

## RESEARCH REPORTS

*Reviews of new research by public agencies and private institutions*

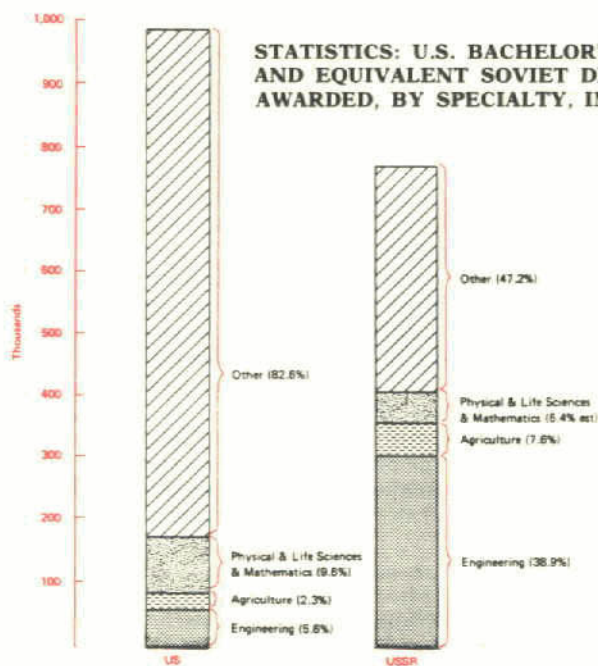
### "The Science Race: Training and Utilization of Scientists and Engineers, US and USSR."

SRI International, 1161 North Kent St., Arlington, Va. 22209. 280 pp. \$22.50.  
Authors: Catherine P. Ailes and Francis W. Rushing.

The Soviet Union's startling success in launching its Sputnik satellite in 1957 spurred the United States to invest heavily in education and research in the sciences. But American fears of technological inferiority gradually faded, especially after the Apollo landing on the moon in 1969, and the U.S. science effort slackened. Moscow, meanwhile, steadily continued its scientific advance and today threatens to open a real technology gap with the United States.

America still enjoys several advantages over the Soviets. It spends more on education (7.3 percent of GNP versus 5.3 percent in the Soviet Union in 1977), has more four-year college graduates (15.4 percent of the population versus 6.7 percent with equivalent degrees in the Soviet Union), and has a more educated population, on average.

But Ailes and Rushing, senior science policy analyst and senior economist, respectively, at SRI Interna-



Courtesy Crane, Russak and Company, Inc.

tional, write that Soviet education is far more heavily oriented toward scientific and technical training.

The Soviet emphasis on science education begins early. Biology instruction commences in the fifth grade, physics in the sixth grade, and chemistry in the seventh. American students take up such courses later and for shorter periods of time—56 percent of all American students in grades nine through 12 took no science courses at all in 1973. Soviet science students at the college level also receive more intensive training. They spend from one-and-a-half to two times as many hours in class as their American peers do.

On the other hand, the United States has far more college students (10 million versus the Soviets' five million in 1978) and graduates about twice as many specialists in the physical and life sciences and mathematics. The Soviets, however, produce six times more engineers. At the graduate level, about 75 percent of Soviet students are enrolled in engineering or scientific fields, as compared to only 20

percent in the United States (down from 30 percent in 1960).

The result: Although in 1950 the two countries had equal numbers of engineers, by 1974 the Soviet Union had a threefold advantage. Meanwhile, the American lead in natural scientists dropped from 2:1 to 1.5:1.

The Soviets face several disadvantages in scientific competition. The training their scientists get is so narrowly specialized that it poorly equips them to master new knowledge or cope with technological advance. In addition, the Soviets misuse the talents of many of their scientists and engineers, thanks to bad planning and an inefficient system.

The United States, say the authors, does not suffer from those constraints. Its handicap is "the failure of the leadership . . . to grasp the necessity for a stated national policy for development of scientific and engineering manpower." Needed: school curricula revisions to strengthen mathematics and science instruction, more mathematics and science teachers, and more spending on scientific research.

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### **"Marijuana and Health: Report of a Study by a Committee of the Institute of Medicine, Division of Health Sciences Policy."**

National Academy Press, 2101 Constitution Ave. N.W., Washington, D.C. 20418. 188 pp. \$11.25.

"What little we know for certain about marijuana's effects on human health—and all that we have reason to suspect—justifies serious national concern."

That—despite some optimistic press accounts that have emphasized scientists' uncertainties—is the major conclusion reached by a committee of the National Academy of Science's Institute of Medicine after surveying the existing research on marijuana.

Marijuana's well-known short-term effects are themselves cause for alarm.

Normal "social" doses of marijuana impair judgment, coordination, and motor skills; the drug may rival drinking as a hazard when an individual is driving.

But research also shows that, for hours after the initial "high," marijuana impairs short-term memory and causes a distorted sense of time. The drug makes coherent thought and learning difficult. These effects wear off, but they may represent lasting, if indirect, damage to those high school students who are intoxicated during

school. (Close to 400,000 seniors use marijuana daily.)

Marijuana can cause unpleasant sensations, even among regular users; 33 percent of them, one study found, at times experienced "acute panic, paranoid reaction, hallucinations, and unpleasant distortions in body image." Extremely heavy users run the risk of "acute brain syndrome," in which clouded consciousness and disorientation may persist for days. Clinicians have long noted the "amotivational syndrome" in heavy users. Symptoms include apathy and a decline in school or work performance. Scientists do not know whether marijuana causes this condition or whether it merely satisfies and aggravates a pre-existing inclination. Nor can they say whether marijuana causes any permanent psychological changes.

