

UFOs I Have Loved and Lost

Professor Condon conducted a study of Unidentified Flying Objects, from late 1966 to the summer of 1968, at the request of the U.S. Air Force. The full report has been published under the title, "Scientific Study of Unidentified Flying Objects," in paperback by Bantam Books, and in hardback by E. P. Dutton and Co. This article is based on a talk presented before the American Philosophical Society last April. The author is professor of physics at the University of Colorado.

Throughout human history men have been seeing strange and terrifying apparitions in the sky. The literature dealing with such experiences is enormous. The word "spectre" is used generically to describe phenomena of this type. This word's earliest use, cited in the Oxford English Dictionary (OED), is in the title of a book by Z. Jones published in 1605, "A Treatise of Specters or straunge Sight, Visions and Apparitions appearing sensibly unto men." The word "spectrum" is cited first in 1611 in a passage which said, "Walsingham hath written of a fatal Spectrum or Apparition . . . where sundry monsters of diuers colours . . . were seen." Sixty years later, Isaac Newton used the word to describe his decomposition of sunlight with a glass prism in these words, "The Sunbeams . . . passing through a glass prism to the opposite Wall, exhibited there a Spectrum of diuers colours."

From these two uses of the word "spectrum" comes naturally the two meanings which the OED gives for the word "spectrology": (1) The science or study of spectres, and (2) The scientific study of spectra. The OED cites as an example of the first meaning an 1820 quote from Washington Irving's "Sketchbook": "The gloom of religious abstraction, and the wildness of their situation . . . had filled their imaginations with the frightful chimeras of witchcraft and spectrology." And of the second, an 1862 quote from the "American Journal of Sci-

ence": "The attention of the French scientific world is wholly fixed on spectrology, for thus do they designate the experiment with the spectroscope of Bunsen and Kirchhoff."

I am the second man in human history to have written a book on spectrology in both of these two distinct meanings. Donald Menzel was the first.

FLYING SAUCERS

Modern interest in UFOs stems mainly from the observations of Kenneth Arnold, a Boise, Idaho, businessman on June 24, 1947. While flying near Mt. Rainier in Washington he reported seeing some objects skimming along which he described in a manner that led newspapermen to call them "flying saucers." Although not all objects later reported are saucer-shaped, this term is often used generically, but the term UFO is preferable. The Air Force studies anything seen flying in the sky which might present a defense hazard, and thus has been concerned with the thousands of reports of sightings of UFOs that have come to them in the nearly 22 years since this first modern report.

From such study they concluded long ago that no defense problem was involved in these reports from the public. The amount of attention which the Air Force gave to the problem after the first four or five years has been minimal.

In the early '50s the story of UFOs began to appear in sensational pseudo-science magazine articles and paperback books. These have had a large sale. The book by Frank Edwards, "Flying Saucers—Serious Business," probably holds the record with more than 1,300,000 copies sold. Several other titles have sold more than 200,000 copies. The so-called Condon report was given an initial printing of 200,000 copies. In the last three years 40,000 school children have written the Air Force asking for UFO data.

The principal source of the widespread interest is the contention of some writers that at least some of the

things seen may represent flying craft from other civilizations, either elsewhere in the solar system, or even from a planetary system associated with some other star.

We must be extremely careful about our language. Some UFOs may be such visitors, it may be postulated, and some writers go so far as to say that they actually are. To discover clear, unambiguous evidence on this point would be a scientific discovery of the first magnitude, one which I would be quite happy to make. We found no such evidence, and so state in our report. But it is not true to say that we "proved that flying saucers do not come from outer space." All that can be said is that, of the cases we looked into carefully, we found no evidence in support of the hypothesis of their extra-terrestrial origin.

STUDY ADVISABLE

We concluded that it is not worthwhile to carry on a continuing study of UFOs in the manner which has been done thus far: that of going out into the field to interview persons who say they have seen something peculiar. The difficulty about using objective means of study lies in the rarity of the apparitions, their short duration, and the tendency of observers not to report their experience until long after it has ended. When a known object is the source of many reports, as in the case of the Zond IV re-entry of March 3, 1968, there is extraordinary disagreement among the descriptions of what was seen by different observers of the same event. This result shows that no great certainty attaches to the specific details of any of the reports.

These difficulties led us to conclude that it is quite unproductive of results of scientific value to study UFOs in the traditional manner. But, contrary to popular belief, we do not rule out all future study. We say: "Although we conclude after nearly two years of intensive study, that we do not see any fruitful lines of advance from the study of UFO reports, we believe that any scientist with adequate training and

credentials who does come up with a clearly defined, specific proposal for study should be supported."

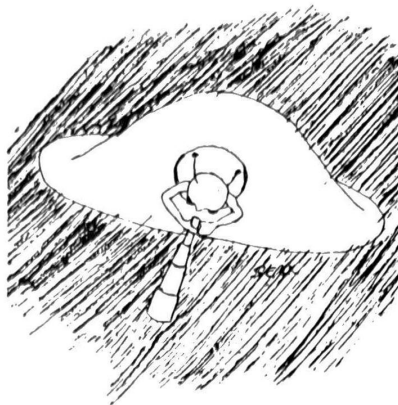
This conclusion has been bitterly denounced by the flying saucer buffs who have been making money from sensational writing and lecturing to gullible audiences, and collecting dues from the membership of their pseudo-science organizations. One prominent professor of atmospheric physics has been giving speeches in which he advocates that the federal government spend on UFO study amounts of money which would "dwarf" that spent on the space program.

Even though nearly a year has gone by since my work in this field ended, I continue to be astonished at the fervor with which many people hold views that are totally unsupported by objective evidence of any kind. Many people seem quite incapable of recognizing any distinction between what might be so and what actually is so. Some of these are charlatans, in my opinion, who profess belief in order to collect royalties from writing and fees from lecturing. But others are deeply sincere.

THE CULTISTS

We ran into many more interesting cases than we could include in the report, already criticized by many for being too thick. There was a young airman, second class, at an Air Force base in New Mexico whose 19-year-old wife died suddenly of a heart attack. They were members of a flying saucer cult which gathered around and decided that the woman's spirit had gone to Venus on a flying saucer, and that she would want her body back when she returned. So they wrapped it in a sheet and stored it in a barn rather than having it properly buried. The police learned of this by a mysterious postcard from a woman in Spokane, Washington. At first they thought the card was a hoax, but investigation proved that the young woman's body had been by this time stored in that barn for about three weeks. The young airman had seen lots of flying saucers but had not reported any of them, saying: "I didn't know the Air Force was interested!"

In the spring of 1967 I was visited several times by a well-mannered man who claimed to be acting as agent for the Third Universe (we are the First,



and the Second is inhabited by beings that resemble polar bears, he said). He said he was authorized to negotiate a contract with the U.S. government by which they would teach us to make inter-stellar flying saucers for \$3 billion. The first billion was to be paid after a demonstration to government officials at Dulles airport, the second after a major national laboratory had been built and our scientists and technologists had learned how to make flying saucers, and the third after they had trained our flight crews in inter-stellar navigation. He was specific down to the point of naming the bank in Arlington, Virginia, where the \$3 billion was to be deposited.

He wanted me, in the interim, to pay him \$3,000 as "earnest money" to be deposited in a particular bank in Western Colorado to the account of his organization, which was called the "Omnific Intelligence Continuum." Inquiry to that bank revealed that there really was such an account. Asked the size of the account the



banker cautiously said, "Small sums go in and out." Asked about membership of the organization the banker told me, "So far as I know Mr. X is the only member." Since part of Mr. X's story is thus verified, ought we now to believe everything he tells us?

REAL OR PSEUDO-SCIENCE

The most vivid lesson that I learned from such experiences is what a narrow, wobbly line there is between real science and pseudo-science. So far as the public is concerned most of the science which they know about they do not understand. Very few people can state clearly the grounds for belief that the Earth goes around the Sun, rather than vice versa, or for that matter, for our belief that the Earth is a ball rather than flat. Coming to more modern instances, who among the many investors in the profitable semiconductor industries have the slightest idea how a transistor works really?

In the given circumstances most of the scientific ideas that are accepted by the public are accepted entirely on faith. To most people, completely lacking any basic understanding of underlying principles, the proposition that the configuration of the planets and stars at the time of our birth determines the course of events in our lives, seems no more unlikely or preposterous than many of the well-established truths of science which they do accept without understanding them. There are some 10,000 astrologers in America who make their living practicing astrology and only about 2,000 astronomers who live by practicing astronomy. If celestial matters were decided democratically by the members of both professions lumped together, then the "real" astronomers would always end up as a depressed minority.

Flying saucers and astrology are not the only pseudo-sciences which have a considerable following among us. There used to be spiritualism, there continues to be extrasensory perception, psychokinesis, and a host of others. Hanson W. Baldwin in the "New York Times" has told how the Marines at Camp Pendleton are trained for Vietnam in the use of dowsers made of bent wire coathangers as a means of locating tunnels and other underground works of the Viet Cong.

Recently a visitor from a Navy research installation told me that some

admirals had purchased from an inventor a wholly worthless invention which it was claimed could detect submerged submarines by a radar-like reflection of electromagnetic waves. This could not possibly work because of the conductivity of sea water, and it did not work when expensively tested. A test had to be made to satisfy the admirals and certain congressmen. A Russian spy in the same Navy laboratory got hold of the invention and our test results and sent them to Russia. The Russians did more work on the invention. Although they understood at once that it must be foolish, they thought they might be wrong because the Americans had spent so much time and money studying this crackpot invention. We know about this because an American spy in their laboratory sent to us the story of their work.

These and many other examples that could be given show that we have failed rather miserably to give even to so-called educated people some feeling for the way in which science investigates a subject, and the way in which scientists subject their observational material to critical evaluation before reaching conclusions. The thing that most people are least able to do is to refrain from drawing conclusions when there is not enough evidence at hand to warrant drawing conclusions.

In ancient times, the future was foretold in many ways that have gone out of favor, such as by examining the entrails of sacrificed animals, or basing omens on the study of the flight of flocks of birds. (Cicero practiced this latter method.) Before you smile, bear in mind that these views have never really had as much scientific study as have the UFO reports. Perhaps we need a National Magic Agency to make a large and expensive study of all these matters, including the future scientific study of UFOs, if any.

Where corruption of children's minds is at stake, I do not believe in freedom of the press or freedom of speech. In my view, publishers who publish or teachers who teach any of the pseudo-sciences as established truth should, on being found guilty, be publicly horsewhipped, and forever banned from further activity in these usually honorable professions. Truth and children's minds are too precious for us to allow them to be abused by charlatans.

MARGARET MEAD

Public Policy and Behavioral Science

I am testifying out of long experience in the application of anthropology to contemporary national and international problems. During World War II, I worked within the context of the National Research Council on problems of nutrition, national morale, civilian defense, and cross national communication with Great Britain. I was one of the group that developed anthropological work on cultures at a distance—notably Germany and Japan—and after World War II, I participated in and directed a series of studies on behalf of the Office of Naval Research, Rand and MIT, including studies on the Soviet Union, China and France. These were interdisciplinary team activities (summarized in "The Anthropology of Human Conflict," Mead and Metraux in "The Nature of Human Conflict," edited by Elton B. McNeil, Prentice Hall, Inc. 1965). Since 1952 I have devoted myself to the study of technical assistance and political implications of culture change, education, cross national and international order and control of warfare, population control, environmental control, urbanization, cross ideological communication, and recently to the world wide implications of the generation gap.

I am here to discuss the possible contributions that the behavioral sciences together, and anthropology in particular, can contribute to national and international affairs.

During World War II we made a fine start in the utilization of this group of young sciences on a whole series of problems ranging from obtaining a better understanding of the national cultures of our opponents, our allies and ourselves, to the deter-

Physical scientists have been vocal and highly influential in Washington in the shaping of public policy on a number of fronts since the end of World War II. But what has become of the influence of behavioral scientists in Congress and on Capitol Hill? Margaret Mead discusses the question in this excerpt from her testimony before the U.S. Senate Foreign Relations Committee June 20, 1969 in a hearing on the psychological aspects of public policy. Dr. Mead is Curator of Ethnology at the American Museum of Natural History and Adjunct Professor of Anthropology at Columbia University.

mination of specific policies within the armed forces and within the nation, from the prediction of how Japan would respond to our treatment of the Emperor, to a clarification of relationships between the United States and our principal allies, to an illumination of the ambiguities in the responses of the various occupied countries to problems of civilian morale, to the maintenance of the health of the nation, to an unprecedented mobilization of our industrial resources, and to a deployment of resources in post war rehabilitation of a badly wounded world. These successes were accomplished under a set of conditions which can be clearly specified: a state of preparedness, mobilization and post war activity made possible by almost total commitment to a war which could be seen as a moral effort against almost overwhelming power and risk; a willingness of the community of behavioral scientists to give unstintingly of time and effort, within and without government,



Dr. Compton's \$500,000,000 pays ...

