they might have left after a first attack by us. And to guarantee that outcome, a conservative Soviet planner would have to call for many more total Soviet offensive warheads than there were total U.S. interceptors. Thus, an ABM designed to cope with blackmail by 50 to 100 Chinese missiles can produce a multiplying and a ratchet effect requiring a total Soviet warhead inventory much larger than the more than 1000 warheads they now possess. Clearly, in such an event we cannot hope to achieve any meaningful strategic arms limitation.

A second way in which ABM and MIRV affect the possibility of a successful outcome of the SALT talks is through the uncertainties they introduce into the strategic equation. The main uncertainty connected with ABM is the one that has been so persistently raised for more than a decade: How well will it work? The main uncertainty connected with MIRV has to do with the impossibility of knowing how many warheads were actually poised for launch. As is well known, we are fairly confident about our ability to know how many missiles the Soviets have, but, as others have pointed out, it is quite another matter to know how many MIRV warheads each missile carries.

At present, then, each of us, the United States and the U.S.S.R., is fairly confident in his predictions about the results of a hypothetical nuclear exchange, and each is confident that he has a force adequate to deter the other. With ABM and MIRV, this confidence will be greatly weakened, and neither of us will be sure of what we could do to the other, and of what he could do to us. Unfortunately, experience has clearly shown that such gross uncertainties produce an atmosphere in which arms control agreements are practically impossible. For example, for more than a decade, similar uncertainties about detecting underground explosions, combined with wild speculations about the kinds of developments which might flow from a secret series of underground tests, have inhibited any progress toward eliminating such tests and thus achieving a complete nuclear test ban. In the same way, the uncertainties inevitably associated with ABM and MIRV will lead us into a similar morass, and no progress will be possible in the extremely vital area of strategic arms limitations.

In summary, the steady progress of the arms race has led to an equally steady and seemingly inexorable decrease in our national security and safety. Today, the strategic balance is such that strategic arms limitation agreements, which could bring an end to the nuclear arms race, seem possible. ABM and MIRV threaten to upset this balance in a way which will make such agreements impossible, or at least extremely difficult. ABM and MIRV are inseparable; each inspires and requires the other. They must be stopped before it is too late, if we are to avoid another increase in the magnitude of the nuclear holocaust we all face.

Reference and Note

1. An "accuracy of x nautical miles" means that, if a large sample of missiles were fired at a single target, then half of them would fall within a distance of x nautical miles from the target. This measure of accuracy is usually referred to as CEP, or "circular error probable."
2. Report to the Supreme Soviet of the U.S.S.R., 10 July 1969.

NEWS AND COMMENT

South Africa: (II)

University System Follows Apartheid Pattern; Government Enforces Limits on Academic Dissenters

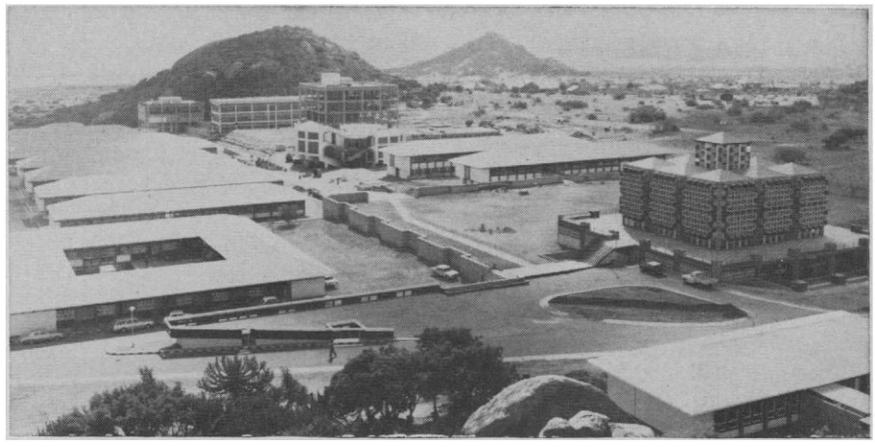
Several of South Africa's English universities have long records of opposition to *apartheid*, but their dissent results in a caricature of the conflicts now commonplace between universities and established authorities around the world. It is a caricature in the sense that the sides are so greatly disproportionate in strength, the reigning national authorities being virtually omnipotent, and the dissenters weak, diffused, and ineffective. Nevertheless, the forms and rhetoric of opposition are amply in evidence. Yes, students and academics in South Africa do sit-in, march, petition, and assail the government on *apartheid*. They do so at what is often considerable personal risk, ranging, at the mildest, from the intimidation of simply being observed by police or informers operating under the Bureau of State Security (BOSS), to confiscation of passports, which is the plight of the novelist Alan Paton and the playwright Athol Fugard, who recently was denied permission to attend the opening of one of his plays in New York. And the risks of opposition extend to midnight arrest, unexplained disappearance, deportation or pressure to leave on a one-way visa, imprisonment, or that South African contribution to contemporary law enforcement, legal banishment, which creates a "nonperson," barred from employment, travel, public assemblage, publication, and mention in public print. In all cases, the repression is "legal," for under two all-enveloping legislative acts, covering "Terrorism" and "Communism," the government's power is virtually unlimited. When whites are involved, there is a tendency to observe the technical niceties of the law, possibly because the South African economy is dominated by an English-derived minority that tends to fuss over proper legal procedure. When blacks are involved, the laws are applied with bland brutality, as was the case with 22 Africans, who, upon being acquitted of charges under the Communism Act, were promptly rearrested under the Terrorism Act and held incommunicado for over a year, until their release just recently. Some 350 Witwatersrand students who marched in their behalf during the spring were arrested and released. At this writing, charges against them, if any, have still not been announced—a status not conducive to further political activity.

