

But the manner in which this election is held is of equal importance to its outcome. If the election is held in such manner that the people of South Vietnam are satisfied that it was fairly held, so that the will of the people has been expressed on an intelligent and informed basis, the "other war" which must be won as well as the military war will be well on the road to victory.

We recognize that there are special problems which obviously prevent an election being conducted there as if it were being conducted in the United States, Japan, Korea, the Philippines, or some other country which is not suffering the torment of war within its borders. Thus, for example, it is most understandable that the ruling junta only yesterday ratified its decree barring pro-Communist or pro-neutralist candidates from running for President; although, as pointed out by Richard Critchfield in today's Washington Evening Star:

Pro-neutralist is usually narrowly defined in Vietnam as someone who advocates forming a coalition government with the Viet Cong.

After the violence and terror which the Vietcong and North Vietnamese invaders have deliberately brought to so many people in that country, the junta's action would be expected, if not demanded, by the great majority of the people.

Government censorship already exists in South Vietnam, and there is nothing particularly new or unusual about this, taking into consideration the circumstances. There is no absolute right of free speech, and the right can vary in its dimensions according to the circumstances. However, people the world over who live in a democracy have come to expect that free speech will receive its maximum recognition during political campaigns. This, of course, does not mean that libel and slander are to be permitted. Nor would it seem proper to permit someone sympathetic with the Communist cause to masquerade under some other cloak than a pro-Communist or pro-neutralist in order to abuse free speech by taking the Communist or neutralist line. But there should be no Government censorship of issues which are vital to the future of the Government of South Vietnam and which trouble a great many of its people—issues such as land reform, education, the economy, corruption in the Government itself, and the like. These are matters which demand free speech in election campaigns. They are not matters which should be subjected to Government censorship. These are matters which candidates should be permitted to discuss openly, without fear of reprisal. Newspapers and other press media should be permitted to carry campaign advertising and to report fairly and fully what the candidates say about them. Editorial comment should, of course, be permitted to confirm and support or to ridicule and rebut statements by candidates. But the general voting public must have an opportunity to hear and read about the issues if it is going to be an informed electorate.

Thomas Jefferson once wrote that the success of a democracy depends, not

alone on the will of the majority, but rather on the will of the "enlightened" majority. The right of the individual citizen to know about the candidates and the issues is, of course, balanced by his responsibility to be informed. But the responsibility cannot be carried out without the right.

The eyes of all Asia and of many countries throughout the world will be focused on South Vietnam to see how this election is conducted. If it is conducted in keeping with the right of the people to know, the new Government will stand well, not only with its own people, but with other governments which pay heed to the right of their citizens to know.

It might be helpful for the Asian Pacific Council to send observers to South Vietnam during the month preceding the election to make suggestions to the Government regarding its censorship policies and to report to the Council regarding the freedom of speech and of the press which prevail during the election campaigns.

The Council is an informal association of Pacific states, consisting of Korea, Japan, Nationalist China, Malaysia, Australia, New Zealand, the Philippines, Thailand, and South Vietnam. Each of these countries is deeply concerned over the war in Vietnam, and most of them are directly involved. Each must know that an election in South Vietnam, resting on a solid foundation of democratic principles, will mean a shorter war and a quicker return to peace in their area. At the same time, the Government of Vietnam should welcome an opportunity for observers from its allies and other friendly nations to certify that genuinely free election campaigns were permitted. This would give the lie to Communist propaganda to the contrary which is almost certain to come.

Mr. President, I yield the floor.

WORKER RECRUITMENT PROGRAM OF RHODE ISLAND

Mr. PELL. Mr. President, I again invite the attention of the Senate to an imaginative and viable approach to the problem of recruiting employees to fill the present acute labor shortages in certain areas of my State. I refer to the worker recruitment program conducted by the Rhode Island State Employment Service. This effort is a neighborhood, door-to-door search by individual interviewers seeking those who wish full or part-time employment. This service particularly affects those individuals who wish to combat the pressure of rising prices by supplementing their income through employment. In this group we find the housewife and the retiree, who have learned job skills which are not being fully utilized.

I am happy now to report the progress of this program, as indicated by the status report submitted to me by the Rhode Island Department of Employment Security. One of the most interesting facts found in the report is the ratio of total man-hours spent canvassing to the total number of job placements. From March 1 to March 31, in the city of Pawtucket, R.I., it was found that 66

hours of canvassing produced 15 job placements. During a more extended period, in Providence, R.I., 464 man-hours of effort by RIDES employees placed 306 people and eased the labor shortage of manufacturers.

Especially significant to me, Mr. President, is the fact that out of these 306 placements, some 21.9 percent came from the 16 through 21 age group, wherein unemployment is an extremely serious problem. This apparent responsiveness of youth to the door-to-door canvassers should be noted. It indicates not only a desire to work, but also the possession of skills to fill available job openings.

This unique placement approach of the State employment service eliminates the unfortunate impersonality inherent in some bureaucratic agencies. People are responding because individual interpersonal contact is achieved. They are made to feel needed and are therefore eager to contribute their services to the employer.

This program, Mr. President, is a successful, continuing one which merits widespread adoption. It will be most successful, however, as part of a series of programs in an all-inclusive approach which provides for training and retraining to make available the skills required by our ever-increasing technology. I must reiterate that such imaginative and effective programs as I have mentioned should be examined and adopted if we are to fulfill our commitments to the American people and the aims of the Manpower Development and Training Acts, as amended.

CALIFORNIA LEGISLATURE CONSIDERS BILL TO OUTLAW GENOCIDE

Mr. PROXMIER. Mr. President, it has recently been called to my attention that the Legislature of the State of California is presently considering a bill designed to outlaw the crime of genocide in that State. Assemblyman Lester A. McMillan, of Los Angeles, introduced AB 141 on January 17 of this year and hearings were held by the committee on criminal procedure on April 18, at which time it was taken under submission to be considered later with another bill on the same subject, AB 2535 by Assemblyman Sieroty.

Mr. President, this is a grave reflection on the Senate. That elected officials of the State of California have taken such action is, at the same time both commendable and reprehensible. I commend Assemblymen McMillan and Sieroty for having taken the initiative in a praiseworthy effort to establish the commission of genocide as a crime in the State of California. At the same time, I express my own regret that the Senate which could have and should have outlawed this crime by ratifying the Genocide Convention has failed to do so.