Bedlam Subdued

When the vast Research and Development Board got under way in July 1947, many a scientist shook his head dubiously. As the government's top scientific group* it was charged with the thorny task of researching for the three armed services. One exasperated scientist explained: "It works like this—the service that screams the loudest gets the most." Board members themselves dubbed the RDB "The Little Town of Bedlam."

This week, exactly two years and 23 board meetings later, the RDB took stock. Settling into new, freshly painted offices in a restricted part of the Pentagon Building, it was vaster and busier than ever. Its silver-haired 61-year-old chairman, Dr. Karl T. Compton, topped a sprawling complex which included a six-man board, a 250-man secretariat, fifteen committees with specialties ranging from guided missiles, atomic energy, electronics, and aeronautics to navigation, ordnance, and human resources; and about 2,000 part-time military and civilian scientists. Compton's king-sized mission: to allocate half a billion dollars a year for military research, fill gaps in military research, and reduce duplication.

Despite what one scientist called "two terrible years," the board this week could point proudly to a number of major scientific accomplishments:

► Some startling but as yet secret advances in guided missiles (presumably in guiding techniques). One board member said: "We feel we may be over the hump in the basic problems of guided missiles."

► A "very promising" new anti-aircraft guided missile. It will be fully tested in about a year.

► Newly designed lightweight tanks for airborne troops and a new tank gun.

► A whole series of new bombsights (combining both radar and visual techniques) for use in jet bombers.

► A new long-range jet bomber to replace the B-36 and similar planes in about five years.

► The development of a revolutionary experimental submarine which, Compton explains, is a model "where no consideration is given to armament. The one objective is to produce the most effective fast submarine to see how far you can go if you forget the torpedo tubes and other armament."

As for the workings of the board itself, "Dr. C." (as the board members call him) could boast of two important advances: (1) Certain fields of research have been assigned exclusively to one of the three services. For example, despite vehement protests by the Navy and the Air Force, the board recently gave the Army the job of handling all biological warfare. (2) For the first time in the nation's history the board this month completed a single research budget for all three services.

The budget, now on Secretary of Defense Louis A. Johnson's desk, was designed, according to Compton, "without regard for a special service slant. We let the chips fall where they may." It apportions some half a billion dollars for 1951 to the Air Force, Navy, and Army on about a 40-40-20 per cent basis. This

follows the general pattern of the current budget, with some shifts in emphasis. The biggest single slice, a total of about 20 per cent, will go for guided missiles. Aside from missiles, the Air Force will concentrate its research on jet bombers, the Navy on naval air power, and the Army on anti-aircraft and tanks.

Unification Agonies: Despite these decisions, RDB men knew that the board suffered all too often from unification wrangles that still harassed the whole National Military Establishment.

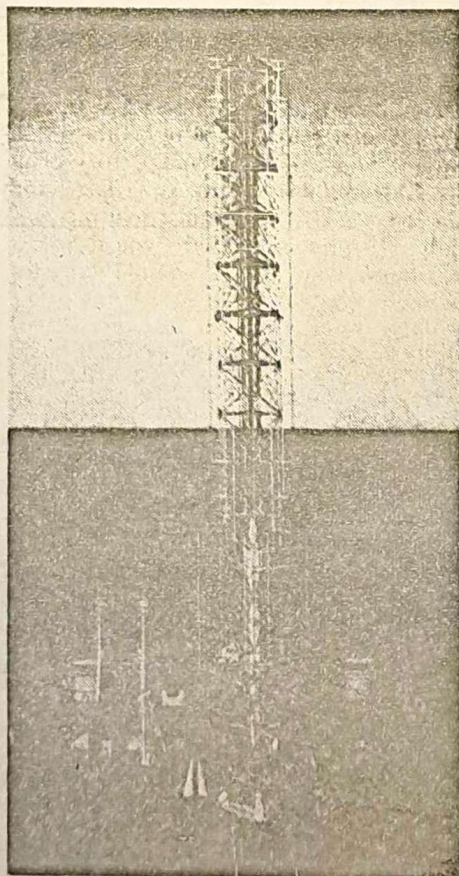
The six-man board consists of two representatives of each service: Gen. Joseph T. McNarney and Brig. Gen. D. L. Putt for the Air Force; Vice Admiral John Dale Price and Rear Admiral Albert Gallatin Noble for the Navy; and Gen. J. L. Devers and Maj. Gen. Charles Gardiner Helmick for the Army. Meeting monthly, these men could hardly avoid some bitter interservice wars. The Air Force and Army, for instance, have pressed the Navy to ditch part of its aviation research and go all out for undersea warfare, but the Navy still earmarks nearly half its research funds for air projects. (This week the Navy told how ship-launched rockets were "sounding" the upper atmosphere.) The Army is disgruntled over getting the smallest slice of the budgetary pie and is also wrestling with the Air Force for more development of tactical planes.

Dr. Compton can do little about this kind of controversy, since the board takes its orders from the Joint Chiefs of Staff on what strategic goals to pursue. But in spite of the handicaps, top board members feel that Compton has performed miracles since he took over from Dr. Vannevar Bush nine months ago. (He gave up the presidency of the Massachusetts Institute of Technology to take the board job.)

Where Bush, bristling with salty impatience, would often rile the military members without obtaining a compromise, Compton with his soft, pleasant voice and persuasive personality applies the soothing technique wherever possible. Illustration: When the board met to vote on the new research budget July 12, one secretariat member said: "We expected there would be a tremendous carrying-on." Yet after a short, soft-spoken introduction by Compton, the six board members passed the budget unanimously by voice vote.

The Hurdle: The next big job for Compton is to make the budget stick. Secretary Johnson is expected to approve it, but there is some doubt as to whether, within his present powers, he can force the services to follow it.

Meanwhile Compton goes quietly about his job. Arriving about 8:30 each morning in his red-draped Pentagon office, he confers informally with a



NME from Acme

...for Navy's seagoing rocket launcher

*Congress set up the RDB under the National Security Act to succeed the Joint Research and Development Board, which combined Army and Navy research.

stream of scientists and military men or pokes into other RDB offices to check on lagging projects. He works until 5 or later, then drives his gray Lincoln home to his apartment in the Wardman Park Hotel, where he often types out notes for future projects on one of his three portables.

He takes a philosophical view of his tough job, saying: "A very substantial amount of coordination of the departments and the improvement of the programs is accomplished not at top levels but by the getting together of the working technicians."

Magnets With Memories

An electromagnet is simply a hunk of iron with wire coiled around it. When an electric current passes through the wire, the iron acts as a magnet; when the current is turned off, the magnetic force fades to a shadow. This shadow, known as residual magnetism, is generally a nuisance, for when an electrical engineer turns a magnet off, he usually wants it all the way off.

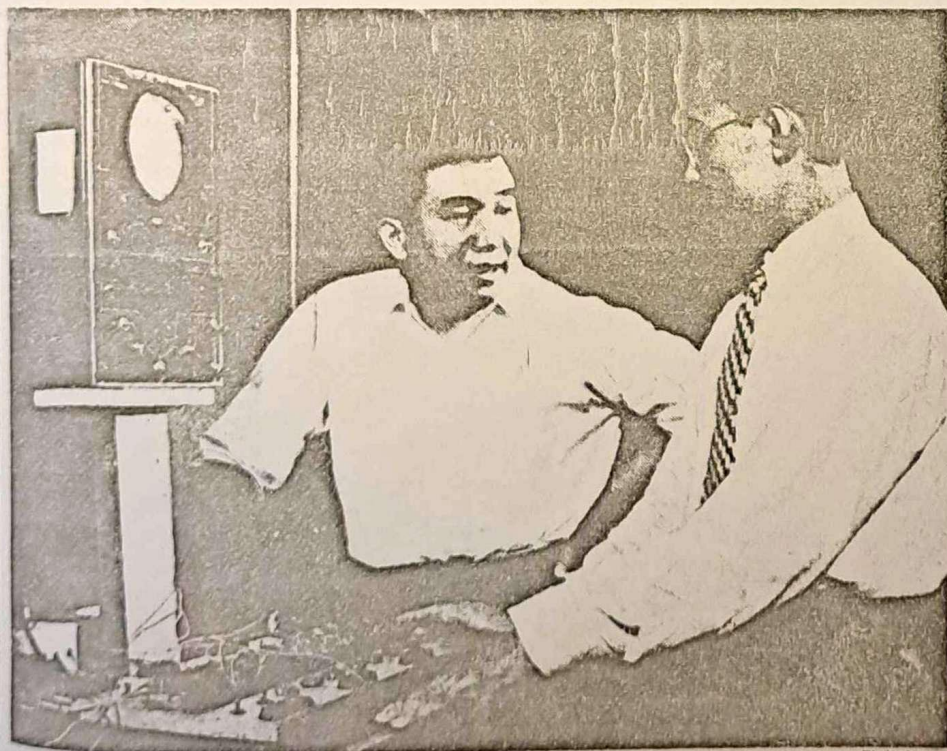
But to Prof. Way Dong Woo and Dr. An Wang of Harvard University, residual magnetism is the key to an ingenious new device—a rapid-fire "memory organ" for temporarily storing numbers and instructions in super-speed mathematical computing machines. Woo and Wang, who are both graduates of Chiao Tung University in Shanghai, are physicists in Harvard's Computation Laboratory, which has been the birthplace of several famous automatic computers.

Last week Professor Woo explained

how the new magnetic memory system works. (Dr. Wang was honeymooning and could not be reached.) Doughnut-shaped slugs of a special iron alloy are positively or negatively electromagnetized, leaving them with positive or negative residual magnetism. All numbers and letters of the alphabet can be represented with a two-symbol code (for example, the Morse code with its dots and dashes), and so any sort of information can be stored in a series of iron doughnuts by magnetizing some positively, the rest negatively.

Woo and Wang wired their magnets together in strings and worked out a way to make electrical pulses push the magnetism from one iron slug to the next and so on down the line. Thus their gadget can rattle off numbers or commands to an obedient computer at a top speed of 35,000 dots or dashes per second. It also can bide its time indefinitely, holding numbers in storage until they are needed.

The scientists who build and play nursemaid to computers are interested in memory organs, for they agree that one of the weakest links in the modern mechanical brain is its memory. Commented mathematician Edmund C. Berkeley, secretary of the Association for Computing Machinery: "This new device for the rapid memory of automatic computers is wonderfully fast and permanent. Up to now we have had fast devices for memory; but whenever the current was interrupted, the information vanished. We also have had permanent devices for memory; but reading information out of them has been discouragingly slow."



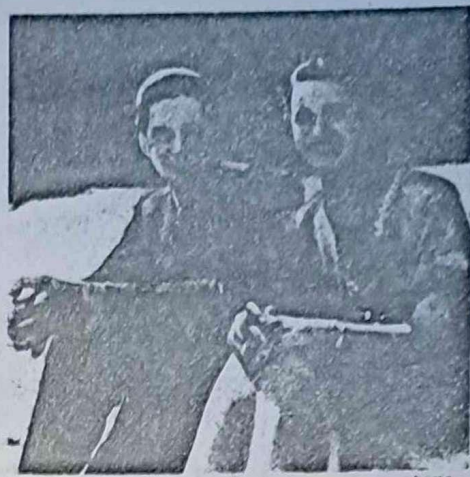
Fleischer

DRs. Woo and Wang: Their device recalls 35,000 numbers a second

August 1, 1949

TRANSITION

Engaged: In London July 20, the **EARL OF HAREWOOD**, 26, son of the princess royal, and Vienna-born concert pianist **MARION STEIN**, 22. The earl, opera critic



The earl and his girl: A royal nod

of the left-wing New Statesman and Nation, had to obtain the official consent of his uncle, King George VI, before his engagement could be announced.

Remarried: **BARNEY ROSS**, former holder of two world's boxing titles, and dancer **CATHY HOWLETT**, divorced in July 1946, were remarried in Del Mar, Calif., July 24.

Divorced: Academy Award winner **JANE WYMAN**, 35, ("Johnny Belinda") and actor **RONALD REAGAN**, 37, president of the Screen Actors Guild, whose marriage was once touted as one of Hollywood's happiest; in Los Angeles, July 19.

Suing: Onetime child star **ANNE SHIRLEY**, 31, is seeking a divorce in Los Angeles from director **ADRIAN SCOTT**, 37, one of the ten "unfriendly witnesses" cited for contempt by the House of Representatives in 1947.

Americanized: On July 19, in Washington, President Truman signed a bill permitting **LEON NIKOLAI VICH VOLKOFF**, 35, former Soviet bomber pilot and hero of W. L. White's book "Land of Milk and Honey," to remain in the United States and take out citizenship papers.

Died: **VAN A. BITTNER**, 64, veteran labor leader and vice-president of the CIO; in Pittsburgh, July 19. He was taken ill some months ago in Atlanta.

► Rear Admiral **FREDERIC R. HARRIS**, 74, who designed the world's largest floating drydocks, capable of lifting 100,000 tons; in New York, July 20.