Those foreigners who would respond to *apartheid* by extending a blanket ostracism to all things South African are beseeched by white liberals there to ponder that South Africa's miniscule opposition is the first to suffer from the absence of foreign contact (the candid views of nonwhites on this subject,

as on all other political matters in South Africa, are not readily accessible to the short-term visitor). If the South African economy were to be hurt by boycotts, the whites argue, there is no doubt that the impact would fall first on the nation's 15 million nonwhites, many of whom already exist in the vicinity of the subsistence level. The 3.6 million whites, by and large, live well—it is obviously very comfortable to have a white skin and even just moderate means in South Africa—and can be counted on to retain their advantage at whatever price to their dark-skinned countrymen.

So, it should be recognized that an opposition does exist. It is personified in a single parliamentary seat long held by the Progressive Party, which is geographically and spiritually close to the University of the Witwatersrand, in Johannesburg. And in a recent election the Progressive Party increased its national vote to 52,000, out of a total vote of 1.5 million (voting is, of course, restricted to whites), and fell just short of acquiring another seat. At the same time, the ultra-right wing of the ruling Nationalist Party was obliterated. (A student explained this result to me as follows: "It's like the Birch Society is in office, and beats off an attack from the right.") And the Nationalists even lost a few seats to their English-dominated ideological twin, the "opposition" United Party. Thus, there is at least an appearance of political flux in South Africa, and it is intensified by the recurrent complaints of businessmen and industrialists who argue that by restricting nonwhites to menial tasks, the government has produced a labor shortage that is choking the economy. From this, optimists take heart and speculate that change is being forced upon South Africa, regardless of the rantings of pro-*apartheid* ideologists. (The right-wingers who were wiped out in the election offered a kind of "quality-of-life" platform. If lower industrial productivity is the price that must be paid for *apartheid*, they argued, then so be it.)

It is possible that internal pressures are moving the country toward more liberal and humane practices. Perhaps, as I was repeatedly told, the political and social atmosphere is considerably freer now than it was just a few years ago. A first-time, 3-week visitor cannot judge these matters. But repeatedly I encountered evidence of how the system at present effectively operates to allow— and then negate—dissent, evidence of how a fair body of antigovernment rhetoric is tolerated, perhaps for safety-valve purposes, as some contend, but also how dissent is intimidated, de-energized, and almost invariably ignored; also, of how the *apartheid* program is proceeding inexorably, even to the extent of the government having decreed in June that some 700 Johannesburg families will have to divest themselves of live-in black servants. Separation of the races, except for nonwhites coming into white areas to work for whites, is not a racist fantasy. It has already gone a long way and further "progress" is being pushed hard.



University of the North, about 150 miles north of Johannesburg, one of South Africa's three institutions of higher education for the "Bantu" population. The multistory building in the foreground is the library. Under construction toward the background is a multistory laboratory building.

Let us look at academic dissent in South Africa.

The English-speaking University of Capetown (UCT) was founded in 1829, and is the oldest of South Africa's universities. With 7200 students, and an academic program that encompasses all the major disciplines and professions, it is also one of South Africa's largest. And, situated as it is in the country's most anglicized and physically beautiful city, far away from the industrial, booming, Ruhr-like atmosphere of Johannesburg, UCT finds many grounds for pride. High among them is its longstanding and outspoken opposition to *apartheid*. It might be argued that the opposition does little but soothe the soul of UCT; nevertheless, opposition it is, and it bears many of the mannerisms of dissenting activities on campuses in other nations.