Indeed it is the Senate of the United States and not the Assembly of the State of California nor the legislatures of any of our States which should proscribe the commitment of a crime so atrocious as genocide. It is up to us, Mr. President, to ratify the Convention on the Prevention and Punishment of the Crime of

Genocide, a treaty which was presented to us 18 years ago by President Truman, a treaty upon which we have not yet acted.

In the hearings before the California Legislative Committee on Criminal Procedure, an old and thoroughly discredited refrain was sounded once again by a handful of opposition witnesses: "My God was murdered by a minority group—the Jews." Several scriptural references were cited to emphasize divine distrust and contempt for all Jewish people.

It is this sort of distorted ranting which, unfortunately, the Senate has failed to refute. By stepping forward and atoning for our inactivity of 18 years, we shall also be moving in the direction of peace and human dignity. We are being asked today by the citizens of California, indeed by the citizens of the world, to act favorably upon the Genocide Convention. Let us not disappoint them any longer.

ABM

SYSTEMS OF NUCLEAR DEFENSE

Mr. TOWER. Mr. President, this month's issue of Fortune magazine contains a perceptive article written by Richard J. Whalen, concerning systems of nuclear defense and the effect of the present Soviet buildup upon U.S. policy in this critical area.

Mr. Whalen—formerly a member of the Fortune board of editors—is presently with the Georgetown University Center for Strategic Studies.

I ask unanimous consent that the article be printed in the RECORD.

There being no objection, the article was ordered to be printed in the RECORD, as follows:

[From Fortune magazine, June 1, 1967]

THE SHIFTING EQUATION OF NUCLEAR DEFENSE (By Richard J. Whalen)

(NOTE.—The author, a former member of Fortune's board of editors, is currently writer-in-residence at the Georgetown University Center for Strategic Studies.)

On his desk in the Kremlin, Nikita Khrushchev used to keep a laser-scarred piece of steel, a reminder to himself and visitors of the potential for Soviet superiority in advanced military technology. He often dreamed aloud of the terrible wonders of the future, as when he said in 1960: "The armament which is being created and which is to be found in the folders of the scientists and designers is truly unbelievable." In his bold Cuban missile adventure, Khrushchev impatiently ran ahead of his strategic weaponry, and the retreat from the brink led to his overthrow. But the promise symbolized by the prized piece of steel also fascinates his dour, methodical successors. Under their more efficient management, Soviet scientists, engineers, and technicians are turning ideas into hardware at an accelerating rate. The current swift buildup of Soviet strategic offensive and defensive systems reflects Moscow's evident determination to forge ahead in a new technological arms race.

The U.S., preoccupied with Vietnam and anxious to preserve the hope of détente, has made a studied effort so far not to overreact. Addressing the Russians early this year, President Johnson spoke of the common "duty" to slow down the race and warned that a renewed arms spiral "would impose on our peoples, and on all mankind, an additional waste of resources with no gain in security to either side." He proposed negotiations to halt the Soviet deployment of antiballistic-missile (ABM) defenses, re-

ceiving in return Soviet Premier Aleksei Kosygin's unenthusiastic consent "to discuss the problem of averting a new arms race, both in offensive and defensive weapons." While negotiations have not even begun, Soviet ICBM and antiballistic-missile deployments are continuing.

The one-sidedness of concern is increasingly apparent and puts U.S. leaders under rising pressure. Secretary of Defense Robert McNamara, overriding for the second time the unanimous recommendation of the Joint Chiefs of Staff, has further deferred the crucial decision on whether to begin production of the U.S.'s own Nike-X antiballistic-missile system. McNamara argued his position at length before Congress last January, and later circulated a confidential memorandum among his staff, the military, and defense contractors, urging the widest possible dissemination of the message contained in his Congressional Posture Statement.

"The foundation of our security," McNamara declared in his statement, "is the deterrence of Soviet nuclear attack. We believe such an attack can be prevented if it is understood by the Soviets that we possess strategic nuclear forces so powerful as to be capable of absorbing a Soviet first strike and surviving with sufficient strength to impose unacceptable damage on them." McNamara conceded that the kind and amount of damage the United States would have to be able to inflict to provide this deterrent "cannot be answered precisely," but he ventured the "reasonable" assumption that the destruction of one-fifth to one-fourth of the Soviet Union's population and one-half to two-thirds of its industrial capacity "would certainly represent intolerable punishment." The U.S. ability to inflict such punishment, regardless of Soviet defensive counter-measures, is the key to the deterrence philosophy of "Assured Destruction."

But McNamara went further in his remarkable document, which may deserve a place among the most important state papers of our time. The Secretary gave the Russians cost-effectiveness advice on their own best defense interests. "If our assumption that the Soviets are also striving to achieve an Assured Destruction capability is correct, and I am convinced that it is," said McNamara, "then in all probability all we would accomplish by deploying ABM systems against one another would be to increase greatly our respective defense expenditures, without any gain in real security for either side." This line of reasoning was clearly intended to reinforce the President's plea to the Soviet leaders for negotiations on arms limitation. But it fell on some ears in Washington, particularly those of well-informed members of Congress, as disturbing evidence of the amount of faith that U.S. defense policy was putting into a hypothetical equation under rapidly shifting circumstances.

THE UNEASY ENVIRONMENT OF SURPRISE

The experts who read the intelligence reports on Soviet activity are aware, as the public is not, that the enormous U.S. advantage in weaponry and technology of the 1950's and early 1960's is steadily being narrowed. Not only has the Soviet Union run harder; the U.S., wishing to avoid leading an arms race, has also deliberately limited production and deferred deployment of major new offensive and defensive weapon systems. The Russians, in effect, have been told: "We won't build it if you won't." The appealing notion has prevailed that weapon technology stands on a "plateau." As former White House scientific adviser Jerome B. Wiesner declared in 1963, the "scientific military revolution" has "stabilized."

The limited nuclear test-ban treaty, which ushered in the present period of search for a détente, has been widely interpreted as a

joint U.S.-Soviet admission that further arms competition was pointless. A "stalemate psychology" has spread, which takes for granted and even discounts the military superiority the U.S. has enjoyed throughout the trials of the cold war. Reductions have been made in "soft" first-strike weapons such as bombers, and the U.S. missile deterrent force, after rising rapidly throughout the early Sixties, is now leveling off. It consists of 1,000 Minutemen, 54 Titan IIs (to be phased out in 1970), 656 missiles aboard 41 Polaris submarines (about half of which are on station at any given moment), and 680 strategic bombers, which will be cut back to 465 in 1972. From a peak of \$11.2 billion in fiscal 1962, U.S. outlays for strategic forces declined to a low of \$6.8 billion in fiscal 1966 and stood at \$7.1 billion in fiscal 1967.