Reinterred: The body of **RODGER YOUNG**, infantryman who died gallantly on New Georgia in 1943 and was immortalized in the Army song "Rodger Young," was buried near his home in Green Springs, Ohio, July 22.

GENERAL SCIENCE

Security System Harmful

Dr. Vannevar Bush reveals he believes there are two "serious weaknesses" impeding research and development in the defense program of the United States.

Following are excerpts from testimony by Dr. Vannevar Bush, president of the Carnegie Institution of Washington, to a subcommittee of the House Committee on Government Operations. Although the hearings were held in June, they were made public only last month.

► "LET ME say first of all that the development of weapons is very closely interlinked with their use; and it is impossible to separate the discussion of their development completely from the way in which they are used in practice.

"I think there are two serious weaknesses today that impede our program of research and development.

"First, the security clearance system as now practiced is, in my opinion, doing great damage to the relations between science and Government, and particularly to the relations between scientists and weapons development.

"Second, it seems to me that we have lost our effectiveness in getting new weapons tested, tried out, produced on an experimental basis, and finally introduced in use. . . ."

Dr. Bush then explained his reasons for believing that there was room for much improvement in the use of the latest scientific advances by the Joint Chiefs of Staff in their planning operations.

Security System Doing Harm

"Now, let me turn to the other weakness for a moment, and that is the security system.

"I don't need to bore you, certainly, with a detailed recital. I feel that the way in which our security system is working at the present time is driving a wedge between the military and the scientific people of the country, and is doing great harm.

"During the war there was developed a partnership between military men and scientific men. It was not brought about automatically; it is not a thing that occurs readily.

"These men come from different backgrounds, and it is hard for each group to understand the other; but nevertheless, by the end of the war an excellent situation had developed in which there was mutual respect between the two groups and they operated together well.

"It must be remembered that one cannot plan modern war merely from the military standpoint or merely from the scientific standpoint. It takes both types of thinking to produce success.

"That partnership, which was a healthy one at the end of the war, is, in my opinion, now almost destroyed, and one of the primary reasons is the security system.

"Now, I will not go into the Oppenheimer affair. I have written on that subject, and I think I should avoid entirely any question of the operations of the central committee.

"And I will not go into the Monmouth matter. But let me bring to your attention just 1 or 2 small incidents that will show the type of thing that is occurring all about us and that is so trying. . . .

"Now, these instances seem trivial, but they are not. The scientists, generally, that served well, loyally, and vigorously now find that they are being queried, and people are going about asking questions about them.

Air of Suspicion

"The whole air of suspicion is just not such as to produce good collaboration, the kind of really wholehearted collaboration between military men and the scientific community that we very much need to have for the problems that are ahead of us.

"For we are not at the end of the possible development of weapons. Not all the problems have, by any means, been solved. We hear a great deal about A-bombs and H-bombs; we do not hear as much about biological warfare, but I can assure you gentlemen that I am as deeply concerned about that as a possibility as I am about fission bombs and fusion bombs.

"I can also say to you that the morale of the scientists today as I meet them is low, so low that while they will not refuse to serve, they will serve without enthusiasm and without fruitful inspiration. . . .

"... We also need to clear up the security matter and get back on firm ground. It is merely a question of how well the scientist group will work.

"There will be no refusal on the part of scientific men to respond when called on. You won't find any strikes, or any such thing. But scientists today are discouraged and downhearted and feel that they are being pushed out, and they are. . . .

"The morale is very low indeed, and it is quite natural that it should be. Let me give you an example. I could give you dozens of examples.

"I met a week ago a man who was a member of the scientific committee that is advisory to the Security Council, and he said to me, 'Well, we have practically

"That's No Eagle"



—Herblock in The Washington Post and Times Herald

stopped working. It is quite impossible to accomplish anything in this atmosphere."

"Now, that is the sort of reaction I would get out of 3 out of 4 scientists today. They go on working, but they feel that they are not welcome, that they are regarded with suspicion, that some of the men who led them during the war are now being questioned and their security and loyalty are in doubt.

"They are like an army without trust in their top leadership or in the political leadership of the country.

"They feel they are part of a group that at the present time is not considered necessary, that they are looked on askance by their neighbors, and they have no enthusiasm, they have no heart for their work.

"I think the basic problem is far deeper than any one move, but I feel that the President's Executive order and the way it has been implemented have been very unfortunate and have increased the seriousness of the situation.

"The basic fact is that this country has been going through a wave of hysteria. When people are afraid they do strange things. One of their immediate responses is a tendency to abandon their liberties, they tend to ride roughshod over some of their own fundamental rights.

"We are afraid in this country, and quite rightly so; we should be afraid in the proper sense in a day of H-bombs; we should be afraid, also, of a situation in which we know that Communists have penetrated our defenses. We have traitors in our midst, and there is reason for being afraid of them. But our fear in this country has taken the form of a hysteria in which

we have gone to extremes, and we have disregarded rights.

"We have put all our emphasis on preventing some of our secrets from leaking and no emphasis to speak of upon getting some secrets that might be worth leaking and into this situation came the Executive order, and I think it was poorly drawn, has been poorly interpreted, and has made the situation much worse than it was before."

Science News Letter, November 6, 1954

PUBLIC HEALTH

Pinpoint Smog Sources

► WITHOUT SHUTTING down oil refineries, other industries and without reducing auto use, high-speed computing machines can pinpoint the sources of smog, research at the National Bureau of Standards has shown.

Dr. Francois N. Frenkiel, a physicist at Johns Hopkins University's Applied Physics Laboratory, Silver Spring, Md., has reported that Standards' electronic computer, SEAC, had been put to work on the Los Angeles smog problem. (See SNL, Oct. 30, p. 279.)

Using actual wind velocity measurements, the machine traced the movement of smoke puffed into the air. Mrs. Luis Marden, a Standards mathematician, supervised the pilot study of the smog problem on the machine.

Although the machine's calculations were made for a past situation, an electronic "brain" could also be used to figure conditions or to predict smog prevalence a few hours in the future.

Shutting down only a few sources for a short time might be sufficient to alleviate the smog hazard.

Refineries, Dr. Frenkiel pointed out, contribute to the smog in a "non-negligible proportion," but so also do cars, filling stations and incinerators. Removing one or more of these sources would "clean the air," Dr. Frenkiel said, but wrong conclusions as to their responsibility in causing the smog might then be reached.

Although the October Los Angeles smog did not threaten to become as dangerous as the London smog of December, 1952, nevertheless it was an unknown health hazard.

AT YOUR FINGERTIPS —

More than 800 Element Facts



The Elemental Slyd-Rul now completely up to date. Symbol, weight, density, number, valences, color, IA & BP in °C for 98 elements plus recent name changes. In tough-check cardboard stock. \$1. postpaid. Student rate: 12 or more, 75c ea.

The Slyd-Rul Co., Canaan, N. Y.

INVENTION

Color TV Tube Given Patent

► DR. ERNEST O. Lawrence, University of California Nobel Prize physicist, has received patent No. 2,692,532 for his color TV tube, which is being shown in an exhibit dramatizing the growth of electronics.

Science News Letter, November 6, 1954

Present regulations for dealing with the smog situation may no longer be "appropriate," Dr. Frenkiel said.

Although he recommended long-range basic research on the problem, he urged that present knowledge be put to use right away.

"Los Angeles county, which largely owes its livelihood and its high living standards to the existence of many sources of pollution, can find how to live with the sources which are necessary to its comfort without letting them become a health hazard," Dr. Frenkiel predicted.

Science News Letter, November 6, 1954

SURGERY

Post-Cancer "Milk-Arm" Relieved by Operation

► OPERATIONS WHICH relieve the pain and swelling of "milk-arm" and "milk-leg" were announced by Drs. Lyndon A. Peer, Manouchehr Shahgholi, John C. Walker Jr. and Alvin Mancusi-Ungaro, all of St. Barnabas Hospital, Newark, N. J., at the meeting of the American Society of Plastic and Reconstructive Surgery in Hollywood, Fla.

"Milk-arm" is a swelling of the arm which affects a small percentage of women who have undergone a radical breast operation for cancer. In this radical breast operation, removal of lymph glands of the armpits sometimes blocks drainage of the lymphatics of the arm and forearm. This results in the severe and progressive swelling known medically as lymphedema.

In the operation reported at this meeting, the thickened fibrous tissue surrounding the muscles is removed to allow blocked lymph glands to drain into the body circulation.

Improvement in five cases of "milk-arm" and two cases of "milk-leg" were reported by the Newark group.

"Milk-leg" is a swollen, painful condition of the leg due to the same lymph blockage that produces "milk-arm," although "milk-leg" develops when there has been no cancer operation. "Milk-leg" often starts during a young girl's adolescence.

One of the patients with "milk-leg" who got an "excellent" result from the operation is a 15-year-old girl. The other is an older patient who had the condition in both legs for 15 years.

Science News Letter, November 6, 1954

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The second step is a process of translating theory into a device that appears to have some usefulness. The essence of invention is the instinctive or intuitive confidence that something should work and the first rough test of whether it will in fact work. We note several characteristics of this step on Chart 6.

The third step toward a breakthrough results from a decision made at the management level, be it in industry or in the military. Such a decision is based on recognition of the potential importance of the invention. The essence of the decision is to allocate resources to translate an invention into a product that is materially useful. In the military this is usually a weapon system, a major component, or a piece of equipment.

The purpose of the decision is to gain an advantage in time or strength over competitors—in the market in the case of an industrial breakthrough or over potential enemies in the case of a military breakthrough. The decisions and actions of the enemy have an effect on the decision makers who seek to achieve a breakthrough. The characteristics of this third step are shown on Chart 7.

In the last step the invention chosen by management is developed as a system and produced in quantity. An essential part of the engineering breakthrough is the advanced development or prototype. The construction of a pilot plant by industry provides the bridge between the breadboard model and full-scale production. The military have taken several approaches to this aspect of the engineering breakthrough. We have built prototypes of aircraft prior to production. In our development of missiles we telescoped the construction of the prototype and production into a single phase under the concurrency principle. In our space effort we had planned to create building blocks such as Dyna-Soar and Titan III booster before the military space program was shut down.

Chart 6

Characteristics of Invention

- A Creative Art
 - Exploits Science, and May Support Science As Well
 - Invention Is in the Realm of Technology, Not Pure Science
 - Invention Can Be a Lengthy Process
-

Chart 7

The Management Breakthrough

- A Decision Is Made Based on Recognition of the Importance of a Scientific Principle or Invention
 - The Choice Has Major Implications on Future Capabilities
 - The Time Required for Decision Is Shorter Than That Required for Invention
 - The Decision Usually Leads to a Production Decision
-

The distinction is further blurred by development of one-time, unique systems, such as our command and control systems. The characteristics of this fourth step are shown on Chart 8.

This division into steps, into bits and pieces, is for illustrative purposes only. We should recognize that scientists sometimes take on the role of technologists, that technologists have made scientific discoveries, that production may require invention, and that scientists, engineers, and managers participate in the decision process. It is impossible to summarize all the many activities of a multitude of individuals in complex technological relationships in four simple steps.

There is no uniformity in this process. At times, individuals have tried to stimulate closer ties between science and technology; Galileo and Newton, for instance, tried to cross-fertilize these two fields. Diesel's attempt to apply the law of thermodynamics (made possible by the high pressure steam engine) led to the invention of the Diesel engine, but the forecast that it would be the best engine for aircraft was clearly wrong.

Historical experience is complex and the four steps we have discussed are only indicative of broad areas of human activity.

However, our interest is in the use of science and technology as elements of strategy and conflict. Let us look at these four steps in this context. The revolution in physics that began with Maxwell and Mach led to new theories, which in turn led to independent work by Fermi and others. By contrast, the atomic bomb was the result of determined effort. The policy breakthrough in this historical example was the decision by the president to spend the large sums of money required to construct a useful weapon. It was based on recognition by the scientific

Chart 8

The Engineering Breakthrough

- Exploits the Realm of Engineering and Technology, Not Science
- It Is a Deliberate Product of Technology with a Useful Purpose in Mind
- Success in This Stage Is the Only Real Addition to Capability
- Requires a Shorter Period Than Scientific Discovery or Invention

community, notably by Einstein, of the practical implications of an advance in basic science.

In the case of the ballistic missile the direct relationship between science and weapon is not quite as dramatic and clear-cut as in the example of the atomic bomb, partly because war rockets are ancient. However, Goddard's initial investigations of rocket propulsion and Oberth's theoretical calculations played key roles in the German development of the V-1 and V-2 rockets. Here is an example of an invention being recognized and resources being allocated for an engineering breakthrough. The Germans made this decision in 1932, and chose two different approaches, rockets and jets. The first V-1 and V-2 flew about ten years later.