In 1959, with 10 percent of its enrollment "nonwhite," *apartheid* became a matter of direct concern for UCT when Parliament adopted the "Extension of University Education Act," the intent and effect of which was to restrict university education on racial grounds. Under the Act, further nonwhite enrollments were prohibited at "white" universities, except in special circumstances, and a system of "university colleges" was established for nonwhites. Since "separate development"—geographical compartmentalization for each racial group—is the operational essence of *apartheid*, the government proceeded to build or expand separate higher educational facilities for each: three for different "tribes" of the so-called Bantus, one for "Indians," one for the "Coloreds"; plus a medical school, under the administration of the otherwise white University of Natal, for nonwhite students. (*Apartheid* makes its mark on medical education not only by requiring segregation of live bodies, but also by prohibiting black students from working on white cadavers. At the white medical schools, however, black cadavers are regularly used.)

UCT, in conjunction with the other major English-speaking university, Witwatersrand, collected petitions and passed strongly worded resolutions in protest against the imposition of *apartheid* on the academic world. Nevertheless, the Act became the law of the land in 1960. UCT commemorated this event with the unveiling of a plaque that reads, in part:

"We dedicate ourselves to the tasks that lie ahead; to maintain our established rights to determine who shall teach, what shall be taught, and how it shall be taught in this university, and to strive to regain the right to determine who shall be taught, without regard to any criterion except academic merit."

Meanwhile, those nonwhite students

NEWS IN BRIEF

● **SEABORG RENOMINATED TO AEC**: Glenn T. Seaborg was renominated last week as a member of the Atomic Energy Commission (AEC) by President Nixon. Seaborg has been chairman of the AEC since 1961; his term will run 5 years.

● **SAFE CAR**: The National Highway Safety Bureau has asked General Motors, Ford, and Chrysler to develop an Experimental Safety Vehicle. The cars will be five-passenger family sedans with many new and unproven modifications, all designed to enable the occupant to avoid accidents or to survive them in much better shape than is currently possible. The cars should be ready in 28 months.

● **FIXED COMBINATION DRUGS**: The Food and Drug Administration has ordered off the market 48 drugs containing fixed combinations of penicillin and sulfa and penicillin and streptomycin. The FDA first published an order to halt marketing of these drugs in June 1969, but appeals by the drug companies delayed action on the order for a year.

● **FAS REVIVES**: The Federation of American Scientists (FAS), an organization which played a significant role in science policy issues immediately after World War II but has since faded into obscurity, has launched a drive to attain greater influence. The organization has appointed a new director, Jeremy J. Stone, an arms control analyst; has expanded its secretarial staff; and has moved its offices from a remote location to 203 C St., NE, close to the Capitol complex, in Washington, D.C. The FAS also plans a drive to boost membership above the 2000 scientists and engineers currently enrolled. Stone hopes to make FAS a "significant force" by setting up some 50 or so "issue committees" and by lobbying at the state and national levels on issues ranging from atomic power to drug abuse to stock market excesses.

● **WHITE HOUSE FOOD CONFERENCE**: The report of the White House Conference on Food, Nutrition, and Health (*Science*, 12 December) is available now. Copies may be obtained for $3 from the U.S. Government Printing Office, Washington, D.C. 20402.

already enrolled were permitted to finish their courses, and, in line with government regulations that permit nonwhites to attend white universities if facilities or programs are lacking at their "own," several hundred nonwhites continue to this day to be enrolled at UCT and Witwatersrand. This is done under case-by-case government dispensations. (These students share educational and dining facilities with whites, I was told, but are barred from campus residential halls and athletic teams.) At the same time, in violation of the spirit but not the letter of the *apartheid* laws, several nonwhites remained on the UCT teaching staff. In this and other ways, UCT officials explained to me, the university signified its opposition to *apartheid*, and sought to maximize its freedom within the law, though, as is befitting an educational institution, they explained, open violations and clashes were avoided. Two years ago, however, a direct confrontation did occur, and it is instructive to examine it as a case study in the form and effectiveness of academic dissent in South Africa.

A young black received a degree in the Department of African studies at UCT, and went on to receive a doctorate in England. He then applied for a teaching post at UCT, and was approved by the various academic groups within UCT that must pass on all staff appointments. However, when the impending appointment came to the attention of the government Department of Education, which is the principal source of financial support for white higher education, it was made clear that the appointment was unacceptable —purely on racial grounds. Two senior administrators at the university gave me the following account of what ensued.

