

ford faculty, administrators, and trustees, are involved in the manufacture of military communications equipment and reconnaissance and surveillance systems. Applied Technology, for instance, whose directors include E. Finley Carter (President of SRI, 1959-63), William Rambo (Professor of Electrical Engineering at Stanford and Director of the Stanford Electronics Labs), and Oswald Villard (see above), contributes to the manufacture of reconnaissance and surveillance systems for military aircraft in use in Vietnam.

Granger Associates, whose directors include the man who may well have directed SRI's communications research, Allen M. Peterson (Professor of Electrical Engineering at Stanford and Assistant Director of the Electronics and Radiosciences Division at SRI), manufactures military communications equipment. Granger's directors also include Frederick Terman, Stanford Vice-President and the man the Sunday Times most credits with creating the Stanford complex; and David Packard, Stanford trustee, director of SRI, U.S. Steel, and General Dynamics, a member of the Advisory Board to the Hoover Institution, and recipient of Stanford's Distinguished Alumnus for 1966 award, presented at the Stanford-Air Force game last year.

AERO-CHEMICAL WARFARE

In its 1957 study for McDonnell, SRI's researchers remarked that weapons limitations "are not inherent in a definition of limited warfare." Scientists at Stanford and SRI have since been prominent in researching, developing, and testing a variety of internationally prohibited chemical warfare agents. This research began in earnest in 1959, when Professor Philip Leighton and Dr. William Perkins of Stanford's Department of Chemistry set to work on the "Meteorological Aspects of CBR Warfare." The project was divided between Stanford and the U.S. Army Chemical Corps Proving Ground at Dugway, Utah, which serves as the principal station for field-testing chemical and biological munitions.

In the January 13 issue of Science, Elinor Langer noted that their work was to "improve the knowledge of the effects of meteorological conditions on the behavior of aerosols and particulates." Its scope was total—"the development of new models to describe diffusion processes, and the behavior of particulates in downwind travel from all source types, for all climate and vegetation and terrain situations." In June 1961, their research had progressed to the point where "trials [were] being conducted in a mountain-valley complex... a contract [was

to] be let on tropical rain forest canopy penetration."

The significance of this research becomes clear when one knows that five of the seven chemical agents currently listed in the Army field manual, "Employment of Chemical and Biological Agents" (1966), are disseminated as aerosols, while the other two are "airborne." And, as Miss Langer points out, "the idea of disseminating infectious [BW] agents by aerosols ... seems to be displacing earlier notions about how to transmit disease."

While Perkins and Leighton were discovering for the Chemical Corps how aerosols behaved, researchers at SRI were discovering how to make them. Chemical Corps work in 1959 to obtain "fundamental information on the formation of encapsulated aerosols for possible application to the solution of problems on the dissemination of chemical agents," apparently led, through similar contracts in 1960 and 1961, to a three-year contract in 1963 "for investigations of incapacitating chemical materials" (\$1.1 million), and in 1964 to a still-continuing contract for "the dissemination of chemical solid and liquid materials" (\$2.5 million).

SRI has worked with CS, "one of the more recently developed agents of the general tear-gas type" (Langer). In use in Vietnam, according to the Army, it is employed to "flush out" unmasked enemy troops from concealed or protected positions." As photographs have made clear to us all, the gas finds other victims.

THE SRI LOBBY

SRI's military contracts are not always concerned with counterinsurgency, of course. One recent contract is for "research on interaction between U.S. and U.S.S.R. military postures, programs, and strategies, and use of such interaction to mold Soviet military behavior." And SRI has recently won contracts totalling \$1.5 million for a "study and evaluation of potential effectiveness of Nike-X antimissile missile system," something in which the electronics firms with directors who are Stanford trustees, or faculty, or SRI directors, are very much interested.