The German engineering work played a significant role in Russian rocket development and in our own as well. For example, both the Redstone and the Russian T-1 and T-2 used oxygen and alcohol. However, the technical paths diverged at this point. The Russian strategy was to pursue an engineering approach to missile development. We, on the other hand, chose to await an invention in nuclear weaponry to give us a lightweight, high-yield, nuclear bomb. Once this invention had been realized, we made the decision to allocate resources to our missile program and sponsored the many engineering breakthroughs in guidance, airframe construction, and reentry technology required for operational missiles.

In summary, then, we see that the atomic bomb followed the four-step pattern; however, in the missile field the division is not so clear-cut, notably because the policy breakthrough came so late that technology from other areas of research had caught up with missile technology.

In its broadest sense the term technological breakthrough applies to the entire process when it results in advances that thrust us into a new

era of military capabilities. However, the term is used also in connection with limited parts of the process. A new theory may be described by scientists as a breakthrough. An inventor may describe his work as a breakthrough. The engineers working on a specific part of the problem of production may describe an advance they make as a breakthrough. This is most likely to occur when an invention is necessary for production; use of the term breakthrough has some validity because without the invention, production would not be feasible or efficient.

The key step in the process is step three, the policy breakthrough. A decision in the realm of the engineering breakthrough cannot be considered in isolation from effort allocated to steps one and two. The importance of the policy breakthrough cannot be overemphasized.

In attempting to bring order and control to the technological breakthrough, we have in the past concentrated on steps three and four in the process. We have studied management and decision procedures in more detail than the intellectual breakthrough and invention. We have brought a great effort to bear on production so that systems are made realities in a minimum of time. We consider it a major breakthrough when the time covered by steps three and four is reduced from eight years to five years. We have not made a similar effort to reduce the total time covered by the entire process.

At present, the period covered by the intellectual breakthrough and the invention cannot be reduced. This is an unavoidable consequence of our scientific and technological effort, partly because steps one and two lie outside the military sector. In their broadest sense steps one and two are the consequence of our society, and our contemporary society has not organized an effort to influence these steps. The way we approach invention has changed: in the past, invention was usually the work of an individual; today, we are making an institutionalized effort to stimulate inventions. But this change is not always productive, because it may stifle the loner and out-of-step creativity.

Once again there is much to be said for both sides of this argument. The team approach is not always superior to an individual approach to an invention. Some creative individuals cannot work as members of a team; others function best as part of a team. Furthermore, some parts of science, notably chemistry, seem to require a team effort to make advances; but in the field of physics and mechanical engineering, more advances seem to be made by the individual working alone. On the other hand, there is the difficult task of interdisciplinary work. Regardless of the approach followed, it appears difficult to reduce the

time necessary for intellectual breakthroughs or inventions and it is unpromising to organize according to pat formulas.

It may well be that recognition and acceptance of new theories and inventions will always require a period of mellowing, testing, and evaluation. Early distribution of the new idea would help—provided its significance is recognized. However, as far as our immediate interest is concerned, a new theory or invention usually has little impact within the coming decade. This brings us to another aspect of the breakthrough.

From the point of view of technological strategy, our principal concern is in the time when such advances occur. The invention of a new jet engine today would not produce a new era in military capabilities as did the first jet produced by Whittle. Conversely, the invention tomorrow of a practical way of using focused energy beams as weapons would alter radically the whole sphere of military activities. Time is especially crucial in technological maneuver.

Whether the breakthrough is a surprise to the enemy or is an advance that he anticipates but cannot counter, the side making the breakthrough should plan for technological pursuit to maximize the gain made possible by the new advantage. Pursuit has proved difficult in warfare. The losses sustained in winning the battle frequently have reduced the momentum of the winner. Also, uncertainty about the conditions of the loser has made the winner act with caution.

In technological conflict pursuit is facilitated by the circumstances surrounding the breakthrough. Rather than causing losses, the technological success increases the power of the side that makes the advance, and victory may heighten morale. The breakthrough can reduce the amount of uncertainty about the enemy's technology position.

These circumstances point out clearly that significant technical advances must be exploited. The concept of pursuit has a valid role in technological conflict. This is well-illustrated by Soviet space activities. Once they achieved a clear advantage over us in space they engaged in a form of pursuit to negate our attempts to make any advances in this new arena of conflict.

Moreover, this advance was used as the basis for maneuvers in other forms of conflict. The Soviets broke their word on nuclear testing and prevented the "neutral" powers from criticizing them. This advantage in another aspect of the technological conflict is an example of technological pursuit.

Pursuit is not the exclusive province of the aggressor. The defender should plan on pursuit when he has acquired an advantage over the aggressor. Up to the present, we have yet to engage in pursuit to overcome the Soviets. On the contrary, we have halted short of using our superiority in aeronautics, nuclear weapons, or missiles to cause the Soviets to modify their goals, strategy, or operations.

As the side on the defensive, we have one advantage which comes not from our technological strategy but from our resources. That advantage is mobility. We can change the priorities of our efforts and counter new threats as they appear. The richness of our technology makes this mobility possible.

The crucial question in this emerging new era of conflict is meeting the threat in time. This is especially vital for us because we are on the defensive, have never tried to achieve surprise, and have never engaged in technological pursuit. The Soviets need not be as concerned about the time dimension of technological conflict, since they know that our goal is containment, not defeat of Communism. Thus, our advances pose threats only to their near-term goals abroad, and never to their security at home.

U.S. Policies and Technological Progress

The United States has no overall policies with regard to technological development. In part this is due to the decentralization of technological resources in independent private industries, and is a benefit to our overall progress. Unfortunately, we have no policy or strategy at the governmental level, although paradoxically we do suffer there from overcentralization of the decision process. However, our central decision makers are not guided by strategic considerations and projects are related to each other mainly through budgetary actions. Various projects have their goals and we make extensive efforts to relate projects to each other, but the relationships do not come from a felt need to execute strategy. Without strategy, there is no mechanism for integrating goals, tasks, and priorities, and there is no criterion for the weighing of risks and costs.

Our technological effort is guided to some degree by conflicting policies. For example, we assert frequently that we are advancing along a broad front. Also, we minimize direction and control, for in that way we assist progress. Consequently, innovation and invention are where we find them; we abhor invention on schedule. From the point of view

A is used in such a way that it bypasses or neutralizes the counterweapon of B; if no surprise were attempted, A would be required to use massive superiority to crush B's counterweapon. The difference is like that between judo and a bare-knuckle fight.

Tactical surprise usually does not lead to the nullification of the opponent's armament, but if it is well-conceived and backed by technological improvements and adequate forces tactical surprise can go a long way toward eliminating enemy armor as a relevant factor. Given the complexity of modern systems, the surprised opponent is faced with considerable delay before he can readjust his tactics; in a fast-moving war such readjustment may not be feasible.

Under modern circumstances time and technology as well as combat procedures are needed to gain tactical surprise. Technology can produce new types of weapons, new weapon effects, improved weapon effects, improvements in delivery systems, combinations of weapon systems, better active defense, and so on. Examples ranging from the "War of the Iron Ramrod" of Frederic the Great to the devastating effect of Lee's rifle pits at Cold Harbor show that technology and its proper tactical use may achieve surprise. With superior armaments or doctrines, and with troops trained in their use, the entire armament of the opponent can be nullified.

While this is the ultimate goal of tactical surprise, it is usually difficult to achieve. This is so because the possibilities of complete technical surprise are limited. Because of time required to develop a new weapon system, opportunities are increased for technical warning and for counterefforts, either technical or operational. Furthermore, excessive secrecy or failure to deploy weapons can result in surprising one's own troops, with disastrous results—as happened with the use of the mitrailleuse by the French in 1871. On the other hand, tactical surprise can be accomplished by a minor weapon improvement that from a technological point of view may be marginal but which today or tomorrow may facilitate victory in battle by creating a decisive advantage.

Strategic Surprise through Operational Surprise

Surprise can result from operations of the forces available, as well as from technological innovation. To achieve surprise of this type, the commander operates in a way unexpected by his adversary; in the ideal situation the enemy is unable to devise countermeasures in time. The

attacker hits the defender where and when he does not expect to be hit. Or, conversely, the defender reacts by hitting with weapons or with performances the attacker did not anticipate and against which he cannot protect himself properly; the defender counterattacks when and where he is not expected.

The number of operational variations is truly infinite, and the details of such operations usually can be planned and prepared with a high degree of secrecy. These variations are possible because of the multiplicity of weapons, the great spectrum of their performance, and the vast number of operational options.

Opportunities to use operational techniques to achieve surprise arise from various combinations of the performance of the carriers of destructive agents and the effects of those destructive agents when they are transported to the target—from the possibilities of multiple routes and methods of attack—from the variety of environments—and from countless other factors and their combinations. In addition, there are the skills of tactics, the principal one of which is to use a military force in a surprising manner. The use of expedients, saturation, and other techniques that cause uncertainty create further possibilities for tactical surprise.

Technology and Surprise

We repeat, surprise is not confined to active combat. Even though hostilities are not occurring now, the battle for tactical advantage and the effort to achieve surprise goes on incessantly. Laboratory is pitted against laboratory to find new advances such as radar techniques for looking over the horizon and for distinguishing between warheads and decoys. The laboratories struggle to compress data so that information, particularly details on attack, can be instantaneously transmitted and presented to decision makers. They search for new concepts that can find expression in hardware and tactics.

In addition, there is the broad area of strategic deception in matters of science. This includes deception about the general state of excellence, the level of progress in a given aspect of science, and the application of science to specific weapon and component development. It seems that behind the Iron Curtain there is a second curtain that conceals the nature of Soviet science.

To conduct this deception, the Soviets release scientific articles and withhold others, thus creating a false impression of their successes,

failures, and interests. Another method is to send scientists to international meetings, where they either spread misinformation or are evaluated by their counterparts as not being knowledgeable or as being geniuses. Such evaluations may lead to all kinds of false deductions.

For example, we have seen arguments that the Soviets did not know anything about decoupling techniques to conduct nuclear tests underground in secrecy. Also, we have been told by Soviet leaders that the day of the heavy bomber is passed—which did not deceive us. On the other hand, we were quite surprised when the Soviets sent a man into space, although they had been forewarning us.

Stratagems to Achieve Surprise

Scientific deception can have a great impact on research and development lead time. The United States has devoted a great deal of effort to reducing the time required to translate a scientific theory, discovery or invention into a practical weapon system. In spite of much study we have not reduced the time interval to less than five years. To develop and produce a weapon in even this fairly long time costs billions of dollars.

Scientific deception aims at keeping the enemy's lead time as long as possible. In this way a significant military advantage may result. This advantage may be crucial at the tactical level where it could have a direct impact on a strategic decision such as overt aggression.

The ultimate goal is to gain a strategic advantage by acquiring a major new family of weapons while concealing from the enemy that it is being developed. The appearance of a brand new weapon often is termed a breakthrough. When a nation makes a breakthrough of this type, as we did with the atom bomb, the British with radar, the Soviets in space, an entirely new arena for military operations is opened up. If the breakthrough leads to a military advantage that the enemy cannot counter in time, such as domination of the air, space, or deep water, the breakthrough may be decisive.

Strategic surprises can be accomplished in many ways. A few examples are:

- The choice of a strategic concept;
- The selection of weapon systems and their combination;
- The quantitative and qualitative strength of the battle forces;
- The size of the reserves and their degree of invulnerability;

The exploitation of geography such as bases, areas of access, and approach routes;

The formation of alliances, including secret prewar alliances or the utilization of an allied territory to launch an attack from an entirely unexpected direction;

The proper choice of a center of gravity of the operation; and

The mounting of diversions, so that the opponent divides his forces.

The major problem is developing techniques to achieve technological surprise. If we assume that the enemy intelligence service watches the development of a weapon system from its early scientific inception to its use by operational forces, deceptive moves we make at any step in the process contribute to the ultimate surprise. For example, in the scientific field we can misinform and disinform to fool the opponent. Scientific misinformation would not be propagated in the form of false formulas which would not survive the first test, but it can be created by cryptic hints about programs and alleged results. Disinformation makes the enemy doubt the accuracy of his findings.

In addition there is secrecy. A classic method of achieving a technological surprise is secretly using foreign know-how. Another widely used method has been making an unobserved modification in a technologically inferior weapon systems to give it a massive improvement in performance.

In the period of weapon development, surprise can be achieved through hiding and concealment, by pretended inadvertent showing of weapons and weapon components, by phony orders placed abroad for spares or scarce materials, and through a whole host of such stratagems that are not complex but must be planned into the production cycle.

One of the most effective methods is to start the development of several competing weapons, select one, and then give a great deal of publicity to the weapons that have been rejected and will not go into production. This was used by the Soviets when they exhibited the TU-31, equivalent to our B-36; the TU-31 did not go to production. In addition, rejected test models can be exhibited in operations in such a way that the enemy will be sure to see them and draw erroneous conclusions, while tests of the chosen models are concealed. If this is impossible, erroneous information can be fed into the technical intelligence stream and various red herrings can be used. In brief, the true testing operation can be enveloped in a lot of phony operations.