The government warned that if UCT insisted on the appointment, it would enact legislation to remove the few nonwhites who still remained on the faculty. There were also hints of financial reprisal. The administration of the university then withdrew the appointment. This touched off a student sit-in that lasted about a week. The protest, by all accounts, was peaceful, but came close to possible violence when several hundred students from the nearby jewel of Afrikaner higher education, Stellenbosch University, alma mater of most South African prime ministers, marched on UCT with the stated intent of attacking the protesters. (None of the Afrikaner universities accept nonwhites under any circumstances, and, with a few minor quibbles, they back *apartheid* down the line.) The marchers were thwarted by police with dogs, and not long afterward UCT returned to normal.

One of the UCT senior administrators went on as follows:

"We are violently opposed to *apartheid*, but we have to bow to reality. The students tend to operate on ethical principles, but the council and senate are responsible for running this university and we are threatened with the loss of our government grant. We had to withdraw the appointment. Abstract principle is one thing, reality is another."

He continued, "However much I disagree with the government, I feel that a majority of the Afrikaners are decent people. We are not dealing with Nazis."

Then he proceeded to an analysis that I frequently encountered in South Africa, one that put aside the issue of the morality or justice of "separate development" and instead delved into the question of whether it was proceeding at adequate speed, with proper financial support, and tactical matters of that sort. He said, "When the government ordered nonwhites out of the universities, they *did* permit those who were already there to complete their work. And they *did* establish separate universities for the nonwhites. I know that separate is unequal, but they have tried to be decent about this and we can hope that these nonwhite universities will improve."

"Look at the English Newspapers"

A long evening with a scientist from another English university produced the following conversation, considerably condensed here, but substantively intact:

"You don't understand," he said—a remark I frequently encountered—"we *do* have free speech here. Look at the English newspapers. They're full of antigovernment stuff. I've given speeches against government policies."

I pointed out that the leading English newspaper, the *Rand Daily Mail*, had been severely penalized for reporting on torture of political prisioners, and that all political articles were required to carry not only the name, but also the address of the reporter.

"That's true," he said, "but they still do criticize, you have to admit that. I haven't encountered any difficulties when I attack the government. Now, one does have to be somewhat careful. If I'm going to speak out on some issue, I always send a copy beforehand to the

[government] Department of ————. And I try to rely on their own published information as much as possible in making my point. I've got a family and I don't want a couple of Special Branch men showing up here in the middle of the night and asking questions in front of the children. It's just that you've got to be careful. For instance, I check my bookshelves every now and then to make sure that some book I stuck away 10 years ago isn't labeled subversive now. I don't want to give them an *excuse*, that's all. But I still feel I can speak out. Well, yes," he continued, "some things have been suppressed about what's going on in the Bantu areas, but lots of things have been published too."

The conversation proceeded along these lines for a time, and then he said, "Look, I vacillate between feeling that we're in a difficult transition period and that it's working out slowly but all right, and then I feel that we're a damned fascist state without hope. Then I feel that these Afrikaners who are running things are really okay and that we've got to help them against their own right wing. But then I know that a system that ends up with all the suffering that's been inflicted on the Africans can't be right."

On to another subject: "I'm *persona non grata* with the government because of my political views," he said, "but they don't touch my research grants or travel funds. I get what I want. You have to hand it to them. They're decent about that. Anyway, I know they can't touch me. I've got an international reputation and I've got excellent professional connections with a lot of scientists who are close to the government."

"What about Hoffenberg?" I asked, referring to a distinguished medical researcher at the University of Capetown, Raymond Hoffenberg, who was "banned" in 1967 after he became active in a defense fund for political prisoners. (Hoffenberg was subsequently given a one-way visa, and is now on the staff of the National Institute for Medical Research in London. At the time of his banning, Prime Minister Vorster publicly warned that no profession is immune to the internal security laws. An attempt to enlist the South African Medical Association in Hoffenberg's defense was defeated on the grounds that professional societies should not become involved in political issues.)

"Hoffenberg," the scientist said glumly, "Oh, I don't know."

Finally he said, "Okay, I'm making *apartheid* work by teaching at a racially segregated university. But dammit, someone has to teach these people. Is it better for them to be ignorant?"

