest that the gastric antisecretory action of prostaglandins may now have practical application.

Several years ago the principal acute vasodepressor lipid from the medullary portion of the kidney was identified as PGE_2. An antihypertensive role of the kidney, which seems to be associated with the renal medulla, has also been proposed for many years. Since PGE_2 is not only a vasodepressor substance but also has potent natriuretic and diuretic actions, a physiological role for renal prostaglandins has been postulated. Evidence in favor of this hypothesis continues to accumulate.

A pure culture of rabbit renal medullary interstitial cells synthesized prostaglandins. This culture was obtained free from fibroblast contamination by a novel method. Medullary tissue from one kidney was first grown as an autotransplant in the donor rabbit and then used later to establish the cultured cell line.

Histochemical techniques localized prostaglandin synthetase activity in the renal medulla of several rodents, mainly along the collecting ducts and papillae. Prostaglandins E_1, E_2, and $F_{2\alpha}$ were found in human urine, but it is not clear whether these were derived directly from the blood or from biosynthetic processes in the kidney.

An active vasodilator role for renal PGE_2 was suggested by studies on renal autoregulation. In such studies, blood pressure and flow to a dog kidney is controlled. If the pressure of the blood

is reduced, the flow at first diminishes, but then recovers spontaneously toward the initial value by dilatation of the blood vessels in the kidney. In parallel with this autoregulatory dilatation, a PGE_2-like vasodilator appeared in the renal venous blood. Both autoregulation and the appearance of PGE_2 were blocked by indomethacin, an inhibitor of prostaglandin synthesis.

Prostaglandins of the A series are $\Delta^{10, 11}$-prostaglandins formed by dehydration of E series prostaglandins. Prostaglandin A_1 has relatively little smooth muscle stimulating activity, and so would not be detected by the usual biological assay methods used for prostaglandins. This fact may explain why little has been published concerning the presence and possible physiological roles of this prostaglandin. Published studies have primarily dealt with the renal and overall cardiovascular actions of PGA_1, which, at least superficially, resemble PGE_1 and PGE_2. Evidence for a physiological role independent of the kidney was presented. Subdepressor infusions of PGA_1 in man strikingly increased plasma aldosterone, a salt-retaining steroid hormone from the adrenal cortex. This effect was independent of changes in renin, adrenocorticotropic hormone, or serum electrolytes. Support for the concept that PGA_1-controlled secretion of aldosterone came in a participant's comment that a radioimmunoassay has now been developed and that, in rats and in human volunteers, a low-sodium diet increased and high-sodium diet decreased the concentrations of PGA_1 in the plasma.

Convincing evidence that prostaglandins may be one of several mediators of the inflammatory response has been reported, and it has been proposed that nonsteroidal anti-inflammatory agents (for example, aspirin and indomethacin) owe their activity to inhibition of prostaglandin synthetase. This conference added evidence that prostaglandins were associated with the writhing reaction in mice following interperitoneal injection of irritants, were present in the aqueous humor of rabbit experimental uveitis, and were formed by the skin after scalding injury. In contrast, anti-inflammatory actions have also been attributed to prostaglandins. Subcutaneous treatment twice daily of rats with PGE_1, PGE_2, PGA_2, and $PGF_{2\alpha}$ inhibited adjuvant-induced arthritis.

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PRODUCTS and MATERIALS

Microscope Culture Chamber

The Dvorak-Stotler controlled environment culture chamber is circular in design with opposing ports. The chamber components that media or materials would touch are Teflon, stainless steel, glass, and a tin-silver alloy solder. The distance between optical surfaces does not exceed 1.2 mm and the chamber is recessed into the stage which renders the lower optical surface flush with the top of the stage. The device offers rapid and reproducible alterations in chamber environment and provides for referenced relocation of areas of interest. The 170-μm cover glasses permit the use of high numerical aperture objectives and they may be removed cleanly for fixation and staining of adherent cells. Nicholson Precision Instruments. Circle No. 124 on Readers' Service Card.

Photometric Analyzer

Enzyme kinetics and reaction end points may be studied with the ABA-100 Bichromatic Analyzer. The difference in absorbance at two wavelengths is measured and the effects of turbidity and interfering substances are minimized. Reagent consumption is reduced because of the system's sensitivity. A visual display indicates the sample carousel revolution, the particular sample station, and the reading. The operator may select either 30° or 37°C for the incubator and he may select from five analysis times. The system is complemented by the company's A-Gent chemical reagents. Abbott Laboratories, Scientific Products Division. Circle No. 123 on Readers' Service Card.

Heated Vacuum Desiccator

Vacutherm can accommodate up to 50 test tubes at a time. The 300-watt heater has a solid-state proportional regulator which maintains the temperature of the bottom of the chamber to within ±1°C of any setting from 30° to 150°C. The desiccation chamber is an aluminum cylinder 18 cm high and 28 cm in diameter. There is a domed Plexiglas lid with a greaseless silicone rubber seal at the side wall of the chamber and a greaseless nonfrictional vacuum valve at the center, 22 cm above the floor of the chamber. Trace moisture may be removed from samples or small quantities of liquid may be rapidly evaporated in this device. Zymel Corporation. Circle No. 122 on Readers' Service Card.