Management at SRI has always been concerned with the health of the war (and space) economy and with that of Pacific Basin capitalism. Although worried in 1963 that "possible extensions of agreements between the United States and the Soviet Union" might reduce "defense expenditures," Weldon Gibson, then SRI Executive Vice-President, found in 1964 "indications that short-term losses over the next few years may be recouped later in the decade with new developments in anti-missile missiles or a new gen-

eration of strategic weapons." He seems to have been right on both counts.

Gibson's interest has not been limited solely to California war industry; rather it has extended to "developing" the Third World and the "world struggle against communism." In April of this year he directed the first meeting of the Pacific Industrial Conference, attended by "business leaders from 29 nations," the theme of which was "Free Enterprise and Pacific Development." Now Director of SRI International and of the Pacific Indonesia Business Association, Gibson's mission has widened. In August, together with 200 "senior executives," he descended on Jakarta for a four-day meeting to discuss Indonesia's "economic problems" and advise "government and business leaders about possible solutions."

According to a March 25 article in Business Week, Gibson sees "great potential for SRI in the Pacific because of the rapidly developing triangle trade among the U.S., Japan, and Australia." Part of that trade is between Marcona Co., holder of a recent 30-year lease on Peru's iron, and the Japanese steel industry. Ernest Arbuckle, Dean of the Stanford Business School and present Chairman of the Board of SRI, is a director of Utah Construction and Mining Co., which owns 50% of Marcona and manages its business. Utah also builds B-52 bases in Thailand, where SRI has three "teams" working in "Project Agile," the Pentagon's "world-wide counter-insurgency research program." Arbuckle is also a director of Castle and Cooke, Inc., which owns Dole Philippines and 50% of the Thai-America Steel Co. Among his other directorships are many with the electronics firms in the Stanford Industrial Park.

THE STALEY PLAN

The Stanford complex has long been concerned with the political and economic development of South Vietnam. When, on his return from Vietnam in June 1961, then Vice-president Johnson announced a special mission to Vietnam "to work out cooperative measures for the meeting of that country's most pressing financial, military, and political needs," Eugene Staley, an SRI senior economist, was appointed to head it.

Staley is supposed to have spent six weeks in Vietnam, most of it in Saigon, and to have recommended increases in military and economic aid to the Diem dictatorship—"measures which could restore security within 18 months." Commentators from the USIA's Douglas Pike to the author of the Republican Blue Book credit Staley with creating the "strategic

hamlet" plan, but he maintains that he merely advised an expansion of the "agroville" program beloved of Diem and Nhu, urging that they concentrate on safeguarding the inhabitants rather than controlling them. Whether or not the difference between the agrovilles and the strategic hamlets is qualitative, the dangerous naivete of Staley's anthropology and politics is apparent.

Now a Professor of Education at Stanford, Staley is a kind and honest liberal, in a liberal dilemma. Red-baited in the '50's for such things as backing foreign aid and the United Nations, he was hard-pressed to defend his internationalism. In 1954 he wrote that "it is part of our interests that there should be prosperous markets at home and abroad for the products of our farms and factories, and a plentiful supply of the things we need to buy, including raw materials, that, to an increasing extent, are needed from abroad." Furthermore, "three quarters of the imported materials included in the United States stockpile program for critical and strategic items come from underdeveloped areas, for example...virtually all of our natural rubber, manganese, chromium, and tin."

In the 1961 revision of his best known book, *The Future of the Underdeveloped Countries: Political Implications of Economic Development*, Staley set out the terms for U.S. control of these strategic supply bases. He noted that "nations can achieve security only through some world system which will protect all of them by preventing war," and argued that "we face today the problem of strengthening the defenses of the non-Communist world against the demonstrated readiness of the Communist bloc to expand by any means, including military force and internal subversion."

Another SRI senior economist, William Bredo, has been more recently involved in Vietnamese affairs. After completing a study for AID on the "Development of the Cam Ranh Bay: Evaluation and Strategy," Bredo embarked on an AID project to draw up a land reform program which the Agency will then attempt to press upon Saigon. In the project proposal submitted to AID, SRI put great stress on its understanding that "it is considered most important at this time to... produce political results that will contribute to winning the war."