We turned to the question of foreign boycotts of South Africa, and the decision of Harvard's Jerome Bruner (described in the previous article) to decline an invitation to South Africa on the grounds of his opposition to *apartheid*. "What good is that going to do?" the scientist asked. "Who's that going to hurt? Us or the Afrikaner universities? They support everything the government does, and besides, they don't care about boycotts. They don't have as much to do with the outside world as we do. I could have left this place and got a good post in Britain or the United States. I had plenty of offers. But I decided to stay here, with my wife and children, and fight. And I get furious when these people won't come here. Let them come here and attack the government. They can say things we can't say. But they'd much rather play it holy back there and collect points with their campus radicals by announcing they'll have nothing to do with South Africa. They make me sick."

One of the most striking aspects of the government's response to anti-*apartheid* sentiments is to be found in the manner in which white dissatisfaction is steered into charitable rather than political activity. *Apartheid* has caused enormous suffering among the nonwhites, ranging from soul-cannibalizing humiliation to severe malnutrition among thousands of persons who have been forcibly relocated in accordance with "separate development." It has destroyed families and social relations by forcing well-established communities to move considerable distances from places of employment, without providing adequate transportation for those who must otherwise live close to white areas to hold on to their jobs. [A detailed account of the horrors that have ensued

U.S.-Soviet High Energy Exchange

In a new U.S.-Soviet exchange, a team of American high-energy physicists will travel to Russia this fall to collaborate with Soviet scientists in experiments with the particle accelerator at Serpukhov.

As part of the exchange, two Soviet scientists have been participating in planning sessions since 21 June at our giant accelerator in Batavia, Illinois, plotting out experiments to be made once the accelerator is in operation, a year or two from now.

The scientific exchange climaxes negotiations begun in 1966 and signals new prospects for cooperation between scientists at the world's three largest accelerators—at Batavia, Serpukhov, and the European Organization for Nuclear Research (CERN) near Geneva. The Soviets and Americans had previously conducted experiments in collaboration with CERN, but none with each other.

Last September, Darrell Drickey, a physicist from the University of California at Los Angeles (UCLA), went to Russia with the latest proposals for an exchange. The Soviets at first wanted to trade time on the Serpukhov accelerator for equal time at Batavia, but this proposal seemed too rigid to the Americans and no agreement was reached.

The negotiations seemed destined to fail, but this year the United States unilaterally invited the Soviets to send representatives to the summer session at Batavia. At the same time Drickey received word from Serpukhov that the experiment in which he is to participate (to make measurements of π-mesons) would begin in mid-September. No formal quid pro quo arrangement has been mentioned, Drickey told *Science*.

He will lead the five or six Americans who will be in the group that goes to Russia. Not all of them have been chosen, but most will come from UCLA, Drickey said.

Meanwhile, Soviet physicists P. Ermolov and A. Mukhin are at the 6-week session at Batavia, along with 38 other scientists from the United States, Canada, and CERN. The Batavia officials have arranged for the Soviets to visit the Stanford Linear Accelerator, the Lawrence Radiation Laboratory at Berkeley, and possibly the laboratories at Brookhaven and Argonne.—NANCY GRUCHOW

is to be found in *The Discarded People, An Account of African Resettlement*, by Cosmas Desmond (Christian Institute of South Africa, 305 Dunwell, Jorissen Street, Braamfontein, Transvaal, South Africa). It contains a foreword by the South African writer Nadine Gordimer.] These and other problems arising from *apartheid* and the economically depressed condition of most nonwhites, inevitably disturb many South African liberals. Among their proudest and best-developed responses is an organization that the University of Capetown operates for the city's "Colored" inhabitants. Dating back to 1943, and known as the Students' Health and Welfare Centers Organization (SHAWCO), it is mainly financed with funds derived from the annual student festival at the university. SHAWCO's programs include three medical clinics staffed by university medical students under the supervision of licensed physicians. These clinics offer services without charge, though a token contribution is suggested, and they draw on the voluntary services of some 650 students, three-quarters of the UCT medical enrollment. SHAWCO also provides facilities for nursery classes organized by a Jewish women's organization, and it includes various social and athletic clubs, cultural activities, and so forth. SHAWCO's activities were described to me by Derek Livesay, who became head of its staff 2 years ago, after having been a British magistrate in Zambia and a management trainee with Shell-British Petroleum. Pointing out that SHAWCO was the only social welfare organization that he knew of in South Africa that did not receive some financial assistance from the national government, Livesay said that "this might be due to some political taint."

No Political Involvement

"Prior to my arrival," he explained, "the students ran it and it drifted off into politics. Student activists got in and gave out press releases without sufficient thought as to the consequences. I made it clear that this is a welfare and social organization, not an instrument for telling the government that it's not doing enough for the people of South Africa. One of my main functions is to see that we don't become involved in politics."