The relatively stable level of R. and D. spending over this period conceals a significant shift in emphasis, away from innovation and toward refinement of existing weapon systems. The U.S. has chosen not to maintain the initiative, while the U.S.S.R. has visibly bent every effort toward seizing it.

Now a new era is opening in which the U.S. and the U.S.S.R. can be expected to possess increasingly comparable military technology. Far from being an omen of "stability," that elusive nirvana of the thermonuclear age, the environment of near parity promises to be extremely unpredictable and therefore marked by much apprehension. The U.S., to be sure, has carefully hedged against foreseeable Soviet capabilities; over the past few years, for example, more than \$1 billion has been spent to prepare advanced warheads and sophisticated penetration aids to defeat the newly installed Soviet ABM defenses. However, this kind of hedging leaves the U.S. vulnerable to surprise in the form of an unforeseen or successfully concealed weapon advance on the Soviet side.

In a congressional hearing more than a year ago, General John P. McConnell, Air Force Chief of Staff, warned: "We know . . . the Soviets today are engaged in a massive program of research and development in military weapons systems of all types. In a program of such great scope, the possibility of technological surprises or dramatic breakthroughs cannot be overlooked, particularly when such surprises could erase the margin of strategic superiority which we currently enjoy." In spite of improved U.S. satellite surveillance, the Russians have simultaneously improved their skill in the arts of concealment, and they are now capable of deploying weapons that the West has never seen tested.

Close observers of the unfolding Soviet R. and D. enterprise worry because the adversary has a dynamic view of military capability and strategy, as contrasted with the static conception of technology and strategy implicit in the U.S. posture. Deterrence depends not only on existing forces; it also depends on the adversary's state of mind. The very rationality of Soviet leaders, which the U.S. relies upon to restrain attack, could find in advancing technology the incentive to consider the gamble of a first strike. A veteran analyst of the nuclear balance observes: "Never has fundamental strategy been so sensitive to a few—a very few—technical parameters."

The intentions of the uncommunicative Soviet leaders are a mystery, perhaps even to themselves, but it requires a minimum of theorizing to grasp the point of what they are currently doing. They are altering the existing balance of strategic forces that favors the U.S., and they are doing it at a pace that startles the most knowledgeable American students of Soviet military capability. Just two years ago McNamara said the Soviet leaders "have decided that they have lost the quantitative race, and they are not seeking to engage us in that contest." Now Pentagon authorities are no longer sure. In contrast

to the earlier false alarms of the bomber and missile "gaps," based on projections of potential that went unfulfilled, the present rate of confirmed Soviet hardware deployment is forcing upward revisions of Russia's potential.

NOW WE SEE THE THREAT

Soviet production of intercontinental missiles has surged ahead, from an annual rate of 30 to 40 in 1962 to 110 to 120 last year, and this rate appears to be accelerating. Since Khrushchev backed down in the missile confrontation of the fall of 1962—and the date is relevant because of the long lead times involved—the operational Soviet ICBM force based on land and sea has grown from fewer than 75 to an officially estimated 470 (as of October, 1966) and a likely current figure of close to 600. By mid-1968, according to informed estimates, land- and sea-based Soviet ICBM's could leap to between 800 and 900, or more than half the U.S. force. And there is no reason to assume the Soviets will halt there.

The rapid growth in numbers, however, is less significant than the qualitative improvements, apparent and suspected, between the first and second generation of Soviet ICBM's. Two new missiles—the SS-9 and the SS-11—have been identified as entering the operational inventory in dispersed and hardened silos. The SS-9 is a large three-stage missile propelled by storable liquid fuel, which is not necessarily a sign of inferiority when compared to solid-fueled U.S. missiles. Storable liquid and semi-liquid fuels provide greater thrust than solids. The SS-9 is roughly comparable in size to the U.S. solid-fuel Titan II, but it carries a warhead twice as heavy, estimated at over twenty megatons. The SS-11 is a small single-stage missile, propelled by either solid or storable liquid fuel. It resembles the early Minuteman in range and ability to carry a similar one-megaton warhead.

The Russians, well ahead of the buildup schedule assumed until recently by American defense planners, are fast approaching a critical point in the development of their ICBM force. If their missiles are equipped with the advanced warheads and the more accurate guidance systems known to be within their technical ability, their force could quickly become a real threat to the hardened Minuteman missiles that are the backbone of the U.S. deterrent. In designing the U.S. deterrent forces, Pentagon planners have weighed the alternatives open to an aggressor: a strike against our cities; a "counterforce" strike against our retaliatory missile sites; or a combination strike aimed at some key population centers and some portion of the land-based ICBM's. The U.S. has sought to deny an aggressor the "counterforce" option by building and deploying a thousand Minutemen, presumably a large enough number of targets to be safely beyond the productive and economic capacity of the Russians. This estimate on their capabilities has new been rudely shaken.

"As recently as a year ago," says a high-ranking officer in the Pentagon, "we didn't think the Soviets could get a counterforce capability. Now we see the threat." It could materialize by the mid-1970's.

THE "NEW MATH" OF MIRV

The U.S. itself has discovered how to use a single ICBM launcher to carry several individually propelled warheads, which can be guided accurately to different targets hundreds of miles apart. The multiple individually guided reentry vehicle, known as MIRV, could revolutionize nuclear strategy if the Soviet capability should match our own.

The strong side of Secretary McNamara's philosophy of deterrence is apparent in the improvement of U.S. striking power. The entire front end of new missiles is being redesigned. The land-based Minuteman III,

scheduled to replace the Minuteman I, and the submarine-launched Poseidon, the successor of the Polaris A-3, will be equipped with MIRV, decoys, and penetration aids. When they are in place within the next three years, McNamara declares that these formidable missiles will surely be capable of penetrating the Soviet anti-missile defenses currently being deployed. And so they doubtless will—if they are ever fired in anger.

By preparing to meet a changing offensive threat and defensive capability with an improved offense only, however, McNamara displays the weak side of his strategic philosophy. The development of MIRV in missiles means that a new way of calculating striking power is needed, and therefore a new way of appraising the U.S. deterrent. The long-vaunted U.S. lead in ICBM boosters, currently estimated at three to one, no longer provides the reassurance it once did, and Pentagon officials now quietly downgrade such rough numerical comparisons. As McNamara himself said in his Posture Statement, "It is not the number of missiles which is important, but rather the character of the payloads they carry; the missile is simply the delivery vehicle."

