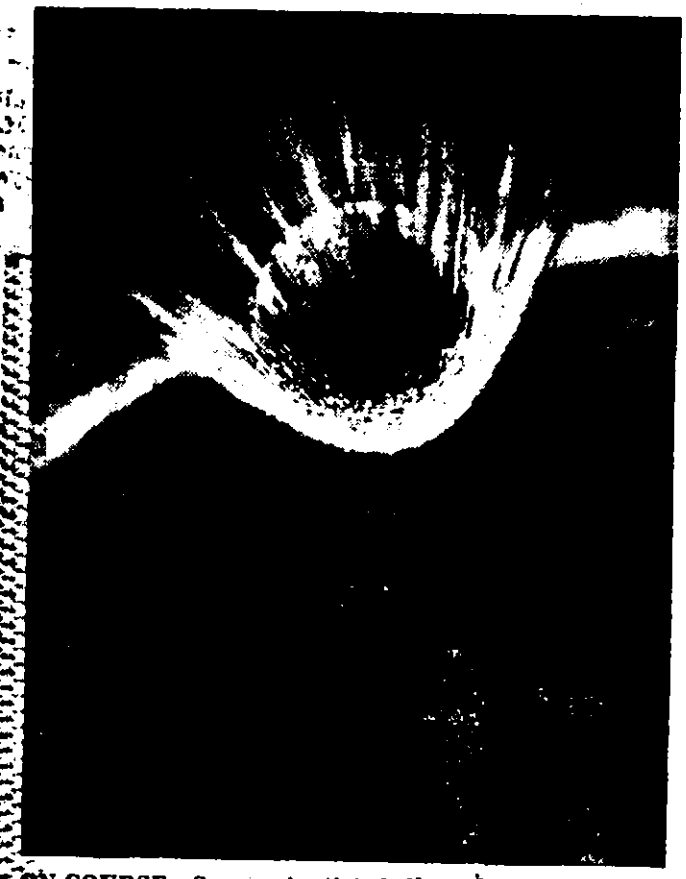

ON COURSE—Some scientists believe that the asteroid Hermes could be started on a collision course with the earth by exploding H-bombs on its surface. One mile in diameter, Hermes would impact with more force than a multi-gigaton nuclear bomb.

Space War Could Mean 'Doomsday'

By DR. I. M. LEVITT
Director of the Fels Planitarium of the Franklin Institute

Fantastic weapons resulting from new concepts just realized, or concepts using sciences as yet unborn, represent some disturbing prospects for the future. Only when man has lived in the environment of space for extended periods of time can the scientist and engineer assess the prospects of space weapons and defenses to be used to counter these space weapons, if indeed a defense exists.

Based on a careful search of the literature to uncover thoughts of our scientists, apparently at least four radically new space weapons are within the range of possibility. These comprise that anti-ICBM system, the gigaton nuclear warhead, the meteorite or asteroid bomb, and the "death ray."

The development by either the East or the West of an effective anti-ICBM could have a decisive effect on the world power struggle. The nation with such a defense could launch an attack with their own ICBM's with impunity. The possession of such a safeguard may mean that even the threat of an ICBM attack would be sufficient to gain the objectives of the country possessing this system.

It is known that the United States is now studying a space-based ICBM system, but it is also obvious that the present Russian lead in space boosters gives them a decisive advantage in the race to develop such a defense. While the anit-ICBM system is being considered here as a weapons system, it is also an effective countermeasure and this aspect will be discussed in the next and last article in this series.

Many people in this country were startled and alarmed by the detonation of the 58-megaton (58,000,000 tons) nuclear bomb in Siberia. This country has not attempted to detonate this large though no technological reasons exist for supporting that this cannot be done. From what is known of our present nuclear weapons capability, there appears to be no limit to the size of the bomb which can be constructed and detonated by this country or the Soviets.

Certainly a nuclear bomb ten times as powerful as the 100-megaton bomb is feasible. And the size can go to 20 gigatons. A 20-gigaton nuclear bomb when detonated would yield the energy equivalent to 20 billion tons of TNT!

From the scaling laws found in our handbooks on atomic energy, it can be demonstrated that a 20-gigaton bomb exploded at an altitude of several hundred miles — while still in orbit — would ignite all the combustible material in the United States. The resulting fire storm would cause a gigantic atmospheric implosion comparable to an enormous country - wide tornado.

It is doubtful that any plants, animals, or structures would survive such a bomb. The entire country would be turned into an incinerated wasteland. This, then, could be considered the "doomsday" weapon.

While a multi-gigaton warhead may be 1,000 times the size of the large ones available today, in time these warheads can be placed in orbit. The large boosters being built today and which may be operational by the mid-1960's will probably have the payload capability of orbiting these Warheads. Thus, in a few years the ultimate weapon, if there is such a thing, will be available.

Between Mars and Jupiter are tens of thousands of chunks of rock which range in size from several hundred miles to few hundred feet, These are called asteroids and are among the most interesting of the sun's family because of their curious motions. Some of these have elongated orbits which can bring them in close to the earth.