Similar tricks are available to hide production. The weapon system perhaps cannot be hidden, but there are many methods to make it difficult to obtain accurate performance data. As time goes on, several modifications that change the over-all characteristic of the weapon system can be concealed.

Errors contributing to surprise can be induced about the state of training and the precise deployment. In ground war, the effective concealment of a center of gravity is half the battle won. Generally, it is not correct to assume that military forces act consistently. Some nations tend to bluff; the German pre-World War I general staff operated on the principle that one should be considerably stronger than one appears to be. With respect to technological strategy, it is much better to create simultaneously impressions of greater, as well as lesser, capabilities.

The purpose of such maneuvers is to generate uncertainty in the mind of the opponent. Surprise may result from technology, but the actual surprise is not in the weapon system; it is in the mind of the staff that is being surprised.

The devastating effect of surprise in the past has been caused by the fact that the members of a particular staff have for years conditioned their thinking according to firm expectations of enemy behavior and have carried out all their calculations within that framework. Suddenly, the basic assumptions are proved false. The result is a paralysis of thinking which often makes it impossible to carry out even those adaptations which could be accomplished within the time available.

In a discussion of surprise in very broad sense, it is often overlooked that surprise about many smaller items has occasionally been truly decisive. If it is true that a major weapon system cannot be hidden, it also remains true that specific performance data can be manipulated in such a way that the enemy makes small errors. These errors may be within the margins usually allowed by statisticians, let us say 5%. In actuality, speed differentials of 10 or 20, let alone 50, miles per hour may spell the difference between victory and defeat in combat. Similarly, such small differentials in, let us say, a radar performance, reliability of communications, or accuracy of missiles can be of the greatest significance.

In missile warfare, the reliability of the birds is crucial. If reliability is 10% higher or lower than estimated, the enemy's strike capability is quite different from what it is supposed to be. In addition, this reliability must be figured in the time dimension. Reliability can be

very high if there are hours to get ready for the launch. If there are only 30 minutes, and if the force must be launched as the attack commences, the figure would change substantially.

When Minuteman II was deployed the reliability of its guidance and control system was about one-sixth of requirement. It took three years to overcome the difficulty, but then performance exceeded specifications. If we had been attacked during this period, we would have been in a fine mess. Since the mishap was widely rumored, the Soviets probably knew about it—fortunately, the U.S.S.R. lacked adequate strength.

There are a number of rationalizations that facilitate the surprise. For example, the assumption is frequently made that the enemy wouldn't do what we don't do—"Why should he do that?" Another widespread notion is that the enemy would not do what he apparently is doing because, according to his opponent's calculations of the cost-effectiveness of a weapon system, there are cheaper and better ways to achieve the desired result. There are also such common beliefs as that the enemy would not pursue a certain course of action because he would duplicate a strength he already possesses, because he could not afford the expenditures involved, or because he would not be so dastardly.

By contrast, sometimes the enemy makes a spectacular demonstration or diversion for no other reason than to create attention and misdirect the estimator's interest. Then, after losing years in trying to figure out what the military significance of the stunt really was, the estimator arrives at the wrong conclusions.

Historical Examples

In 1937, the Germans won a race in a spectacular manner by stripping down their Messerschmitts whereas the other nations entered fully-equipped fighters. Presumably the staffs understood this particular trick, but the public, the reporters, and the political decision makers were fooled. This, of course, is an example of combined technological and psychological strategy.

The most intriguing aspect of the history of aerospace war and the role of the surprise is that very professional staffs have been deceived about the most basic elements of this new type of war. At times this has been self-deception; at other times they were deceived through deliberate campaigns.

20 Billions Proposed For U. S. Air Defense

Special to THE NEW YORK TIMES.

WASHINGTON, March 15—The latest study to guide defense officials on how best to prepare the United States for air attack proposes additional defense expenditures running to \$20,000,000,000.

However, top Air Force strategists are debating whether such a sum should be spent for purely defensive devices, such as radar stations and warning systems, or for strategic bombers capable of striking at the enemy bases.

The debate has been set off by the most recent paper in a continuing study by the Massachusetts Institute of Technology, under an Air Force contract of two years' standing. The study was conceived by Thomas K. Finletter, then Secretary of the Air Force. Dr. James R. Killian, president of M. I. T., has served as chairman of the study committee.

The paper stresses the vulnerability of American metropolitan

Continued on Page 27, Column 5

MARCH 16 1955

The material in this volume was prepared by the authors under the direction of the Chiefs of the following administrative divisions:

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FOREWORD

THIS VOLUME of the series on the history of the Office of Scientific Research and Development describes the work of those sections of that office and of its subdivision, the National Defense Research Committee, which were mainly concerned with the development of new devices for controlling the behavior of projectiles and other missiles. The devices developed included systems of fire control for the correct aiming of guns on the target, proximity fuzes for use on shells, bombs, and rockets to secure explosion at the right distance from the target, and "guided missiles" which, either by manual or by self-directed control, can actually be made to seek out the desired target. It will hence be appreciated that the volume deals with some of the most elaborate, novel, and important developments in the modern art of warfare. Since many of the devices were especially important in the field of air warfare, the volume has been given the descriptive title "New Weapons for Air Warfare."

The volume was written by the authors listed on page viii, under the direction of the administrative Chiefs there named. It was edited by Joseph C. Boyce, Special Assistant to the Chairman, NDRC. Particular appreciation must be expressed for the work of the Editor, who has written some of the chapters *ab initio*, has improved or rewritten others, and has tied the whole together into a coherent presentation.

As I read the volume over — even in partially completed manuscript form — it brings pleasure to find that the men concerned in the writing have performed their task both adequately and interestingly. We get not only a competent account of the course of many diverse developments, but we get a sense of the devotion of the scientists and engineers who — to the point of exhaustion — put their best into the work to be done for their country, and we find pungent phrases that recall once more the successive days of fear and confusion, of organization and progress, and finally of achievement and victory.

After two introductory chapters, the first part of the volume describes the development of fire-control devices and systems which was undertaken at first by a section of Division D, NDRC, and then continued

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FIRST EDITION

Published September 1947

ATLANTIC-LITTLE, BROWN BOOKS
ARE PUBLISHED BY
LITTLE, BROWN AND COMPANY
IN ASSOCIATION WITH
THE ATLANTIC MONTHLY PRESS

Published simultaneously
in Canada by McClelland and Stewart Limited

PRINTED IN THE UNITED STATES OF AMERICA

PUBLISHER'S NOTE

Under the terms of the contract for the publication of *New Weapons for Air Warfare* and of the other volumes in the long history of the activities of the Office of Scientific Research and Development, entitled *Science in World War II*, the publisher has agreed to waive its right under the copyright of each separate volume after ten years from the date of its publication. Thereafter the volume will be in the public domain and dedicated to the public.

This history of OSRD is intended to be a survey of the way in which certain weapons were developed or improved, and is not intended to be a complete documentary record of the making of the inventions that happen to be mentioned in it. Therefore the dates used, which serve to outline the general chronology, do not necessarily establish dates of conception of inventions, of their reduction to practice, or of occasions of first use. Moreover, in the interest of simplicity, credit for the development of a device is frequently given to a group identified by the name of its leader, rather than to the individual who was the actual inventor.

The authors and editor of this volume do not receive any royalty from its sale.

Radar equipment developed by another section of the OSRD carried out automatic tracking of the enemy planes—in this case, the buzz bombs), and furnished the data about location and flight path. The BTL director M-9 accepted these data and computed the predicted position. The fuse time settings did not have to be utilized, for by then still another OSRD development was available for use, the proximity fuse. This device, developed under the inspired direction of the physicist Merle Tuve (his section of the OSRD was so clearly a personal affair that it was designated as Section "T"), was an electrical marvel that replaced the time fuse in the nose of the shells and automatically detonated them when they came into the near neighborhood of the target.

The success of these three interdependent devices, the radar set, the electrical director, and the proximity fuse, is a matter of record. As of August 2, 1944, before the U.S. batteries became operative, the cumulative averages on destructions of V-1 were that, of those launched, anti-aircraft fire destroyed 10 per cent. After the five battalions of U.S. 90-millimeter guns were installed, equipped with automatic radar tracking, the M-9 director, and proximity fuses, the percentage of buzz bombs destroyed by A.A. fire rose by a factor of five, to 50 per cent. Actually the shooting record was better than this average figure indicates. Of the V-1's actually engaged by the heavy A.A., the percentage of kills was about 80. For example, the U.S. 124th and 125th Battalions, during one period, destroyed thirty-one of forty that were launched over their area. One battery, observed by Clarence A. Lovell of Bell Telephone Laboratories, who made a trip there engaged nine buzz bombs, all of which were shot down.

Illustrated with photographs

SCENE OF CHANGE

A Lifetime in American Science

For many years Warren Weaver was the Director for Science of the Rockefeller Foundation, and he has also been an officer of the Sloan Foundation. In these capacities, he has been largely responsible for the administration of more than \$100 million in grants for the support of scientific research. Much of this aid was for the development of biology, agriculture, and medicine.

In his autobiography, he reminisces about his life and work; dramatically illustrates the tremendous advances that science has made in the last three-quarters of a century; includes his unique and personal views on molecular biology, quantum theory, applied mathematics, and science and religion; and gives glimpses of such distinguished men as Raymond Fosdick, Linus Pauling, Norbert Wiener, and Jonas Salk. Rich in detail and humanistic in approach, this new addition to Scribners Scientific Memoirs is an important historical document.

Warren Weaver is known to many as the author of *Science and Imagination*, *U.S. Philanthropic Foundations*, and other books and has won numerous awards for his contributions to science.

Reference notes, chronology, selected bibliography, index.

E. C. A. OFFICIAL TO RESIGN NO ACTION ON BAR TO AID

Deputy Administrator Bissell Will Return to M. I. T.

Special to THE NEW YORK TIMES.

WASHINGTON, June 5 — Richard M. Bissell Jr., Deputy Economic Cooperation Administrator and one of the chief architects of the Marshall Plan, has told associates he will leave Government service to return to the Massachusetts Institute of Technology.

Because he will be one of the chief administration witnesses before Congressional committees examining the \$8,500,000,000 mutual security program, Mr. Bissell has not yet set a definite date for his resignation. He expects to return to M. I. T. late this summer.

Mr. Bissell was executive secretary of the original Harriman Committee which worked out a formula for the Marshall concept of helping Western Europe to help itself. Following passage of the Economic Cooperation Act, he became assistant deputy administrator of the E. C. A. and deputy administrator when William C. Foster was promoted from that post to succeed Paul G. Hoffman as administrator.

Although he will be at M. I. T., Mr. Bissell also will be concerned with research for the Ford Foundation, of which Mr. Hoffman is president.

June 6, 51

30 More Hotels Struck

Thirty more smaller Manhattan hotels were struck yesterday by Local 144, Hotel Front Service Employees, A. F. L., in the dispute with the Associated Hotels and Residence Clubs. The strike, which

House Group Delays Bill to Ban It if Nations Help Russia

WASHINGTON, June 5 (AP)—The House Foreign Affairs Committee delayed action today on a bill to invoke sanctions against nations assisting Russia. It wants to hear more on the subject from the State Department. A subcommittee had approved the bill, which would withhold United States military and economic aid to nations supplying arms or war-potential goods to Russia or her satellites.

President Truman spoke out critically Saturday on a similar proposal attached to an appropriation bill by Senator James P. Kem, Republican of Missouri, and passed by Congress. The Kem rider applies only to economic aid and does not affect military aid.

Although the President signed the bill he urged Congress to act to replace what he called "this hasty rider with more workable legislation at the earliest possible moment." He also said that withholding aid to friendly nations doing business with Iron Curtain countries might do more harm than good where East-West trade channels had been re-established.

The President's statement, coming when it did, was seen as one reason why the full committee decided to have a second look at the proposal.

Gen. Bragdon to Retire

WASHINGTON, June 5 (AP)—Maj. Gen. John S. Bragdon, deputy chief of Army Engineers, will retire on June 30 at his own request, the Army announced today. Gen-

METEOROLOGY

No Weather "Cold War"

► SO far as the weather is concerned, the U.S.S.R. is exchanging information with the United States in a most cordial and effective manner, a check-up at the U. S. Weather Bureau reveals. The two nations are able to talk about each other's weather four times a day and the American forecasters are getting all the information they need to help predict general U. S. weather of next week and view world weather almost from hour to hour.

The interchange is by radio and there are no complaints about one nation jamming the other's radio transmissions of weather information. The facts about the weather are in prearranged international code, arranged through one of the few international organizations, besides the United Nations, to which the Soviets still adhere, the International Meteorological Organization.

Actually on a good day when radio reception is satisfactory, the U. S. forecasters have more weather observations from Soviet points than they have from the United States. This is because the U.S.S.R. covers more area.