He did not add that, with all the additional payload weight resulting from multiple warheads and penetration aids, the thrust of the delivery vehicle also becomes a critical factor—and in the case of the U.S. at the present, a sharply limiting factor. Except for the relative handful of Titan II's, which are scheduled to be phased out, the lift capacity of U.S. missiles averages about one megaton for each booster. Soviet boosters, in contrast, can carry an average warhead load of more than seven megatons. If these missiles are, in addition, capable of being fitted with multiple warheads, the U.S. booster advantage of three to one over the Russians could quickly become a fiction. The new SS-9 could be fitted, at least in theory, with ten or more individually guided warheads. In one fashion or another, MIRV introduces a new kind of missile math—a relatively inexpensive means for the U.S.S.R. swiftly to achieve parity or better with the U.S. in terms of deliverable megatonnage. They are known to have tested the components of a multiple-warhead system. Therefore, U.S. watchers on the outside, peering through the cracks in a closed society, are anxiously anticipating an operational capability because of the short lead time involved. As little as eighteen months could separate our discovery of a MIRV development program and the operational deployment of Soviet missiles carrying multiple warheads. Those who would know whether such a development program has been detected are quite properly silent.

THE IMPLICIT AND EXPLICIT THREAT

The memory of the nonexistent ICBM "gap" debated during the 1960 presidential campaign may prompt a certain skepticism toward the potential new danger implicit in a Soviet resort to multiple warheads. This time, however, the Soviet missiles that might be fitted with such warheads already exist; the numbers are growing rapidly; and the new missile math suggests the advantages of their going the route of MIRV if they can. The kind of targeting problem that the U.S. poses for Soviet war planners provides the logic for traveling that route. The major U.S. cities, in which population and industry are concentrated, have long been the presumed targets of a relatively few Soviet ICBM's fitted with high-yield warheads. So long as an ICBM could deliver only one warhead to one target, the small Soviet missile force was believed to be checkmated by the sheer number of U.S. Minuteman and Titan missiles in their dispersed and hardened silos. But the problem of multiple targets could be brought temptingly near "solu-

tion," however Soviet planners may define it, through the use of multiple warheads on their growing missile force.

Until last year MIRV was considered so secret that even members of the congressional defense committees had not heard about it in executive session. Reports of multiple-warhead contracts were published in the technical press late last year, and discussion began in earnest last November when McNamara announced the accelerated program to produce and deploy the Poseidon in the Polaris fleet. Oddly enough, within four months after MIRV came into public view, it was abruptly covered up again by the Secretary's order. No longer a secret, it has become an un-word scarcely ever uttered in the Pentagon. "It's ridiculous, this trying to stuff the genie back in the bottle," comments a dissenting official. "Apparently we're concerned that the Soviets might be alerted to their own capability. It's part of trying not to be provocative."

THE MOVE TO ABM

The mounting uncertainties facing decision makers in the White House and the Pentagon center on the Soviet construction of extensive new ABM defenses. Reconnaissance satellites and monitoring radars alerted the Joint Chiefs of Staff to this activity in 1965. In January, 1966, McNamara secretly briefed the members of the congressional defense committees, and last November he publicly disclosed that the U.S. had "considerable evidence" of the Soviet ABM deployments without being specific about their nature and location. However, he declared: "I think it is important that we assume [the Soviet ABM system] is effective, and, of course, that will be the assumption on which we base the development and deployment of our own ICBM's." This prudent assumption leaves unanswered the urgent question: how effective are the Soviet defenses?

The U.S. possesses a good deal of intelligence data, but it does not support definitive judgments. If experience counts for anything, as it surely does in this esoteric realm of weaponry, the U.S.S.R.'s capabilities should be taken very seriously. It is known that the Russians, heeding their doctrinal imperative of balance between offensive and defensive military forces, began concurrent development of missiles and anti-missiles as early as 1948. By the early 1960's they had built what was apparently the prototype of a defense system aimed against medium- and intermediate-range missiles, and they deployed it at Leningrad. U.S. intelligence rated this system capable of handling as many as five targets simultaneously, but it was regarded as ineffective against ICBM's. In a rare secret session of the Senate in April, 1963, Senator Thurmond, of South Carolina, a member of the Armed Services Committee, warned that Russia had an operational ABM system, and he urged that the U.S. proceed at once with the Nike-Zeus, then ready to go into production. Soon afterward, the U.S. turned to the improved Nike-X system (see "Countdown for Nike-X," *FORTUNE*, November, 1965).

The Zeus ABM system, which grew out of the Nike-Hercules anti-aircraft defenses deployed in 1958, had a limited range and "kill radius," and its effectiveness against a large-scale attack was doubtful. The successor Nike-X (the X stood for "unknown") exploited major breakthroughs in radar technology, which greatly increased the number of targets the system could handle; and it also supplemented the Zeus missile with a new high-acceleration interceptor, Sprint, which was designed to provide last-ditch defense against ICBM's that got past Zeus. Even with the improvements, however, the Nike-X remained a "point" defense intended to protect a single target by engaging in-

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coming ICBM's in a "bullet-to-bullet" duel in the atmosphere. An "area defense," which would protect several targets at once, would be much more effective, but this kind of ABM requires a long-range missile equipped with a large warhead that can intercept ICBM's above the atmosphere. In 1965 the U.S. began development of such a missile, named the Spartan, which will replace Zeus in the Nike-X system. But by this time the Russians had abandoned the Leningrad ABM and were well along in the development of more advanced concepts.

Incomplete and often contradictory information currently available on the Soviet antiballistic-missile defenses has caused some divergence of opinion within the U.S. intelligence community. There is no question that an "area defense" system has been deployed in the vicinity of Moscow. The command center, containing radar scanners and computers, is a multi-level structure built entirely underground. A large phased-array radar is located northwest of the city, and it is integrated with small tracking radars at several points.