Until 4 years ago, he said, SHAWCO operated a night school. "But the government closed it down on the grounds that the government alone is responsible for education." The school has been succeeded, he said, by individual tutoring programs "that are coordinated with local school officials." SHAWCO, he explained, is linked to the municipal authorities through a mainly government-appointed advisory committee. The "Colored" community, he said, is yet to offer any significant financial support, but shows some signs of becoming more involved in the development of SHAWCO's activities. For example, he pointed out, a "Dove Club," established by the Capetown Rotary Club as an offshoot for "Colored" businessmen, was planning an art exhibit at one of the centers. The UCT Medical School contains a number of "Colored" students who are permitted to study there under government dispensation, since the lone "nonwhite" medical school is both crowded and over 1000 miles away. None of these "Colored" students, the head of SHAWCO told me, has volunteered to serve in the clinics. "They're just off the first rung of the social ladder," he said, "and probably are not feeling very charitable."

With rare exceptions, higher education for blacks is confined to three "Bantu" institutions, all of which are located far out in rural regions, and overwhelmingly staffed by whites. Such is the staffing, too, of the university for "Indians," in Durban, and the university for "Coloreds," in Capetown. I visited all but one of these nonwhite institutions, and there is no doubt that considerable expenditure has been made on their capital plant, much of which is modern, attractive, and well equipped, including fairly extensive laboratory facilities and library collections. (At one of them, I was invited to examine the book collection. "We have everything here," the librarian told me, "even Marx.") There is also no doubt that while the dynamics and public relations of *apartheid* and "separate development" inevitably lead to the establishment of nonwhite higher education, the government regards these institutions as potential menaces that require constant political surveillance. In any case, there has been no rush to expand their enrollments. In 1967, South Africa's "Bantu" population was numbered at 12.7 million. The three universities serving this population currently have a total enrollment of 2032. The 10 full-fledged white universities, serving a population of 3.6 million, have enrollments totaling nearly 50,000. The interracial correspondence school operated by the University of South Africa numbers another 20,000 students, the great majority of whom are white.

At all of the nonwhite universities, I was told that inadequate secondary school preparation is the limiting factor on enrollments, and that all reasonably well-qualified applicants are not only accepted, but are also provided with necessary financial assistance. "They work hard," a rector told me, "because they realize that their chance here is one in a million."

Nevertheless, despite the geographic isolation of the "Bantu" institutions—often referred to as "bush colleges"—and the obvious economic advantage that awaits almost any black university graduate, political unrest has sprouted among their students, though in each instance it has been met with prompt repression; and, at present, it is generally agreed, black student politics has been neutralized, or at least forced to submerge. Toward this objective, considerable effort has gone into preventing contact between white and black students, for while white student philanthropy in behalf of blacks is at least tolerated, student political activism that touches on *apartheid* is responded to like fire in a dynamite factory.

Contact Forbidden

Thus, a few years ago, when the National Union of South African Students (NUSAS)—an organization in which the Afrikaner universities decline membership—sought to establish contact with students at the all-black Fort Hare University, authorities there declared contact to be forbidden, though they later switched to the contention that the black students really did not desire contact. According to press reports, 354 of the 641 black students at Fort Hare then marched on the acting rector's office to present a petition protesting the refusal. All of them were immediately suspended and directed to reapply if they wished to continue at the university. Twenty-one of the applicants were permanently dropped from the university rolls. (It was explained to me, "This was handled in a decent manner. They were told that they could work for their degrees in correspondence courses at the University of South Africa.") Not only the Fort Hare campus, but also the entire region was declared off limits to NUSAS leaders, several of whom were later hounded or thrown out of the country by the Special Branch.

This incident, among other matters, came up during an interview with J. M. de Wet, who left a professorship in statistics at the Afrikaner University of Potchefstroom to become rector of Fort

Hare in July 1968, when the "unrest" had already started.

Friendly, talkative, and apparently pleased that *Science* was interested in his institution, he began by saying, "Never a dull moment here. I personally see my task to be to get for African students the very best facilities. I came here to do everything I can for them. And I want to do everything to safeguard their academic standards.

"The sitdown?" he said. "What started that? I wish I knew. We invited them to discuss what they wanted, but they turned it down. They were never aggressive. They were given a time limit to end the strike. When they didn't, the police came and took them away in buses. They're just like the students in America. They want to break things down, but they never offer anything in its place. Last year, I offered to set up a committee of senior senate members and students, but they turned it down. But we are all very friendly."