Most useful to us are the observations from eastern Russia and Siberia because weather travels from west to east in the northern hemisphere and storms that originate there often come to Canada and the United States.

From 500 ground stations in the U.S.S.R. full reports are received every six hours when the radio conditions are good. This may drop to 200 on a day of bad radio reception. These 500 synoptic reports, as they are called, give temperature, pressure,

wind direction and velocity, humidity, whether it is clear, cloudy, rainy, etc., visibility, pressure changes, which are all standard data. Comparatively, such reports are received from 400 U. S. stations.

We also know what the weather is in the air over a large number of Soviet points. From 65 to 70 Soviet localities pilot balloon observations, called "pibals" for short, are received four times daily. These give wind direction and velocity usually up to 25,000 to 30,000 feet on clear days, and occasionally to 50,000 feet. The number of U. S. Weather Bureau stations making pibal observations is about 150.

Radiosonde flights, which consist of miniature radio sending instruments carried aloft by balloons, provide temperature, pressure and humidity data up to 50,000 feet altitudes from 35 Soviet points each weather radio transmission. The coverage of the U. S. A. by such rayobs or rawin sondes, as they are also called, requires more than 50 such observations.

The Russian weather messages are usually copied at present in Tokyo and Germany, although they could be received directly in the United States if that seemed advisable, instead of having them relayed from overseas. Both American and Soviet weather messages are included in the international weather transmissions that anyone can pick up and decode and use. Most of the larger nations contribute to the world weather forecasting by issuing such information by regular radio transmissions.

Science News Letter, October 22, 1949

GENERAL SCIENCE

Strong Military Defense

► OVERLOOKED in the excitement of the Soviet atomic explosion is a strengthening of the military arm of the United States that promises to have far-reaching effects.

The Research and Development Board of the Department of Defense has been given more authority and responsibility. It can now see that what it believes should be done in weapon development is actually carried out. It has been moved from the situation of being advisory and getting results by knocking military heads together to one of being able to order things done.

Despite the effectiveness of the predecessor organization of World War II, the famous OSRD, the Office of Scientific Research and Development, headed by Dr. Vannevar Bush, the complaint of the key scientists in that organization was that it took too long to get the new discoveries and developments of the scientists into actual operation.

This was not a real criticism of the military men, for in general they realized the need of new methods to counter and surpass the enemy's technology. But it was necessary to go through another layer or echelon of command to get things moving that took precious and sometimes deadly time.

Now Dr. Karl T. Compton, chairman of the RDB, who was one of the Bush group, heads an organization that has the burden and opportunity of decision as well as development. In the new RDB set-up, there is now either an undersecretary or an assistant secretary of the Army, Navy and Air Force, as well as high-ranking officers. Thus there is a fusion of civilian and military command to help put scientific brainpower to work.

Just what the RDB is doing is largely secret. But experts come and go within the far-flung program. We can now expect that the direction of the search for

better offense and defense will be shifted more rapidly than ever before, even if we can not hear about such changes.

For science, there is almost a feeling of active war in the air, with scientists saying less than ever they have since V-J day and fewer and fewer publications appearing in certain fields of development.

Science News Letter, October 22, 1949

On This Week's Cover

Greater stockpiles of blood, for use in event of an atomic war or other national disaster, may come through new methods being developed for the National Blood Program of the American Red Cross. On the cover Drs. John G. Gibson of Harvard Medical School and Charles P. Emerson of Boston University are shown inspecting a new silicone-coated blood collecting bottle in which the separation of red cells from plasma is speedily accomplished through the use of a blood substance, fibrinogen. (See SNL, April 30, p. 275 and May 14, pp. 314, 315.)

Science News Letter, October 22, 1949

PSYCHOLOGY

Answer to "Who Are You?" Varies with Age and Sex

► ASK a person "who are you?" and you'll get a wide variety of answers. Give those answers to a psychologist and he may find them psychologically significant.

So say Dr. James F. T. Bugental and Seymour Zelen, psychologists at the University of California at Los Angeles, who have asked this question of several hundred students, church members, white collar workers and laborers.

Those tested were asked to write three responses to the question. An analysis revealed that more than 18% considered themselves to be, first of all, a name such as "Joe" or "Bill." Slightly less than 18% replied with their occupational status, that is, student, riveter. The same percentage fell into the sex category, such as "I am a boy, a girl, a woman, a male."

One female very conscious of her femininity replied, "a female, a coed, a sister." Others identified themselves as a "unique person," "getting a kick out of life," "some joker."

Group patterns were evident in the over-all analysis. For example, older men seemed to favor occupational status, whereas, mature women favored family status. Younger subjects responded more often with sex identification and the youngest females seemed to favor social status.

Science News Letter, October 22, 1949

Mexican tortillas, pancakes made of corn meal, have higher nutritive value if made of a mixture containing one-tenth sesame meal.

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THE NATIONAL MILITARY RESEARCH AND DEVELOPMENT BOARD



Full personnel attend meeting in the Pentagon Building in Washington. Seated left to right are Gen. J. L. Devers, Chief of the Army Field Forces; Dr. Karl T. Compton, chairman, and Rear Admiral Albert G. Noble, Chief of the Navy's Bureau of Ordnance. Standing are Brig. Gen. Donald L. Putt, Air Force Materiel Command; Lieut. Gen. Benjamin Chidlow, Air Force Materiel Command; Rear Admiral Robert P. Briscoe, Office of the Chief of Naval Operations, and Maj. Gen. C. G. Hemlick, Deputy Director for Research and Development, Logistics Division, of the Army General Staff.

The New York Times (Washington Bureau)

McNARNEY, Joseph T., army officer; b. Emporium, Pa., Aug. 28, 1893; s. James Pollard and Helen (Taggart) McN.; B.S., U.S. Mil. Acad., 1916; grad. Air Corps Tactical School, 1921, Command and Gen. Staff School (honor grad), 1926, Army War Coll., 1930; m. Helen Wahrenberger, June 30, 1917; 1 dau., Betty Joe; Comm'd. 2d Lt., U.S. Army, 1915, and advanced through the grades to major general (permanent), 1943, to general (temporary), 1945; with aviation section, Signal Corps, 1916; comd. corps observation groups, overseas, 1917-19; instr. Air Corps Tactical School, 1921-25; mem. gen. staff, War Dept., 1926-28; comd. March Field, Calif., 1930-31, 7th Bombardment Group, 1932-33; instr. Army War Coll., 1933-35; staff G.H.Q. Air Force, 1935-38; comd. 7th Bomber Group, 1939; gen. staff, War Dept., 1939-41; apptd. chmn. War Dept. Reorganization Committee, Jan. 1942; apptd. deputy chief of staff, U.S. Army, Mar. 1942; mil. observer, London, 1941; appointed member bd. of experts to investigate Hawaiian surprise attack, December 7, 1941. Appointed Deputy Supreme Commander-in-Chief Mediterranean and commanding gen. U.S. Mediterranean Theater of Operations, Oct. 23, 1944; acting Allied supreme comdr. in Mediterranean area, October 1, 1945; comdr. U.S. Forces in Europe, Nov. 1945. Apptd. Army Air Force rep., Mil. Staff Com., United Nations, 1947, comd. gen. materiel command, Wright Field, Dayton, O., 1947. Apptd. mem. U.S. Can. Permanent Joint Bd. of Defense, Aug. 1940. Named chmn. Nat. Defense Management Com., 1949. Mem. Order of Distinguished Service. Clubs: Army and Navy, Army, Navy and Marine Country (Washington). Address: Office Secretary of Defense, Pentagon, Washington 25.

PUTT, Donald L. (exander), air force officer; born Sugar Creek, O., May 14, 1905; s. Harry Edwin and Lucy Hollis (Prestar) P.; B.S. in elec. engring, Carnegie Inst. of Tech., 1928; M.S. in aeronautical engring, Calif. Inst. of Tech., 1933; Air Corps Engring Sch., 1936-37; m. Margaret Wiley Tent, Dec. 27, 1932; 1 son, William Donald. Enlisted July 1923, commissioned 2d Lt., 1925; advanced through grades to maj. gen., 1943; stationed with 1st pursuit group, Selfridge Field, Mich., 1929-33; flight test pilot, Wright Field, 1933-36; chief bombardment branch, Engring Div., 1938-45; dep. comd. gen. Intelligence, Air Materiel Command, 1945-46; dep. chief, engring div., 1946-48; dir. Research and Development, U.S. Air Forces, since 1948; dir. tech. services, Air Tech. Service Command, Europe, 1945; Decorated Legion of Merit; Bronze Star Medal with Oak Leaf Cluster; Croix de Guerre with Palm (France). Mem. Inst. of Aeronautical Sciences, Research and Development Bd. and Nat. Adv. Com. for Aeronautics, Sigma Alpha Epsilon, Tau Beta Pi, Theta Tau, Eta Kappa Nu, Sigma Xi, Scabbard and Blade. Home: 610 Crescent Dr., Alexandria, Va. Office: Dir. Research and Development, U.S. Air Forces, Washington, D.C.

PRICE, John D., naval officer; b. Augusta Ark., May 18, 1892; s. David Flournoy and Anna Frances (Corley) P.; B.S., U.S. Naval Acad., 1916; grad. Naval Aviation Sch., Pensacola, Fla., 1920; m. Miriam Johnston, May 17, 1924; children—Dale (Mrs. A. B. Cooner), John; Comm'd. ensign, 1918, and advanced through the grades to vice adm., Aug. 1949; gunnery and mining officer U.S.S. Quinechan, World War I; commanded by sec. of navy for experimental flying on aircraft carriers; commanded U.S.S. Jason, U.S.S. Peconoke (aircraft tenders), 1931, 1939, Naval Air Station, Seattle, 1928-30, Anacostia, D.C., 1937-39; Jacksonville, Fla., 1942-43; Patrol Wings 3 and 8; comdr. A. F. Pacific; nominated chief Naval Air Operations, Washington, D.C. Awarded W.W. I medal, Mexican, Yangtze medals; Navy Cross, Distinguished Flying Cross, Legion of Merit. Club: Army-Navy Country (Washington, D.C.). Home: 1801 S. Taylor St., Little Rock, Ark. Address: care Naval Operations (Air), Navy Dept., Washington 25.

NOBLE, Albert Gallatin, naval officer; b. Preston, Tex., Dec. 14, 1895; s. Albert G. and Sally (Wilson) N.; B.S., U. S. Naval Acad., 1917; M.S. (Mech. Engineering), Massachusetts Institute Tech., 1923; m. Anna Madeline Martin, August 9, 1917; 1 daughter, Nancy Louise (Mrs. Robert S. Myers). Comm'd. ensign, United States Navy, 1917, promoted through grades to rear adm., 1944; served in U.S.S. Delaware, Battleship Squadron 6, British Grand Fleet, World War I; comd. destroyers Dallas and Cassin, and served as fleet gunnery officer, staff of comdr. in chief U.S. Fleet, 1938-40; comd. cruiser, 1943-44; chief of staff to comdr. 7th Amphibious Force, Mar-Dec. 1944; comdr. Amphibious Group, Pacific Fleet, Jan. 1945-May 1946. Decorated: Navy Cross, Navy D.S.M., Army D.S.M., Navy Legion of Merit with two gold stars, Army Legion of Merit, Atlantic and Pacific area medals, World War I medal. Club: Army-Navy Country, Army Navy Town (Washington). Home: Naval Gun Factory. Address: Office Bureau of Ordnance (Chief of Bureau), Navy Dept., Washington, D.C.

DEVERS, Jacob Loucks (devers), army officer; b. York, Pa., Sept. 8, 1887; s. Philip Knoderer and Ella Kate (Loucks) D.; B.S., U.S. Mil. Acad., 1909; m. George Hayes Lyon, Oct. 18, 1911; 1 dau., Frances Lyon (wife of Lt. Col. Alexander Graham). Comm'd. 2d Lt. F.A., U.S. Army, 1909; advancing through grades to maj. gen., 1940, Lt. gen. Sept., 1942, gen. Mar. 1945; served as exec. officer, Sch. of Fire, F.A., World War; then instr. mil. tactics, U.S. Mil. Acad., for 5 yrs.; detailed as field arty. officer to participate in planning operations with mechanized troops, 1930-34; became expert on mechanization; charge mechanization of Panama Canal defenses as chief of staff, Panama Canal Dept., 1939-40; became comdr. Fort Briggs, 1940; apptd. command Armored Force, Fort Knox, Ky., 1941; comd. U.S. Forces in European Theater of Operations, 1943; comd. gen. North African Theater of Operations and dep. supreme allied comdr., Mediterranean Theater, 1944; comd. gen. Sixth Army Group, Sept. 13, 1919; children—Judith Louise (Mrs. Judith Louise Settle), Joyce Gardner, Charles Gardner. Commissioned ensign, United States Army, June 6, 1913; resigned, July 12, 1913; advanced through the grades to brig. gen. (temp.) comd. New England subordinated Legion of Merit with two oak leaf clusters.