THE TALLINN ABM SYSTEM

A quite different type of installation has appeared in an arc extending several hundred miles along the northwestern border of the country, and this is the focus of disagreement within the U.S. Known as the "Tallinn line" after the Estonian city where one of the defensive sites has been detected, this deployment has been subject to various interpretations: as an advanced anti-aircraft system, another type of ABM, or perhaps a combination of both. Existing Soviet SAM-2's and SAM-3's would seem to provide ample defense against aircraft, particularly in view of the declining U.S. reliance on bombers. Moreover, the line sits athwart the principal "threat corridor" of land-based missiles launched over the North Pole from the U.S. It is the unanimous judgment of the Joint Chiefs of Staff that the Tallinn line is an anti-missile system, but McNamara so far remains publicly unpersuaded.

In addition to the Moscow and Tallinn deployments, informed sources report a great deal of activity elsewhere in the Soviet Union at existing anti-aircraft installations and new sites as well. Some of these sites are in the South and may represent the early stages of defenses directed against Polaris missiles launched from U.S. submarines on station in the Mediterranean. Other sites spotted east of the Ural Mountains face Red China. The small tracking radars along the Tallinn line apparently are tied together with the phased-array radar at Moscow. As evidence of such links accumulates, the likely scope of Soviet ABM plans expands, confirming McNamara's statement to Congress last January: "... we must, for the time being, plan our forces on the assumption that they will have deployed some sort of an ABM system around their major cities by the early 1970's." Not only the cities, of course, would be defended, but also military installations, particularly hardened offensive missile silos within a vast territory.

MEETING MIRV IN MID-COURSE

Debate continues inside the Pentagon concerning the characteristics of the antiballistic missile (or missiles) that the Russians are deploying. In November, 1963, a missile was shown in a Moscow parade for which the Russians claimed an ABM capability. Western officials, who code-named the missile Griffon, were skeptical, and inclined toward the belief that it was primarily intended for interception of supersonic aircraft and their air-to-surface missiles; but they did not rule out the possibility that it had been developed originally to counter the medium-range Thor, Jupiter, and Polaris A-1. Griffon was not credited with an exoatmospheric (above the atmosphere) range, though some observers, reflecting now on the pace of subsequent

Soviet advances, believe it should have been. An advanced model of Griffon, in fact, may be deployed on the Tallinn line; or the ABM missile there may be one the West has never seen.

The missile used in the Moscow ABM system was first shown a year later than Griffon, in 1964, when tractors dragged it through Red Square coyly concealed in its protective canister. Given the unglamorous code name Galosh, it is believed to be a solid-fueled, long-range interceptor carrying a high-yield warhead. Estimates of Galosh's range cluster around a few hundred miles, comparable to the Spartan missile the U.S. is now developing. But a minority opinion maintains it could have a much longer range, perhaps as much as 2,000 miles.

This minority view begins with the fact that the best antiballistic-missile system the U.S. has been able to devise uses two missiles and several types of radar. It is suggested that Galosh, the only missile deployed at Moscow, may combine the long range of Spartan with the high acceleration of Sprint, the companion short-range interceptor of the Nike-X system. If this is the case, or if the missile used in the Tallinn line has such a performance capability, the Soviet Union could engage incoming ICBM's far away from their territory and above the atmosphere where fallout would not be a problem—in mid-course of the missiles' trajectory, before multiple warheads and penetration aids could separate. An effective mid-course ABM would provide a formidable defense against multiple warheads.

An experienced defense scientist cautions against overdrawing Soviet capabilities from scant information ("generalizing from the heel of the dinosaur"), but he adds: "If you're honest, you can't say flatly that the Soviets can't do what some people say they are doing. We just don't know."

WEAPONRY IN THE VOID

Easily the most important area of uncertain knowledge, and one where secrets and doubts are kept most carefully guarded, concerns the effects of high-yield nuclear explosions in the thin upper atmosphere and above. This is the environment in which our own and Soviet ABM missiles would function. Questions about the precise "kill mechanism" of an ABM have aroused intense speculation and prompted official reassurance, with the result that the known facts often get lost in a welter of alarming or comforting words. Much of the confusion is penetrated by a scholarly, relentlessly factual new book, *The Test Ban Treaty: Military, Technological, and Political Implications*, by James H. McBride (Regnery), which draws together the highlights of eighteen months of hearings conducted by two Senate committees on the treaty that attempted to curb the fearful competition in nuclear-weapon technology.

"All witnesses agreed," McBride writes, "that at the current state of the art in nuclear technology the greatest need for nuclear testing is in the area of weapons effects..." Again and again in the quoted testimony, the word "void" crops up, as when Dr. John S. Foster Jr., then director of the Lawrence Radiation Laboratory and now director of Defense Research and Engineering, told the Foreign Relations Committee: "The most serious void has to do with the effect that nuclear explosions have on the operation of the system, whether it is an offensive or defensive explosion or an offensive or defense system." This point is absolutely critical because the U.S. has adopted a second-strike posture, which means its weapons must survive the effects of a first strike and then penetrate enemy defenses to destroy their assigned targets.

The effects of nuclear weapons vary principally with their design and yield and the altitude at which they are exploded. (Other

factors, including the time of day a weapon is exploded, also play a significant role.) The predominant effects of weapons designed to be detonated in the atmosphere are blast and heat; weapons for use above the atmosphere are designed to maximize the release of energy in the form of radiation, the most useful effect in this environment. Witnesses who testified during the test-ban hearings generally assumed that the U.S. held a marked lead in the technology of smaller-yield (one megaton and below) weapons while the Russians were well ahead in the very-high-yield (twenty megaton and above) range.

The advantage in the intermediate range (one to twenty megatons) was open to debate, but there was no arguing the fact that the Russians, during their massive 1961-62 test series that broke the *de facto* moratorium, had exploded many more weapons than the U.S. in this intermediate range both in the atmosphere and above, providing them with the opportunity to learn more and apply their knowledge. The Soviet tests clearly had been planned years in advance. Among their seventy-one shots were proof tests, weapon-system tests, effects tests, and tests with missiles and radar. The Russians, obviously extending their ABM technology, on two occasions during the tests launched an ICBM, intercepted it with a nuclear blast, and then fired a second missile, presumably to determine whether its warhead was affected by the radiation resulting from the prior explosion. They also studied the black-out effects of the blasts on their radar.