The asteroid Hermes can come within a million miles of the earth. Scientists believe that a relatively small number of hydrogen bombs exploded on its surface could start it on a collision course with the earth. This one-mile-in-diameter rock could be directed toward an impact on the United States — an impact which would have an even more devastating effect than a multi-gigaton warhead.

Robert S. Dietz, writing in the "Scientific American," presents evidence that about 250,000,000 years ago an asteroid slightly more than one mile in diameter struck near Pretoria, in South Africa, with an energy output of a million times that of the great Krakatoa Explosion in 1883 when the volcano almost disappeared. This impact released 150,000 times as much energy as is contained in a 100-megaton bomb! The impact created a 30-mile crater — ten miles deep.

If such an asteroid should fall into the sea, the resultant tidal wave would sweep across the bordering areas inundating them under more than a mile of water. The impact of this type of weapon would leave its mark on the earth for literally centuries.

One disturbing aspect of the asteroid weapon as compared with the gigaton bomb is that the guilty party may escape unscathed despite the fact that retaliatory weapons might be available in orbit. Unless there is some way of proving that the catastrophe was man-made, retaliation — if possible — would not be attempted. Although statistically unlikely, the impact of an asteroid is always feasible. There are many scars on the earth which bear testimony to this possibility.

The death ray has been mentioned as a potential new space weapon. At this time it is theoretically possible to beam highly concentrated rays of energy across hundreds of thousands of miles of space. However, at this time, because of the difficulty of operating these beams for extended periods of time and the highly localized action of the beams, the death ray is much likely to develop into a countermeasure system rather than as an active weapon.

Next week we will explore the use of the death ray as an exotic countermeasure.

San Jose Mercury-News

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Men Vs. Machines More Fact Than Fiction, Says Expert

By BOB LINDSEY
Mercury-News Staff Writer

STANFORD—Unless man consciously resists, he will become a faceless number in a world run by computers and electronic gadgets, a [redacted] warned in [redacted].

"The question we face," said [redacted] Hamming of the Bell Telephone Laboratories, is "whether we will master the machine or the machine will master us."

Hamming, a research mathematician and a foremost authority on the application of computers, is on special assignment by Bell Labs to explore the philosophical aspects of computers and the effects they will have on society.

In an interview and press conference at the dedication of Stanford University's new computer center, Hamming said the world is in a state of technological revolution wrought by electronics.

"The situation is exactly that in the Industrial Revolution. While the Industrial Revolution freed man from physical labor, this revolution will free him from intellectual routine and hack repetition.

"But there is a big difference. The industrial revolution came slowly. This is going to come much fa[redacted]."

Computers, he said, will have a "profound eff[redacted] our society." So f[redacted] said, where machine[redacted] replaced humans the [redacted] generally has been [redacted] made."

But he said, futur[redacted] employment caused b[redacted] chines replacing [redacted] promises to be a "ser[redacted] problem."

It is up to man, he emphasized, to decide "whether machines are going to have a monstrous effect or a pleasant effect."

He noted the federal government soon will have capability to [redacted] credible records on ev[redacted]ual. The question is, "can this capability be used for us or against us?"

"I'm afraid it's all too likely that the government will think of you as a number."

Unless society resists, he said, government agencies will progress farther and farther into the identification of citizens with numbered anonymity. "It's the way you choose. I believe in democracy. Instead of maximum machine efficiency, you may want to pass up some (efficiency) to make life more pleasant."

Asked if the telephone company's trend to all-digit dialing is a part of [redacted] anonymity to be faced [redacted] the future, Ham[redacted] flushed, smiled and [redacted] the question—"dirty po[redacted]."

He claimed Bell Lab[redacted] tories, which develo[redacted] all-number calling co[redacted]ot, had no choice, that introduction of nationwide direct dialing created the need.

DO IT YOURSELF PROJECT

Industry's Brains Seeking Answer For Peace Problems

By BOB LINDSEY
Mercury Staff Writer

Every three weeks a group of briefcase - toting men converge on a motel within a stone's throw of San Francisco International Airport.

And for four long hours, as cigars and cigarettes turn the air a murky gray, they talk about the problems of peace.

They are company vice presidents, economists, labor leaders, scientists and others participating in a unique enterprise.

Their meetings are the first effort, anywhere, by private industry to look frankly, in concert, at the problems of converting defense industry to meet the needs of the civilian economy.

The seminar was begun last summer by representatives of Lockheed Missiles & Space Co., Stanford Research Institute and the American Friends Service Committee.

In a day and age of multi-million dollar government financed studies, the motel seminars are an anamoly.

It is not costing taxpayers a cent. Nationally - known speakers donate their time, and each picks up his own dinner tab.

Emphasis is on informality, off-the-record comments and fresh ideas. Attendance averages 25 to 30.

Among participants have been men such as Dean Ernest Arbuckle of the Stanford University graduate school of business; Lester C. VanAtta, Lockheed's chief scientist; David Young, director of planning for Aerojet-General; Oscar T. Simpson, vice president and general manager of Philco's Western Development Laboratories; and Stahrl W. Edmunds, director of marketing research for Hughes Aircraft Corp., and Ampex Corp. representatives Robert Sackman, vice president and director of product planning; E. J. Keane, manager of instrumentation product planning, and William Gross, director of research laboratories.