HEMLICK, Charles Gardner (hælmik), army officer; b. Ft. Sherman, Ida., July 7, 1892; s. Maj. Gen. Eli Alva and Elizabeth Allen (Clarke) H.; B.S., U.S. Naval Acad., 1912; grad. F.A. Sch., Advanced Class, 1925, Command and Gen. Staff Sch., 1926, Army War Coll., 1933, Air Corps Tactical Sch., 1938; m. Leah Louise Stock, Sept. 13, 1919; children—Judith Louise (Mrs. Judith Louise Settle), Joyce Gardner, Charles Gardner. Commissioned ensign, United States Army, June 6, 1913; resigned, July 12, 1913; advanced through the grades to brig. gen. (temp.) comd. New England subordinated Legion of Merit with two oak leaf clusters.

Distinguished Service Medal, Bronze Star Medal, Air Medal (U.S.), Army Commendation Ribbon; Legion of Honor, Croix de Guerre with palm (France), Order of White Lion 3d class, Military Cross (Czechoslovakia); Couronne de Cheval (Luxembourg). Clubs: Army and Navy, Army-Navy Country (Washington). Address: Hdqrs. Army Base, Boston 16.

A Second Look at a Bill Saves the Marine Band

By The United Press.

WASHINGTON, March 23—A House Armed Services subcommittee took a second look at a bill today and knocked out a provision that would have put the Marine Corps Band out of action.

"We don't want to abolish the Marine Band," said the committee chairman, Representative Carl Vinson, Democrat, of Georgia.

Unlike other service bands, the Marine Band is separate from the regular Marine organizations. Its members may not be called to regular military duty.

Marine officials protested that its special status would have been wrecked by a bill setting up new pay scales for all branches of the service.

Representative Vinson chided the Marines for "not coming around" to the committee more often. He said today was the first he had seen a Marine officer at a committee hearing in two years.

tary of the Air Force. A tribute to Mr. Forrestal was also paid by Louis A. Johnson, who will succeed him on April 1.

MORE ARMORIES PROPOSED

Royall Urges Up to \$774,000,000 for Expanding National Guard

WASHINGTON, March 23 (UP)—The Secretary of the Army, Kenneth C. Royall, asked Congress today to give the states up to \$774,000,000 to help build armories for the National Guard and Organized Reserves.

He told a Senate Armed Services subcommittee that the Defense Department hoped to reduce the regular armed forces and build up reserve units as the international situation eased. The armories would be needed for training, he said.

The bill authorizes Federal expenditures of from \$22,000,000 to \$774,000,000 over a five-year period. The Federal Government would bear 75 per cent, and the states 25 per cent, of the cost of building armories for the National Guard. The Federal Government would pay for all the facilities for reserve units.

Mr. Royall said he hoped to increase the strength of the National Guard from its present 325,000 to 500,000 and the Organized Reserves from 230,000 to 380,000.

acobs, Democrat, of Indiana, a

FORRESTAL SPEEDS DEFENSE DATA CURB

Orders Release of Information on New Weapons Only Through His Office

By WALTER H. WAGGONER

Special to The New York Times

WASHINGTON, March 23—James Forrestal, Secretary of Defense, has ordered, effective immediately, that all information about new weapons, munitions and other defense equipment "of any kind" be cleared only through his office.

This action, taken in the form of a memorandum to the top officials of the Army, Navy, Air Force and related agencies of the National Military Establishment, moves up by more than a week an important part of the Secretary's public information consolidation order of March 17, which is to take effect at the end of this month.

Mr. Forrestal's directive of last Thursday created a new and unified Office of Public Information for all the armed forces, directly responsible to the Secretary of Defense. The order, under consideration for several months, was issued after sharp Congressional inquiries into defense information policies, and was designed not only to prevent disclosure of possible military secrets but also to check further the "headline competition" between the three military departments.

In his latest move, which would speed up the consolidation process, the Defense Secretary makes his office custodian of all information relating to "performance or capabilities of new weapons or new equipment of any kind."

This presumably would include reports and appraisals of the giant B-36 bomber, among others. The B-36 has been acclaimed in Air Force statements as a long-range carrier of atomic bombs.

"Specific Clearance" Required

The Navy more recently disclosed that naval aircraft, said also to be capable of delivering the atomic bomb, had taken off from the deck of an aircraft carrier with record loads.

Mr. Forrestal's new memorandum, dated March 20, was sent to the Secretaries of the Army, Navy and Air Force, the chairmen of

the Munitions Board and the Research and Development Board and the Joint Chiefs of Staff. It said in part:

"No information of any kind whatsoever relating to performance or capabilities of new weapons or new equipment of any kind will be released without specific clearance from this office."

The memorandum also instructed the three armed forces to call on their subordinate "commands and services" to abide by the terms of the directive.

Among the several specific functions of the new central Office of Public Information was the clearance of all statements and manuscripts designed for either written or oral delivery. This is the section, applying in particular to weapons and equipment, put into effect immediately by Secretary Forrestal.

"Top Secret" Meeting Held

Committee chairmen of the Research and Development Board meanwhile held their first "top secret" meeting today with their new chairman, Dr. Karl T. Compton. The group, consisting of seventeen scientific and industrial experts, considered problems "relating to the National Military Establishment's program on atomic energy, biological warfare, guided missiles and other fields," a statement from the board said.

The committees of the RDB cover all areas of research and development of concern to the Defense Department. Their meetings, as a consequence, receive the highest classification of military secrecy.

In addition to the most spectacular aspects of military science, such as atomic energy and biological warfare, the committees represent such technical fields as human resources, medical sciences, aeronautics, electronics and the basic physical sciences.

Committee chairmen are prominent scientists and technicians who contribute their services to the board on a part-time basis. There are also military members and a full-time secretariat and planning division.

The Defense Department pointed out that the civilian members had been called upon to assist in the security discussions as a result of the shortage of scientists for full-time positions.

Help visitors to enjoy their trips to New York City better by calling at the New York Convention and Visitors Bureau, 500 Park Avenue, at Fifty-ninth Street, New York 22. Literature is distributed free.

CLEAN-UP IS ORDERED FOR JAPANESE UNIONS

Special to The New York Times

TOKYO, March 23—Labor union officials must cease to get their union salaries from company payrolls, according to an order from headquarters to the Japanese Government today. Between 100,000 and 150,000 union officials at present draw their pay only from the companies.

Labor, said Chester W. Hepler, chief of headquarters labor division, must support itself and become independent. He expressed the hope that now that the unions must pay their own officials the union members would inquire into where their dues have gone and clean house.

Although union dues here are generally 2 or 3 per cent of the basic wage and sometimes as high as 10 per cent, hardly a single union has any kind of reserve fund. The money seems to disappear without accounting.

Mr. Hepler declared that the practice of paying union officials' salaries—which developed in the early occupation days when Gen. Douglas MacArthur's aides permitted labor to do almost everything it wished—was in direct violation of the labor union law, which forbids an employer to pay the major portion of the expenses of workers' organizations. He admitted, however, that his division did not plan any move against unions that have taken over buildings, offices, furniture, automobiles and other facilities from employers for their use.

A period of nine days has been given to the Labor Ministry to get the union officials off the company payrolls.

"Surveys show," said Mr. Hepler, "that a majority of the Japanese unions continue to be almost wholly employer-financed."

Puerto Rico Car Study Made

Special to The New York Times

SAN JUAN, Puerto Rico, March 23—Sir William Rootes, London automobile manufacturer, who is making a local survey of market prospects, said today that if Puerto Ricans "buy enough of our cars, we will assemble them here." British-American automobile competition is very friendly, he added, because the Americans recognize Great Britain's need to obtain dollars.

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RESEARCH POWER WIDENED

Johnson Gives Defense Board Rule on Military Projects

Special to THE NEW YORK TIMES.

1750

WASHINGTON, Sept. 22—Louis Johnson, Secretary of Defense, strengthened the authority of the Research and Development Board today, complying with the recent amendments to the National Security Act.

The board, formerly largely an advisory and co-ordinating agency, will now be able to order changes made in the research programs of any of the armed services, instruct them to start new programs and generally take an executive role in the research and development projects for national defense.

Dr. Carl T. Compton, board chairman, said that "the authority to see that its recommendations are in fact carried out will greatly increase the effectiveness of the expert technical advice which the board receives from its consultant and advisors."

Defense Action Urgent

New Research Board to Face Problems of Tank and Air Program Deficiencies

By HANSON W. BALDWIN

A lagging tank program and deficiencies in airborne development and in tactical air power are some of the problems that the Research and Development Board, under a new chairman and with new members, must shortly face.

The Research and Development Board, a keystone in the Defense Department, is charged with the preparation of an integrated program of research and development for all the military services, and with the continuous review and coordination of research projects.

Since Dr. Karl T. Compton resigned as chairman of the board last November, Dr. Robert F. Rinehart, a respected and competent scientist, has been the acting chairman. Ever since the board's organization as part of the new defense structure established by the unification act, it has been a storm center of service interest—for here the competing services jockeyed for position and for control of pet research projects.

The revisions of the unification act, passed last year, gave the board more power and the chairman greater authority. The board in recent months, especially since the resignation of Dr. Compton, has, therefore, been the subject of even greater controversy.

In part, this was inevitable; the board is somewhat in the same unenviable position as the baseball umpire. But, in part the mounting criticism is justified, as this writer pointed out in an article on Jan. 23, for good scientists do not always make good administrators. And the committee and panel system employed by the board utilizes much man power and sometimes tends to foster overlapping and duplication.

Dr. Rinehart Defends Board

Dr. Rinehart, the acting chairman, in a letter to this writer, defends the board, and declares that its effectiveness has been "steadily improving in the last several years, and even more so within the last year."

The reasons for the mounting criticism of the past few months, in Dr. Rinehart's eyes, are primarily four.

"The first reason, paradoxically," he writes, "is the increasingly effective job the RDB is doing in its central task of achieving an integrated program. . . . Under a fixed budget ceiling, a shift in emphasis means that some agency in a military department gains from the shift and another agency loses. . . . The loser . . . naturally resents this action and is of course inclined to cast doubt on the wisdom

and competence of the Board decision.

"The second reason . . . was the new directive issued to the RDB by the Secretary of Defense in September, 1949. . . . This directive increased considerably the authority of the Board and its chairman. . . . In some of the lower echelons in the departments this increased power was viewed with alarm [which] stemmed from the possible effect on some of the entrenched interests. . . ."

"A third reason . . . was Dr. Compton's untimely resignation (due to health). Without a Compton or a Bush at the helm the lid comes completely off the well-springs of criticism. . . ."

"The fourth reason was the establishment of" [a board headed by D. R. E. Wilson, an outside high level advisory group] "to review the RDB's organization and procedures and to make recommendations as to where and how" its operations might be improved.

Stimulation of Criticism Seen

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Dr. Rinehart's points are well taken and the board has, and must continue to have, prestige and respect. But its usefulness was being impaired recently, not only by unfair criticisms, but by its own sometimes tortuous methods of doing business. Its past weak points, however, are now being strengthened, and recent appointments made to the board and the impending appointment of a new chairman, with a past background of administrative experience, indicate further improvement.

Other weaknesses in our security structure—notably the fact that the National Security Resources Board is still without a chairman; the Atomic Energy Commission is about to lose its chairman and beset the basic problem of the hydrogen bomb, and civil defense—must be strengthened immediately, for time in the atomic age can mean life itself.

now dissolved "Op-23," which helped to prepare the Navy's testimony in the now famous hearings, was the central figure in November and December, in a behind-the-scenes struggle in the Pentagon, which ultimately went up to the President for decision.

Despite his outstanding naval record, Captain Burke's name was removed—presumably because of his public activities before and during last fall's hearings in behalf of the Navy—from a selection list for promotion to rear admiral. The resentment in the Navy about this treatment of Captain Burke, who is considered an outstanding officer; the efforts of Admiral Forrest P. Sherman, the new Chief of Naval Operations, in the captain's behalf, and the publicity concerning the removal, forced a reconsideration of the case. Admiral Sherman had at first persuaded the Secretary of the Navy, Francis P. Matthews, that Captain Burke's name must be included; then Secretary Matthews reversed this decision. After publication of the story Admiral Sherman renewed his efforts and, with Mr. Matthews, went to the President, who finally approved Captain Burke's selection.

A Record Is Vindicated

The assignment of Captain Burke to the Research and Development Board is, therefore, a final vindication of the officer and his past record and a testimonial of his superiors' faith and confidence in him.

But it also presages a reorganization of the board, which has been without a chairman since last fall when Dr. Karl T. Compton resigned because of ill health.

A new chairman—probably an administrator with scientific background rather than a scientist with administrative background—may be appointed soon, and fairly extensive changes in the board's somewhat informal method of doing business may be expected. Overlapping and duplication, and a rather loose administration have caused the board to lose, in past months, the once fairly high reputation it enjoyed in the Defense Department. The injection of new blood, it is hoped, will cause a revitalization of this highly important agency.