Prolonged use of marijuana leads to

inflammation of the lungs and airways, but when use ceases, the process is reversed. Marijuana smoke is similar in many ways to tobacco smoke—and so it is likely that, inhaled over a period of 20 years or more, it too causes cancer of the respiratory system.

Marijuana may reduce male fertility and alter levels of reproductive hormones in females; its active ingredients may pass from a pregnant woman to her fetus; it may affect chromosome segregation during cell division; it may suppress the body's immune system, which provides protection against infection. Not all those effects are known to be harmful. Indeed, whether they are, in fact, effects of *marijuana* is unclear from available evidence. But given the drug's widespread use and its effects that *are* documented, there seems to be reason for worry.

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### "Cuba in Africa."

Center for Latin American Studies, University Center for International Studies, University of Pittsburgh, 4E04 Forbes Quadrangle, Pittsburgh, Pa. 15260. 230 pp. \$5.95.

Editors: Carmelo Mesa-Lago and June S. Belkin.

During the late 1970s, Cuba, a small, Caribbean nation plagued by economic problems, dispatched upwards of 40,000 troops to fight in two African wars, in Angola and in Ethiopia. Why, and at what cost?

Mesa-Lago, director of the University of Pittsburgh's Center for Latin American Studies, along with Harvard's Jorge I. Domínguez and 11 other specialists on Cuba and Africa, offer some answers.

The view that Cuba acted as a "puppet" of the Soviet Union is, the specialists agree, an oversimplification. Fidel Castro's Cuba is heavily dependent on the Soviet Union but still has *some* discretion in foreign policy—at least

in places of only marginal interest to the Soviets, such as Angola. In fact, Cuba may have drawn the Soviets more deeply into Angola than otherwise would have been the case; in Ethiopia, however, Moscow may have pushed for heavy Cuban involvement.

No clear consensus emerges, however, about the Cubans' motives. Did they hope primarily to advance the socialist cause, as one specialist insists? Or did they, as another argues, act out of self-interest, hoping to increase their influence in the Third World and their leverage with the Soviets?

During the 1970s, the perceived U.S. threat to Cuba's security diminished,

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leaving the Castro regime freer to act with vigor abroad. But deployment of Cuban troops in Latin America would have risked confrontation with the United States and put the Soviets in a difficult position. Giving aid to "progressive" forces and governments in Africa was, in that sense, safer.

From the mid-'60s to the mid-'70s, Cuba provided arms and training to the Popular Movement for the Liberation of Angola (MPLA), one of three rival nationalist factions. When South African troops intervened in October 1975, the desperate MPLA asked for Cuban soldiers—and got between 18,000 and 24,000 of them, transported, when necessary, by Soviet aircraft. By playing David to South Africa's Goliath, Cuba won increased prestige among African and "non-aligned" nations—and so became a more valuable Soviet ally. That gained Cuba more Soviet aid. And, in an MPLA-run Angola, Cuba secured a potential source of oil, should Soviet deliveries be reduced.

Unlike Angola, the Horn of Africa was strategically important to the Soviets. The coast of Eritrea, an Ethiopian "annexed colony," faces the southern strait of the Red Sea, part of the key waterway linking the Mediterranean and the Indian Ocean.

During 1976–77, after the 1974 overthrow of its pro-Western emperor, Haile Selassie, Ethiopia shifted into the Soviet camp. This dismayed its neighbor, Somalia, whose "Marxist-Leninist" government had received Soviet and Cuban aid. Soviet-Cuban efforts to mediate the resulting Ethiopian-Somali conflict failed, and Soviet and Cuban aid to Ethiopia increased. During the early months of 1978, some 17,000 Cuban troops ar-

rived, in Soviet transports. Soviet advisers played a key role in the successful campaign to drive the Somalis back over the Ethiopian border.

Cuba's services in Ethiopia reinforced its "privileged relationship" with the Soviets; by the end of 1978, Moscow was underwriting the Cuban economy at an annual rate of over \$2.5 billion compared to the average rate of \$550 million during the early '70s.

Yet Ethiopia was not the diplomatic "plus" for Cuba that Angola may have been. Siding with the repressive Ethiopian regime required Cuba to abandon not only Somalia but also the Eritrean People's Liberation Front, which Cuba had aided when it was fighting Haile Selassie. That revived suspicions among non-aligned nations about Cuba's motives.

Finally, the domestic costs of Cuba's overseas exploits have been high, quite aside from the (unknown) Cuban casualty figures. Between 1973 and 1978, Cuba's announced (and understated) military budget went from 400 million pesos to 784 million (\$1 = 0.80 pesos). The adverse impact on the Cuban economy was "heavy and extensive," and probably not offset by Soviet aid. One additional cost was the postponement of "normalization" of U.S.-Cuban relations, with its attendant benefits, notably an end to the U.S. economic boycott of the Castro regime.

Roughly 19,000 Cuban soldiers are still in Angola; another 17,000 in Ethiopia.

The six contributors to this report who offer any predictions, Mesa-Lago notes, agree that Cuba's involvement in Africa during the 1980s "will be significantly smaller or less spectacular than it was in the 1970s."