Speakers at the seminars have come from State and Federal governments, industry and campuses.

The prime mover in the program is a dark haired, chain - smoking 33-year-old SRI political scientist, Carl F. Stover.

Stover, an authority on the interaction of military policy and the economy, says no experts expect a sudden, catastrophic decline in defense spending.

"However," he said, "it's equally plain California must look elsewhere for its major sources of future growth."

Neither defense or space spending will keep the present aerospace and electronics industry moving along at its present pace, he said. To maintain even present levels, without any growth, he added, industries must find and exploit new markets.

California is partially vulnerable, he added, because of demands for geographic dispersion of defense and space spending.

Stover said the aerospace and electronics industry "faces a serious job of examining its capabilities and identify alternate markets for these capabilities and develop particular kinds of products."

"On the record, in the past, efforts to diversify into the private consumer market by defense industries haven't been highly successful," he said.

However, he said the aerospace and electronics industry have unusual skills at managing large scale projects at the farthest reaches of new technology.

Perhaps, he said, its capabilities can be adapted to solve problems of urban renewal, education, mass transit, exploitation of the ocean and advancement of underdeveloped nations.

Have the seminars done any good?—Or are they only gatherings for men who agree they face a problem?

"One of the most important benefits is the degree to which it helps industry, labor and government understand common problems."

And, he said, there has been concrete progress.

"At our group's recommendation, Gov. Brown has established a committee of top level industry officials to advise him on problems faced by the aerospace and electronics industry.

"And we have evidence of deliberate steps taken by corporations, as a result of our meetings, to diversify."

He refused to identify the companies for publication but he said:

—One company with a large facility in Santa Clara county is seeking to apply its missile "systems management" skills to solving the problems of underdeveloped nations.

—"One corporation has been led to increase efforts to diversify by purchase of other companies."

—"Another is intensifying its efforts in oceanography."

Stover predicted the seminars will continue to make gains for industry.

Report Ticks Off Scientists As Slaves of Technology

By HOWARD SIMONS
The Washington Post

WASHINGTON — American scientists have been taken to task in a report suggesting that they have become more the slaves of technology and less the slaves of truth.

The highly critical report, which questions the motives, ideals and competence of American scientists, particularly those in the government's decision-making process, has been disseminated by the Center for the Study of Democratic Institutions, Santa Barbara, Calif.

Contributors of individual papers that make up the report were Robert M. Hutchins, president of the Fund for the Republic and former chancellor of the University of Chicago; Scott Buchanan, former dean of St. John's College; Donald N. Michael, director of the Peace Research Institute; Chalmers Sherwin, vice-president of the Aerospace Corporation; James Real, a management consultant; and Lynn White, Jr., former president of Mills college and professor of history at the University of California at Los Angeles.

The program is overly harsh and extreme in many of its views. Nonetheless, it brings into the open some doubts and misgivings about the role of scientists in government decision-making that are too infrequently debated in public.

Essentially, the papers suggest that scientists have become so specialized both in their knowledge and in their viewpoint that they no longer have the best interests of a free society at heart.

Michaels, for example, claims there "is a new breed of scientist around high Washington conference tables — the science entrepeneur, the 'political scientist'." These men, he says, "want to manage the bureaucracy to the extent necessary to make it behave the way they think it should. They have a sense of political technique, and they enjoy and seek power."

In Buchanan's view, scientists are not able to take responsibility for, let alone make, their own strategic judgments in science, to say nothing of the uses to which their work will be put.

"If the scientist's concern is truth," Buchanan says, "it is his responsibility to be sure that science is not misused so that something false comes out of it."

Buchanan's suggestion is that the heaviest responsibility of the scientist to society "may be to refuse to make himself useful."

The harshest criticism of American scientists in general came from Hutchins who charges that: "A scientist has a limited education. He labors on the topic of his dissertation, wins the Nobel prize by the time he is thirty-five, and suddenly has nothing to do.

"He has no general ideas, and while he was pursuing his specialization science has gone past him. He has no alternative but to spend the rest of his life making a nuisance of himself."

A solution to this problem, Hutchins says, is to reorganize American education and to redefine its purposes so that "men may overcome the limitations of their fractional cultures."

In their criticisms, Real and Sherwin attack scientists in government. Sherwin says, for example, that government management of science and technology "often do not know their business."

Sherwin says further that most creative physical scientists are outside the government. He indicates that he is unhappy about these creative scientists being used as part-time advisers to government because he thinks "the kibbitzing scientist" is not responsible for the consequences of his advice.

At best, Sherwin says, the kibbitzer's advice is "of limited usefulness; at worst, dangerous."

One solution advocated by Sherwin would have the government create nonprofit organizations, the so-called "think factories," within the government itself.

Real, who claims there are fourth and fifth generations of scientists who have never worked on anything but weapons, says that the scientist "no longer has the right to remain apolitical."