Automatic Ranging Recorder

The Auto-Attenuator recorder (Fig. 1) eliminates manual switching of ranges when the pen goes off scale. An adjustment by the operator sets the points, high and low, at which the recorder will automatically shift to the next higher or lower range. The recorder covers 11 spans from 1 millivolt to 2 volts or from 10 millivolts to 20 volts. A marker indicates the number and direction of range shifts. There are 24 chart speeds. Soltec Corporation. Circle No. 121 on Readers' Service Card.

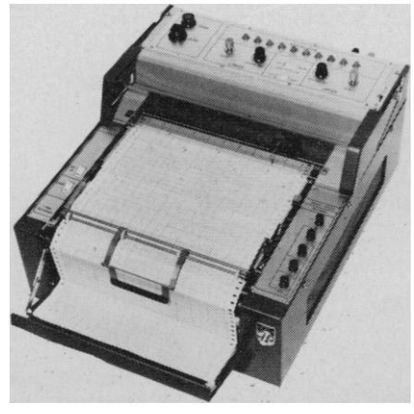

Fig. 1. The Auto-Attenuator strip-chart recorder from Soltec Corporation. The operator designates points at which the recorder will shift ranges, either up or down, when the pen goes off scale.

Literature

Microchemical and Instrumental Analysis is an 80-page manual that covers the use of Millipore membrane filters in a variety of techniques including microscopy, spectroscopy, autoradiography, and others. Millipore Corporation. Circle No. 125 on Readers' Service Card.

EM Reagents: Classified Listings of Laboratory Chemicals is a catalog of laboratory chemicals. It is indexed in 12 sections, including analytical reagents, indicators, buffer solutions, scintillation chemicals, and clinical diagnostic reagents. EM Laboratories. Circle No. 126 on Readers' Service Card.

Clinical Laboratory Reference will be offered annually. It will cover clinical products and instructions for laboratory procedures. Litton Publications. Circle No. 127 on Readers' Service Card.

Chemical Handbook gives structure, molecular formula, molecular weight, and important physical properties of more than 1000 lipids, pesticides, amino acids, carbohydrates, hydrocarbons, drugs, and other chemicals of biologic interest. Methods of preparation of derivatives are detailed also. Supelco, Incorporated. Circle No. 128 on Readers' Service Card.

Research Chemicals for Organic Chemists offers approximately 1200 compounds and lists their physical properties. PCR Incorporated. Circle No. 129 on Readers' Service Card.

Prescription Chemicals and Narcotic Products Catalog includes 50 new products among nearly 500 prescription chemicals, vitamins, and narcotic products. J. T. Baker Chemical Company. Circle No. 130 on Readers' Service Card.

Newly offered instrumentation, apparatus, and laboratory materials of interest to researchers in all disciplines in academic, industrial, and government organizations are featured in this space. Emphasis is given to purpose, chief characteristics, and availability of products and materials. Endorsement by *Science* or AAAS is not implied. Additional information may be obtained from the manufacturers or suppliers named by circling the appropriate number on the Readers' Service Card (see pages 306A and 370C) and placing it in the mailbox. Postage is free.—RICHARD G. SOMMER

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(Continued from page 332)

ing deep-space probes like the Jupiter-bound Pioneer spacecraft. Smaller antennas are used at the station for tracking unmanned earth satellites. The space agency said the deep-space part of the station will be closed next year and the rest of it, possibly, by late the following year. No decision has been made on whether the South African government's Council of Scientific and Industrial Research (CSIR), which runs the station under subcontract to NASA, would keep the facility open by itself after 1975.

In all, the station employs about 280 persons, including 60 blacks; none are American. Information gathered by NASA at the request of Representative Charles C. Diggs (D–Mich.), another member of the black caucus, shows that, whereas blacks hold about 25 percent of the jobs at the station, they receive only about 5 percent of the wages paid by NASA through the CSIR. After a visit last year, Diggs reported that black employees are barred not only from the station cafeteria but, more importantly, from most of the technical and all of the supervisory jobs, as well as from technical training programs.

For his part, Rangel charged in May that "gross disparities" exist between fringe benefits given to white and black employees, such as sick leave, vacation leave, and medical benefits. Rangel also said the highest-paid black employee, "a skilled laboratory assistant," earns $2005 a year, barely more than the lowest-paid white employee, a "raw trainee" who draws $1930 a year.

Under prodding from Diggs and the others, NASA did extract promises last year from the CSIR to improve wages and fringe benefits and to build a primary school for the children of black employees, all of whom live on the 4000-acre site.

But the station's critics in Congress regarded these improvements as merely cosmetic, and South Africa seemed not to think the station important enough to its own interests to justify making exceptions to the rules of apartheid. "The system is so unyielding," said an aide to Rangel, "that if the U.S. had forced the point, South Africa would have just kicked the station out."

What about the 60 blacks who stand to lose their jobs, menial as they may be? "Human problems have to be considered," said the aide. "But Mr. Rangel felt the station was a moral symbol of U.S. compliance with apartheid, and it had to go."—ROBERT GILLETTE