"WAVE OF THE FUTURE"

Ernest Arbuckle, Chairman of the Board at SRI, maintains publically that he wishes to reduce the Institute's dependence on government contracts (75% this year)—for economic, not moral reasons. That he will be able

to do so is doubtful; the Stanford complex is likely to continue to demand and get such weapons research as it needs. Already, according to the March 25 article in *Business Week*, Arbuckle has been "called to Washington to pledge that top people would be kept working at SRI's Strategic Studies Center, which is doing advance work on military systems."

"We have been pioneers in creating a new type of community... a com-

munity of technical scholars'... composed of industries utilizing highly sophisticated technologies, together with a strong university that is sensitive to the creative activities of the surrounding industry," said Frederick Terman, Vice-president of Stanford, in 1965. "This pattern appears to be the wave of the future."

Some call it a military-industrial-university complex at war with half the world, and ride a different wave.

MACE: WEAPON FOR THE HOMEFRONT

by BEVERLY LEMAN

UNDER the rubric of "tear gas" an ominous family of chemical weapons is making its way through police departments throughout the country. Code-named General MK II, MK IV and MK VII, the most well-known is Mace (MK IV). Unlike the common tear gas, CN, which has also seen increasing domestic use in recent months, none of the MK agents contaminates a large area. Instead, they incapacitate their victims with direct hits of chemical spray which "attacks a person's nervous system, leaving him stunned" (*N.Y. Times*, 10/18/67). Their cumulative effects make tear gas look old-fashioned.

Each of the MK agents is an aerosolized spray encased in either a 12", 20" or 26" billy club, a hairspray sized canister (Mace) or a pocket cartridge, sold only to "law enforcement organizations." Produced by General Ordnance Equipment Company, a Pittsburgh Manufacturer, the agents contain CN, Phenylchloromethylketen and "other proprietary chemicals along with activators and carriers in an erosol can.... The exact formulation is confidential and can, therefore, not be revealed" (letter from GOEC marketing manager).

GOEC's brochure for Mace (subtitled: "A new concept in handling dangerous situations") states that:

It "fires" a heavy shotgun pattern of droplets, at a range of up to 15 feet.... Upon facial contact... it envelops assailant with his own small 'cloud' of tear-gas from which he cannot escape.... A burning sensation commences and the reaction of the liquid on the skin immediately generates the tear-producing vapors.... The victim suffers temporary loss of vision accompanied by pain that is incapacitating even though only temporary in nature."

What Mace does to the nervous system is not said. Reporters who were hit by Mace during the Oakland disturbances in October said that the effects

lasted 30-40 minutes. But there is evidence that every one of the MK agents may cause more permanent damage.

RECENTLY, an organic chemist who had access to the GOEC specification sheet informed this writer that Mace contained dimethyl-sulfoxide—DMSO—an industrial solvent which is a byproduct of the pulp and paper industry. A few years ago, medical researchers discovered that DMSO displays the remarkable ability to instantly penetrate skin tissue, providing immediate absorption and circulation for any drug it carries.

Since 1964 DMSO has had a complex and controversial history. Its remarkable ability to "permanize" other drugs has led medical researchers in malaria control to suggest that it might be used to impregnate the skin with insect repellent for long periods of time. From its experimental use with schizophrenics, it has been discovered that DMSO might control the chemical penetration of brain tissue and thus alter the transmission of nerve signals. In September 1964, Wyeth Laboratory, which had been testing DMSO for possible distribution as a miracle "carrier" for heart patients and others who require emergency drug treatment, first noted DMSO's dangers. In experimental animals it caused severe eye damage: abnormal changes in the refractive index of the eyes and cataracts. However, Wyeth did not report these effects to the FDA until November 1965, at which time all testing of the chemical was suspended.

IN AN October 1966 meeting in New York, the N.Y. Academy of Sciences assailed the FDA for withdrawing the compound altogether and issued a formal request for reinstatement as a controlled investigational drug. On December 12, 1966, the FDA acquiesced on condition that its approval was obtained

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