THOUGHTS ABOUT AN UMBRELLA

Such sophisticated Soviet tests could not have been matched at the time by the U.S. In the summer of 1958 the U.S. had detonated its first high-altitude explosions, code-named "Teak" and "Orange." These megaton-range explosions produced astonishing results that clearly heralded the dawn of a new era in weapon effects. Communication links in the Central Pacific were blacked out for several hours, and satellites detected charged particles trapped in the earth's magnetic field. In the Argus series that quickly followed, the U.S. exploded three kiloton bursts, which disrupted shortwave radio and radar and again produced man-made belts of charged particles. The creation of these belts suggested, at least in theory, the possibility of a transient "shield" or "umbrella" ABM defense, provided the particles could be created in sufficient density. However, U.S. scientists concluded that the belts formed by the Argus shots were too weak to injure a warhead passing through them at five miles per second. Even so, the U.S. at least discovered that the obvious ABM problems of early warning, discrimination, and precision tracking could be greatly compounded by the mysterious effects of high-altitude nuclear explosions.

Following the Soviet tests, the U.S. staged a hastily prepared and politically restricted series in 1962-63, which provided valuable data but also disclosed great gaps in our scientific knowledge. Dr. Edward Teller, testifying on the test-ban treaty, revealed that the U.S. had not even completed theoretical studies of some of the high-yield effects the Russians had actually tested. Impressed by recurrent descriptions of the "void" in U.S. nuclear technology, the Senate Preparedness Subcommittee concluded that the treaty "will affect adversely the future quality of this Nation's arms, and... will result in serious, and perhaps formidable, military and technical disadvantages."

With the signing of the treaty banning atmospheric testing, the U.S. put its ingenuity to work underground and discovered that more could be learned there than its experts had believed. Under a top-priority program, the Atomic Energy Commission has been staging low-yield, directional explosions in deep, instrument-crammed tunnels

from which the air has been pumped to simulate as nearly as possible the vacuum of space. But the apprehensions brought to light almost four years ago in the test-ban hearings have scarcely been buried. At bottom, the present controversy over the Soviet ABM capability revolves around whether these half-forgotten fears of technological surprise are now being realized.

Recent uninformed speculation has suggested the possibility that the Russians, by exploding very-high-yield weapons above the atmosphere at the proper altitude and latitude, might be able to create dense belts of charged particles and so establish a "shield" type of ABM defense. U.S. scientists, extrapolating from data provided by tests of much-smaller-yield explosions, are reported to have erred by a factor of 1,000 in estimating the number of such particles that would be caused by a 100-megaton blast. The AEC isn't saying what its latest calculations have disclosed, but a high-ranking AEC official emphatically declares: "Right now, we don't see how the effects of any radiation belt could be made to persist." An impressive body of scientific opinion, within and outside the government, says there is no technical foundation for theorizing about what a Pentagon R. and D. official calls the "ping," or residual umbrella defense. Before the man-made radiation belts could achieve a particle density lethal to warheads the earth's magnetic field would prove too weak to support them, and the umbrella would "leak."

THE ANTIMISSILE THAT GOES "ZAPP"

The improbability of a "shield" form of defense does not rule out other possible defenses using radiation effects. Quite the contrary; the U.S. intends to use such effects in the improved Nike-X system now under development. The Spartan missile carrying a warhead of more than one megaton will rely upon what is believed to be the most efficient anti-missile defense above the atmosphere—the so-called "zapp effect," that is, the tremendous surge of thermal or "hot" x-rays produced by a high-yield explosion. As Dr. Foster has explained to the Senate Armed Services Committee: "Nuclear explosives have a very small surface area to them . . . When they release [their] energy, they get very, very hot. A small surface that has to release enormous energies in a very short time cannot do so without getting so hot that it radiates its energy away. This radiation [is] . . . of such a temperature that it is in the x-ray region."

As much as 75 percent of the total energy of the detonated ABM warhead would escape in the form of such x-rays and flash over thousands of miles in the near-vacuum of space. Within the much smaller "kill radius," which would vary with the yield and design of the warhead and the altitude at which it was exploded, the thermal x-rays would deposit their immense energy within any unshielded object, such as a missile warhead, causing its components to explode internally. An ABM system using the x-ray effect can provide an "area defense" covering thousands of square miles with relatively few installations. Moreover, the requirements for guidance accuracy are greatly reduced, a factor worth bearing in mind when the Soviet radars are described as somewhat "crude."

The U.S. takes the x-ray threat from Soviet ABM defenses seriously enough to be engaged in costly modification of missiles whose components are vulnerable. For example, the fine gold wires (which readily absorb x-rays) are being replaced in the guidance computer circuitry of the Minuteman II, and the change is being incorporated into the design of Poseidon and Minuteman III. Because reflective coatings used to protect a missile nose cone from the heat of re-entry are ineffective against thermal x-rays, new hardening techniques and shielding materials are being sought. The test ban makes

it impossible to expose such materials to actual thermal x-rays and underground explosions are no substitute, so experimenters are using newly created electron beams of comparable energy—beams capable of depositing energies inside a test material a thousand times greater than the pulse from the most powerful production laser.

U.S. missiles have been modified more than once to counteract any unforeseen or newly arising hazard. During the test-ban hearings, many military officers, nuclear scientists, and informed Senators dared not give publicly a major reason for their opposition to the treaty. They feared that the Russians, through their high-yield testing, had discovered a kind of "ultimate ABM," and might be able to use nuclear-weapon effects to turn much of the U.S. missile force into a Magnot Line. An offensive first strike would simultaneously achieve a defensive objective, not only destroying American cities with blast and heat, but also creating electromagnetic pulse (EMP) effects extending well beyond the radius of destruction that might deactivate the electronic systems of missiles in their silos. The U.S. has since revised the electrical circuits in the Minuteman silos, and has modified and shielded missiles, warheads, computers, and guidance systems to protect them against electromagnetic pulse. These countermeasures, of course, can be only as effective as our grasp of such phenomena.

GROWING DOUBTS, BRAVE CERTAINTIES

Last fall, an extraordinary study known as "Strat-X" (for "Strategic Exercise") was launched by Secretary McNamara's order to lay out the full range of alternatives for improving the posture of U.S. offensive forces through the mid-1970's. Strat-X will evaluate offensive missile and warhead designs in terms of different sea and land basing options, and it will weigh the resulting force "mixes" against various levels of threat from the Soviet Union and Red China. In this study the Nike-X is being considered only for the defense of U.S. offensive missile forces—not cities. This shift of emphasis is striking because up to this point the whole debate about Nike-X has concentrated on its use in city defense. This new turn in the thinking of key officials is a clear indication of the changing Soviet threat. A preliminary report will go to the Secretary in a few weeks and a final report is due in September. Little has been said about this highly secret study, and an official in the Office of Defense Research and Engineering tersely summarizes the objective of Strat-X: "more survivable payload." Another high defense official, concerned about appearances, confides: "From the outside, it may look as though we're not sure of the deterrent. That's not so. We are sure."