The rector continued, "Students here can belong to any legal political party. Admission is nonpolitical. But I've told them that I don't like active politics on campus, and that I'll never penalize a student for political activity, as long as it's not subversive."

Of 32 professors at Fort Hare, two are Africans. "We want them to take over this place as quickly as possible," the rector said, "but education is a long process and it will take at least a few decades, and I don't mean two."

I asked why nonwhite faculty members are paid substantially less than their white equivalents, a situation that prevails at all South African universities; in fact, throughout the South African economy.

"There is a very good reason for that," the rector said. "Their living costs are so much lower than ours. But," he assured me, "the Bantus here do very well, compared to what is normal in the Bantu economy. In fact, one of our Bantu professors has a Mercedes."

The published annual report of the rector for calendar 1969 deals with a variety of matters. Among them is a notation that "many of our staff" are members of the local defense force, and that one professor holds the position of "Ethnological Officer at headquarters of the Eastern Province Command." Under the heading, "Subversive Activities," the annual report states: "It is a pleasure to mention that despite the sit-down strike of 1968 probably being fresh in memory, conditions during 1969 were calm and peaceful. It would appear that the students have changed their views. It has truly been a privilege and a pleasure to experience respect and trust in all dealings with students."

While chatting with a white faculty member during a walk through the corridors of one of these nonwhite institutions, he said to me, "I heard you ask about student unrest." I nodded, and he said, "There isn't any now, you know. The student body is full of paid informers, and they chop off any trouble long before it gains headway."

"Where do your students go upon graduation?" I asked. "Oh, there's such a shortage of trained people," he replied, "that they usually find jobs without difficulty. Besides, you can get two Bantu professionals for the price of a white, so why not? They're everyplace, including a few in prison under the Terrorism Act. They're all over."

I attended a sociology class in which the lecturer was slowly dictating while some 50 students copied, word for word, in identical notebooks. The sub-

Nixon Proposes NOAA and EPA

President Nixon submitted to Congress on 9 July executive reorganization plans for the establishment of two new agencies—an independent Environmental Protection Agency (EPA) and a National Oceanic and Atmospheric Administration (NOAA or "Noah"), to be part of the Department of Commerce. These plans, the principal features of which were reported earlier (*Science*, 19 June), will become effective 60 days from the date of submission unless vetoed by either the House or Senate. According to Russell E. Train, chairman of the President's Council on Environmental Quality, congressional reaction to the plans has been favorable.

Establishment of the new agencies does in fact seem assured. EPA, with responsibility for control of air and water pollution and solid wastes, closely resembles the kind of agency proposed in April by Senator Edmund S. Muskie (D–Maine), leader of antipollution efforts in the Senate. It would be made up of units to be transferred from other federal departments such as Interior and Health, Education, and Welfare (the biggest loser will be Interior, which gives up the Federal Water Quality Administration). In fiscal 1971 EPA will have 5650 employees and a budget estimated at $1.4 billion, most of it allocated for sewage treatment works grants.

NOAA also has important support in Congress, especially from members from coastal and Great Lakes states who have been calling for a larger national effort in developing marine resources. It will consist of the Environmental Science Services Administration (ESSA, already in the Department of Commerce, will be NOAA's largest unit) and such other activities as the marine fisheries and marine mining programs from Interior and the sea grant program from the National Science Foundation. NOAA will have about 12,000 employees and a budget estimated at $270 million.

Although the President's plan for EPA will have Muskie's support, EPA will not be given all of the environmental protection functions that the senator believes it should assume. For instance, in his view, the noise abatement program should not remain in the Department of Transportation. Also, he feels that EPA should take over the atmospheric and water monitoring responsibilities of ESSA and the U.S. Geological Survey. However, a major responsibility of NOAA will be to monitor conditions in the oceans and atmosphere and to keep EPA informed of its findings. Similarly, the Water Resources Division of the USGS will provide EPA with data on ground and surface water in the United States.

EPA will assume the functions of HEW's Bureau of Radiological Health and those of the Federal Radiation Council (subject to the President's approval, FRC sets limits as to the amount of radiation to which a person can be safely exposed). But the responsibilities of the Atomic Energy Commission with respect to the licensing of nuclear reactors will not be diminished in any way.—L.J.C.

ject was the relationship between vagrancy and criminal activity. "In the wintertime, the earlier hours of darkness . . . the earlier hours of darkness . . . provide greater opportunity for criminal activity . . . provide greater opportunity . . . opportunity for criminal activity. . . ."