The determined air of confidence in the upper reaches of the Pentagon does credit to earnest men performing difficult tasks. What worries informed observers on the outside is the apparent assumption that the U.S. can safely confine itself to reacting within familiar parameters to a changing threat. The perils of losing the initiative are coming plainly into view. In a recent speech Dr. Harold Agnew, the forty-six-year-old head of the weapon division at the AEC's Los Alamos Scientific Laboratory, said the "apparent drift in national policy on the concept of balance of power and stability is resulting in a stifling of innovation." Because U.S. scientists are authorized to build or consider only those systems that respond to a clearly defined threat, "We are continually in danger of coming up with answers to threats which have changed." The prevailing official attitude of certainty may not take account of a steadily widening range of uncertainty.

THE ULTIMATE UNBALANCING FACTOR

It is Secretary McNamara's firmly held conviction that the possession of secure "sec-

ond-strike" (retaliatory) missile forces by both the U.S. and the Soviet Union creates a stable condition of mutual deterrence. As he told a British television interviewer earlier this year, ". . . technically it's a relationship that's very difficult for either of us to move out of unless the other simply fails to act in a rational fashion." By deploying antiballistic-missile defenses, the Russians, according to McNamara's logic, are behaving irrationally. The U.S. has reacted by making preparations to upgrade its offensive missile forces to the point where the effect of the Soviet defenses will be negated and the prospect of "Assured Destruction" by a U.S. second strike will be maintained. However, the hoped-for maintenance of stability depends not only on the U.S.'s estimate of the situation, but also on the Soviet Union's, and the Russians are clearly moved by their own judgments and not McNamara's. Their belief that they have upset the U.S. deterrent would be, as McNamara himself has declared, "The ultimate unbalancing factor."

In the radically altered strategic circumstances that may lie just ahead, the Russians could begin to doubt the U.S.'s capacity and willingness to inflict unacceptable damage upon them. As General Earle G. Wheeler, Chairman of the Joint Chiefs of Staff, testified earlier this year: "Should the Soviets come to believe that their ballistic-missile defense, coupled with a nuclear attack on the United States, would limit damage to the Soviet Union to a level acceptable to them, *whatever that level is* [italics Fortune's], our forces would no longer deter, and the first principle of our security policy is gone."

It should always be remembered that the vast U.S. deterrent force exists solely to influence Soviet behavior. If it ever must be used, deterrence has failed and catastrophe looms. The threat of its use was a rational instrument of national policy during the days of overwhelming U.S. preponderance under Eisenhower and Dulles, and even as recently as the Kennedy Administration's eyeball-to-eyeball confrontation with Khrushchev. Now, however, such a U.S. threat made in the face of the Soviet offensive buildup would amount to an irrational summons to mutual suicide. The Russians soon may be able to use their deterrent to inhibit the U.S. and gain for themselves greater freedom of maneuver. Short of an all-out Soviet attack, it is difficult to imagine a provocation sufficiently extreme to warrant U.S. resort to the means of assured self-destruction.

Though the emerging second-strike capability on both sides may satisfy the definition of "stability" favored by McNamara and the Pentagon's defense intellectuals, this symmetry of opposing offensive forces is upset by the Soviet commitment to ABM defenses. Add to this the possible first-strike, counterforce use of the proliferating Soviet ICBM's and "stability" vanishes. Though offensive capabilities may match up neatly, intentions and therefore uncertainties do not. The deterrent equation is in danger of becoming unbalanced by the one-sided shift of uncertainty to the U.S. side.

U.S. behavior is already being influenced by the Soviet deterrent. The likely failure of the diplomatic attempt to talk the Russians out of their "worthless" ABM defenses has forced the U.S. into offsetting offensive steps involving major spending—e.g., the \$3.3-billion accelerated development and deployment of Poseidon. And the anticipated Soviet counterforce capability is shifting all serious discussion of deploying Nike-X—at least within McNamara's sphere—from defense of cities to defense of "super-hardened" Minuteman silos.

WOULD THE PRESIDENT PUSH THE BUTTON?

If present trends are allowed to continue and U.S.-Soviet forces grow more asymmetrical, the situation by the mid-1970's could become menacing. An ABM defense lends

itself superbly to bluffing and blackmail. The mere existence of Soviet defenses would exert psychological influence on both sides. It is easy to imagine a suddenly belligerent Soviet attitude toward Western Europe. Would the undefended U.S. react strongly if the defended U.S.S.R. appeared willing to risk war? It is possible to imagine a threat aimed directly at the U.S. itself, perhaps even the execution of the threat by the obliteration of a selected city. Would the President choose automatically to avenge the limited number of dead Americans by ordering a response certain to end civilized life in this country? Soviet planners, as they "war game" with the forces of the 1970's surely ask themselves such questions.

The U.S. must soon recognize that a gradual but almost certainly irreversible change is occurring in the nature of deterrence. The Assured Destruction concept, founded on the superiority of the offense in modern warfare, has been challenged by technology and its application to defense. The technology of missile defense is now advancing more rapidly than the technology of offense. The relative costs and effectiveness of ballistic-missile defense are measured within the Pentagon through the "cost-exchange ratio." A few years ago, the high costs and ineffectiveness of defense were officially expressed in a cost-exchange ratio of between 10:1 and 100:1—that is, every \$100 spent on defense could be offset by spending from \$1 to \$10 on increased offense. Now, however, by Secretary McNamara's own reckoning, the ratio is between 4:1 and 1:1, or parity. Of course, such numerical comparisons take no account of the relative burdens imposed on the U.S. and Soviet economies by higher arms spending. If the technological trend continues over the next decade, defense could gain a margin of superiority.

The improving prospects for defense are welcomed by the Russians, as their respected military commentator, Major General Nikolai Talensky, has written: "The creation of an effective anti-missile missile system enables the state to make its defenses dependent chiefly on its own capabilities, not only on mutual deterrence, that is, on the good will of the other side." More is involved here than a Soviet state of mind that Secretary McNamara dismisses as "an absolute religious fanaticism on the subject of defense." Another Soviet military strategist has emphasized the balanced nature of the emerging Soviet offensive-defensive deterrent: "It must be remembered that victory in war is determined not merely by the character of weapons but by the *relationships of forces of the combatant sides.*"

In future psycho-political conflict, which uses weapons as manipulative symbols, the decisive advantage could lie with the side that possesses defenses. Even though these may be ineffective, the undefended side cannot determine this without exposing itself to mortal risk. A situation in which *both* sides had defenses would balance uncertainties and might well produce greater stability than the previous state of anxious nakedness.

The case for a prompt U.S. commitment to a limited deployment of Nike-X is compelling. Though Secretary McNamara argues that an antiballistic-missile defense would not reduce American casualties "in any meaningful sense," a Nike-X system might save thirty to fifty million lives and as General Wheeler testified, this would be "meaningful, we believe, in every sense." There is little time to act if the President in the mid-1970's, whoever he may be, is to have available a full range of policy alternatives. Clearly the effect of the present policy is to foreclose options for the future President.

From the moment of a decision to proceed, five to seven years would be required to deploy Nike-X around twenty-five major cities and key defense installations. Lieutenant General Austin Betts, Chief of R. and D. for the Army, who has overseen the development of Nike-X, believes the "opti-

imum" moment has arrived for a decision to begin production. Further delay could mean the breakup of contractor teams and the onset of obsolescence in important components.

THE SYSTEM THAT'S READY

An argument can be made that it is better to postpone deployment of Nike-X if further R. and D. could produce a more advanced ABM—and it probably can. But Nike-X is the only defense system that can be deployed by the mid-1970's. Secretary McNamara's projected cost of \$40 billion for a full-scale deployment of Nike-X includes such "damage limiting" measures as interceptor aircraft and shelters. However, this forbidding figure would be spent over ten years. Senator Russell describes it as "a sort of Congressional deterrent." Beyond the question of how many billions of dollars are involved lies the uncertainty about the performance of Nike-X systems in a nuclear environment. These questions cannot be resolved entirely in the laboratory. A decision to go ahead might stir demands for a resumption of nuclear testing, which would surely arouse a world outcry.

But every objection to the limited deployment of Nike-X can be met with soundly based apprehensions about the grave risks of *not* having at least a measure of defense in the next decade. A light attack ("thin") defense has been estimated to cost perhaps \$4 billion and could be modified or superseded by new technology. Such a defense would serve several purposes: it would at once restore strategic balance and reassure the Russians that the U.S. is not obsessed with the offense and tempted to strike first; it would cope with the accidental firing of a missile; it would counter the threat expected from Red China until well into the late 1970's; and it could help check the recent estrangement from our European and Asian allies by enhancing the credibility of our promise to defend them. Should the Soviet threat become more extreme, NATO might be rebuilt around a sharing of defensive nuclear weapons.

Perhaps most significant of all, the deployment of a limited Nike-X defense system, combined with the vigorous pursuit of an improved ABM, would signal the Soviet Union that the U.S. has not, after all, misunderstood the dynamic force of technology. The American will lead the technological race and to maintain superiority is the most enduring deterrent.

FEDERAL RESEARCH PROGRAMS IN FIELDS OF THE DISADVANTAGED AND HANDICAPPED

Mr. MORSE, Mr. President, the Office of Education recently put forth a report listing the principal research programs in the fields of the disadvantaged and the handicapped.

Because the report contains, in short compass, the essential facts which would be helpful to researchers seeking funding for programs, I feel that it can be of great interest to my colleagues and for that reason I ask unanimous consent that the report to which I have alluded be printed at this point in my remarks.

There being no objection, the report was ordered to be printed in the RECORD, as follows:

FEDERAL RESEARCH PROGRAMS IN FIELDS OF THE DISADVANTAGED AND HANDICAPPED

(Prepared by the Information Center Office of Programs for the Disadvantaged U.S. Office of Education, Department of Health, Education, and Welfare, Feb. 10, 1967)

PREFACE

The Department of Health, Education, and Welfare, the Office of Economic Opportunity,

and the Department of Labor support a wide range of research and demonstration programs in fields of the disadvantaged and handicapped. State agencies, private and public institutions of higher education, other organizations, and interested individuals may be eligible to receive grants or contracts. Because of the variety of research and dissemination projects in fields of the disadvantaged and handicapped and similarity in program objectives, the Office of Programs for the Disadvantaged believed that it would be useful to program administrators and interested applicants to compile a list of these research programs describing purpose, program focus, fiscal year 1967 priorities, as well as other information. The listing is intended to inform program administrators of the existence of other on-going research programs with similar interests. The compilation serves several purposes. It may be used as a guide for program administrators to refer research proposals which they may not be able to fund, to another program. It may indicate to program officials of certain identities or focal points among research programs such as growing interest in juvenile delinquency. It may be used to help inform applicants of the different kinds of research programs that exist in fields of the disadvantaged and handicapped and aid them in applying to a program suited to their goals and interests.

The research programs listed have been selected because of their special relationship to the disadvantaged and handicapped. This list will be modified, revised or supplemented as additional information on research programs in these fields becomes available.

REGINA GOFF,
Assistant Commissioner.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE—OFFICE OF EDUCATION

Research programs of the Office of Education are administered by the Bureau of Research. The Bureau receives proposals from colleges, universities, private profit and non-profit organizations, State educational agencies, and individuals for research and research-related projects and programs. Proposals are evaluated by Bureau staff and by field readers and consultants outside the Office of Education. After approval by the Commissioner, a grant or contract is negotiated and awarded. Projects are monitored by the Bureau of Research.

The following programs administered by the Bureau of Research are particularly pertinent to the disadvantaged and handicapped:

Research, surveys, and demonstration

Purpose—To support research into the process and content of education and to devise new applications of this research.

Who May Apply—Universities and colleges, other public or private agencies (profit or nonprofit), institutions, organizations, and individuals.

Project Deadlines—No deadlines.

Matching of Federal Funds—Some matching of Federal funds may be required.

Program Focus—The program supports basic educational research, research in curriculum development for all levels of education from pre-school through adult education and for all subject areas and maintains research and development centers at different universities.

Fiscal Year 1967 Priorities—Educational research projects are grouped under several inter-related headings, basic research, curriculum improvement, and developmental activities. Basic research projects are concerned with the development and strengthening of educational theory and obtaining a greater understanding of the fundamental processes of education. Items in need of extensive basic research include learning theory, guidance and counseling, measurement and evaluation, administration, teacher education, curriculum development, originality, and analysis of