The Future

A common article of faith in the West is that a powerful demand, perhaps an indispensable need, for intellectual and political freedom inevitably accompanies the science and technology that are required for economic and industrial development. In support of this belief, note is often taken of the shaky economic condition of the Soviet Union, where a good number of prominent scientists and academics have long argued that ideological restrictions and police-state tactics are hurtful to the development of a modern industrial society. What relevance does this argument have for political evolution in South Africa, particularly in regard to *apartheid*?

My impression is that it has some, but not very much. South Africa, unlike the Soviet Union, has shown itself to be highly supple in dealing with its academics' insistence, or illusion, that they require intellectual freedom to "do their stuff" for the nation. After all, there is an opposition press, an opposition party with parliamentary representation, a student movement, and Marx is to be found on the library shelf of a "bush college." Those who cannot stomach the atmosphere are either viciously trounced upon, deported, or they quietly leave to work elsewhere. Those who stay are increasingly well rewarded, though as is the case with scientists elsewhere, they frequently contend they are unappreciated. There has been a voluntary "brain drain" in recent years, but its political ingredient is difficult to identify in the worldwide traffic of scientists and engineers who go abroad for professional opportunities or salaries that are unavailable at home. But I was told in many places that with the decline of job opportunities in the United States and Great Britain, and the rapid development of research facilities in South Africa, the "brain drain" has appreciably slowed. In fact, at least half a dozen research administrators reported a sudden and nearly unprecedented flow of applications from American and British scientists seeking employment in South Africa.

But if an academic possesses belief in tolerance in human relations, how does he reconcile his presence in, and contributions to, a society that is constitutionally and operationally organized on the premise that some 80 percent of its citizens are inferior? "It takes some getting numb to," said an American scientist who has been working in South Africa for several years.

For those who remain sensitive, there is, of course, the opportunity—within bounds closely scrutinized by the government—to oppose the system. Such opposition involves no little courage; also no great, if any at all, effect. But it is at least rewarded with a sense of fighting a worthy fight. One student leader said, "Nazi universities are damned for not opposing Hitler. They're not going to be able to say that we didn't put up a fight." He added, however, that he found it to be a hopeless one, and that he was seriously considering leaving the country.

Will the needs of the economy erode *apartheid* simply because of the hunger for trained labor and the spread of education? There are those who say this is already happening. However, if *de facto* slavery can be imposed on gold miners and domestic servants, it is difficult to see why the same cannot be done to computer programmers. With modern police-state methods—and South Africa is not laggard in this field—many things are possible, for racism has bedrock foundations in South Africa, and the problem of making the whites still richer need not inevitably involve an extension of humanity to the blacks. Education and high technology do not necessarily produce generosity.

In this regard, a small incident is perhaps worth relating. I was with a white South African—a decent, well-turned out chap is how they would describe him there; a university graduate occupying a medium-level position in his professional hierarchy. On an extremely sunny day, we passed a tattered-looking black who was wearing sunglasses. My companion said, "Look at that silly bugger. His ancestors were out in the sun for millions of years and *he* has to wear sunglasses."—D. S. GREENBERG

Medical Schools: Portents of National Health Insurance

After World War II, a lot of people believed that health care problems in the United States would be solved if only the medical schools would increase their production of physicians. Today the question of how physicians are utilized looks just as critical as how many physicians there are. And the medical schools are again being nominated to lead us out of the health crisis by taking the initiative in reorganizing the delivery of health services.

The biggest contributor to the shift in assumptions was experience with Medicare and Medicaid, which proved that increasing the effective demand for medical services without substantially increasing resources or reforming the delivery system resulted in drastic rises in costs and strains on service.

However urgent the need for change, the medical school faces real difficulties in filling the role of agent of reform. A few medical schools are tottering on the edge of bankruptcy, and certainly many others are practicing financial brinkmanship. Few medical schools, public or private, are able to afford extensive curriculum reform or the community-service projects and experiments with the health care delivery system which must precede serious reform of the health care system.

Facing deeper deficits than ever, the medical schools, in some desperation, are looking to the federal government—whence came their help in building biomedical research after World War II.

Despite widespread recognition of a health crisis, there is no real sign that help is on the way. Neither the Administration nor Congress, or for that matter the medical profession or the increasingly potent groups representing the users of medical services, have a clear idea of a practical design for a reformed health care system or how to achieve one.

What is happening, nevertheless, is that pressure is mounting rapidly for creation of a National Health Insurance (NHI) program, which would expand on Medicare and Medicaid. It can reason-