The Weapons Systems Evaluation Group, a new and promising unit of the Defense Department, is, on the other hand, about to undergo its first major "trial by fire." In fact, there is some evidence this trial already has started.

The Weapons Systems Evaluation Group is headed by Lieut. Gen. J. E. Hull as director, with Dr. Philip M. Morse as director of research. It was established to "provide rigorous, unprejudiced and independent analyses and evaluations of present and future weapons systems under probable future combat conditions."

Duties of the Group Evalued

In the words of the group's handbook, "such analyses and evaluations are to be 'prepared by the ablest professional minds, military and scientific,' bringing the most advanced analytical methods to bear." Because of the breadth and importance of this mission, the group's studies "may influence military planning at any stage, from the decision to proceed with a weapon development to the evaluation of the results of its use in actual combat."

The group is small—about fifty persons all told—of whom some fourteen scientists and sixteen military personnel do most of the evaluation and analysis, with the help of many other agencies in and out of Government, including the Operations Evaluation Group of the Navy, the Operations Research Office of the Army, the Strategic Vulnerability Group of the Air Force, and the Rand Cor-

poration and a complex intermeshed fabric of other problems.

To aid it in its studies, the group used the "Eniac" calculating machine at Aberdeen Proving Ground, Md., to work out complex ballistic and interception problems and to provide a table of probable loss rates. But its studies also included actual flight tests and bombing missions in the B-36 at various altitudes.

From this mass of data, the group has evolved its "basic answer" for presentation to the Joint Chiefs of Staff. What action the Joint Chiefs will take, and whether Congress will get a declassified abstract of the report is not yet known.

But it is clear that the new and highly important Weapons Systems Evaluation Group, which has been established as an agency to be above service and personal partisanship, will shortly receive its first great test.

There is some fear in informed circles in the Pentagon that "backfires" may be built against the Group or its report by zealous exponents of one or another theory, and, as General Hull has noted, regardless of the answers given, some people will never accept them.

But upon the Group, upon its first great report, and upon its ability to remain above partisanship depends, in some measure, the future of our defense program.

Jan 23, 50

Harrison W. Baldwin

"Defense Front Develops"

Compton, Ill, Quits Research Post; Warns on Cuts in Defense Study

By FELIX REICHERT Jr.
Special to The New York Times

WASHINGTON, Nov. 3.—Dr. Karl T. Compton, noted atomic physicist, resigned today as chairman of the Research and Development Board of the Department of Defense. In a letter to President Truman, Dr. Compton said his decision was dictated by reasons of health.

In accepting the resignation, Mr. Truman wrote Dr. Compton that concern for his health left the President no alternative but to bow to medical advice and "with the utmost regret" terminate his commission effective on the appointment of a successor. Dr. Compton asked for and received a leave of absence without salary beginning Nov. 10.

Pending the naming of a successor and at the suggestion of the retiring chairman, President Truman said the board would be headed by Dr. Robert F. Rinehart as deputy chairman. Two representa-

tatives each of the Army, Navy and Air Force complete the board's membership under a civilian chairman.

In his letter of resignation that served also for his valedictory, Dr. Compton warned against "across-the-board" cuts in research and development funds in the defense budget. He said the agency had "sufficiently intimate and competent contact with the programs under its cognizance to justify financial control on a more rational basis."

Dr. Compton was mildly critical of the checks and counter-checks that size and security imposed on scientific work in the Defense Establishment but which he said "discourage competent research personnel from entering careers under such auspices, except as they are motivated by patriotism or by en-

Continued on Page 26, Column 4

THE NEW YORK TIMES, FRIDAY, NOVEMBER 4, 1949.

FORCED OUT BY HEALTH



Dr. Karl T. Compton
The New York Times (Washington Bureau)

COMPTON RESIGNS AS RESEARCH HEAD

Continued from Page 1

thusiasm for some particular professional opportunity."

The former president of the Massachusetts Institute of Technology conceded that such handicaps were partially inescapable "in the complexity of government and its long chains of public accountability." He noted some recent improvement in policies of research administration among Federal agencies and added:

"But sometimes the effect of high-level investigations or attacks is to multiply excessively the controls on research agencies, and thus to defeat the stated objective of 'efficiency.'"

Dr. Compton stressed that the latter observation was intended to be general in its application "and not related particularly to the Military Establishment."

Program Called "Sound"

Meanwhile, the President had Dr. Compton's word for it that "while always susceptible of improvement, the program of military research and development is sound." He said it was intelligently conceived and directed and added:

"Examination in detail by competent experts, in many cases spot-checked by several intensive investigations, has failed to uncover significant cases of unwarranted duplication."

Dr. Compton gave his personal estimate, based on comparative experience in privately operated research establishments that "major inefficiencies in research under Governmental auspices are not due to faulty technical planning, but to the complications of excessive checks and counterchecks which multiply the manpower requirements for securing research results.

These were the same checks and

counterchecks which, he said, had such discouraging effects on Government research personnel.

While Dr. Compton suggested much room for improvement in Federal research administration there was much of solid achievement by the board to which he pointed in his letter to the President.

"For the first time," he said, "it has made available to the Joint Chiefs of Staff a complete report on the status of every research and development item which may be important in future military strategy, with estimates of performance characteristics and dates of availability."

Truman Praises His Work

"For the first time it has been possible to recommend to the Secretary of Defense, in connection with the plans for fiscal 1951, a budget for research and development which is not based, as in preceding years since the war, on the accidental factor of temporary shortage of research personnel, but on carefully considered estimates of the military importance and technical feasibility of specific projects, all within realistic financial limits."

President Truman praised Dr. Compton's contributions to the national welfare.

"For many years," the President wrote Dr. Compton, "your grateful countrymen will remember your extraordinary contributions to the national security through your service as chairman of the Research and Development Board. Not less remarkable than the things which you have accomplished personally are the things which you have helped others to accomplish and the outstanding overall results which have been achieved under your leadership."

Dr. Compton, who is 63 years old, told the President in his letter of resignation that he had determined to leave the Federal service because of "medical advice which I cannot ignore." He was appointed to the chairmanship of the research agency in 1945, succeeding Dr. Vannevar Bush.

Named to Defense Research Post
WASHINGTON, June 20 (AP)—A Pennsylvania State College scientist who was assistant director of the underwater sound laboratory at Harvard during the second World War will become executive secretary of the Defense Department's Research and Development Board Aug. 1. The chairman, William W. Washburn, said today that Dr. Eric Walker would take over from Dr. Robert F. Rinehart, who is returning to the Case Institute of Technology at Cleveland as a Professor of Mathematics.

NEW MISSILES UNIT HEAD

Millikan Succeeds President of Purdue in Defense Job

ANNOUNCED IN THE NEW YORK TIMES
WASHINGTON, June 16.—Dr. Clark B. Millikan, acting director of the Guggenheim Aeronautical Laboratory at the California Institute of Technology, has been named chairman of the Guided Missiles Committee of the Research and Development Board, National Military Establishment, Dr. Karl T. Compton, chairman of the board, said today.

Fred A. Darwin was named executive director of the Guided Missiles Committee. Dr. Millikan, who has been a member of the committee since its formation, succeeds Dr. Frederick L. Howde, president of Purdue University.

NEW YORK TIMES, WEDNESDAY, FEBRUARY 8, 1950.

Defense Action Urgent

New Research Board to Face Problems of Tank and Air Program Deficiencies

By HANSON W. BALDWIN

A lagging tank program and deficiencies in airborne development and in tactical air power are some of the problems that the Research and Development Board, under a new chairman and with new members, must shortly face.

The Research and Development Board, a keystone in the Defense Department, is charged with the preparation of an integrated program for all the military services, and with the continuous review and coordination of research projects.

Since Dr. Karl T. Compton resigned as chairman of the board last November, Dr. Robert F. Rinehart, a respected and competent scientist, has been the acting chairman. Ever since the board's organization as part of the new defense structure established by the unification act, it has been a storm center of service interest—for here the competing services jockeyed for position and for control of past research projects.

The revisions of the unification act, passed last year, gave the board more power and the chairman greater authority. The board in recent months, especially since the resignation of Dr. Compton, has, therefore, been the subject of even greater controversy.

In part, this was inevitable; the board is somewhat in the same unenviable position as the baseball umpire. But, in part the mounting criticism is justified, as this writer pointed out in an article on Jan. 23, for good scientists do not always make good administrators. And the committee and panel system employed by the board utilizes much man power and sometimes tends to foster overlapping and duplication.

Dr. Rinehart Defends Board
Dr. Rinehart, the acting chairman, in a letter to this writer, defends the board, and declares that its effectiveness has been "steadily improving in the last several years, and even more so within the last year."

The reasons for the mounting criticism of the past few months, in Dr. Rinehart's eyes, are primarily four.

"The first reason, paradoxically," he writes, "is the increasingly effective job the RDB is doing in its central task of achieving an integrated program. . . . Under a fixed budget ceiling, a shift in emphasis means that some agency in a military department gains from the shift and another agency loses."

The loser . . . naturally resents this action and is of course inclined to cast doubt on the wisdom

and competence of the Board decision.

"The second reason . . . was the new directive issued to the RDB by the Secretary of Defense in September, 1948. . . . This directive increased considerably the authority of the Board and its chairman.

In some of the lower echelons in the departments this increased power was viewed with alarm [which] stemmed from the possible effect on some of the entrenched interests. . . ."

A third reason . . . was Dr. Compton's untimely resignation (due to health). Without a Compton or a Bush at the helm the lid comes completely off the well-springs of criticism. . . ."

"The fourth reason was the establishment of" [a board headed by D. R. E. Wilson, an outside high level advisory group] "to review the RDB's organization and procedures and to make recommendations as to where and how" its operations might be improved.

Stimulation of Criticism Seen
This proved to be, in Dr. Rinehart's opinion, a "natural spur toward the marshalling of all available criticisms of the RDB, warranted and unwarranted, to get them before the advisory group."

"This was entirely appropriate," Dr. Rinehart comments, "and Dr. Wilson's group heard and evaluated all the criticisms, heeding some, rejecting many more. A natural result, however, was the further stimulation of propagation of criticisms by the complainants."

These "inspired" criticisms are not, however, in Dr. Rinehart's judgment, a fair reflection of the board's accomplishments or its present prestige and past achievements.

Dr. Rinehart's points are well taken and the board has, and must continue to have, prestige and respect. But its usefulness was being impaired recently, not only by unfair criticisms, but by its own sometimes tortuous methods of doing business. Its past weak points, however, are now being strengthened, and recent appointments made to the board and the impending appointment of a new chairman, with a past background of administrative experience, indicate further improvement.

Other weaknesses in our security structure—notably the fact that the National Security Resources Board is still without a chairman; the Atomic Energy Commission is about to lose its chairman and meet the basic problem of the hydrogen bomb, and civil defense—must be strengthened immediately, for time in the atomic age can mean life itself.

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But upon the Group, upon its first great report, and upon its ability to remain above partisan bias depends, in some measure, the future of our defense program.

RESEARCH POWER WIDENED

Johnson Gives Defense Board Rule on Military Projects

ANNOUNCED IN THE NEW YORK TIMES
WASHINGTON, Sept. 22.—Louis Johnson, Secretary of Defense, strengthened the authority of the Research and Development Board today complying with the recent amendments to the National Security Act.

The board, formerly largely an advisory and co-ordinating agency, will now be able to order changes made in the research programs of any of the armed services, instruct them to start new programs and generally take an executive role in the research and development projects for national defense.

Dr. Karl T. Compton, board chairman, said that "the authority to see that its recommendations are in fact carried out will greatly increase the effectiveness of the expert technical advice which the board receives from its consultants and advisors."

Jan 23, 50
Hanson W. Baldwin
Defense Trust Dist.

Truman Asks Utility Leader To Head Top Research Body

By JAMES RESTON
Special to The New York Times

WASHINGTON, Jan. 31—President Truman has offered the Government's top scientific job—chairmanship of the Research and Development Board in the Department of Defense—to William Webster of Boston, a vice president of the New England Electric System, it was learned today.

Mr. Webster, 49 years old, a graduate of the United States Naval Academy and former chairman of the Defense Department's Military Liaison Committee with the Atomic Energy Commission, would be largely responsible for preparing an integrated military research and development program so that weapons such as the new hydrogen bomb would take their proper place in a well-balanced defense policy.

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Continued on Page 5, Column 3

IT'S A TRITON BOMB, MIGHTIEST POSSIBLE

Would Release Energy More Than Seven Times '45 Type
—No Critical-Mass Limit

By WILLIAM L. LAURENCE

What President Truman referred to yesterday as "the so-called hydrogen bomb" is not a hydrogen bomb at all in the true scientific meaning of the term.

This, the most powerful super-bomb that can be built on earth, it can now be revealed, actually is the triton bomb, in which the basic element used is tritium, a hydrogen isotope (twin) of atomic mass 3. It is an element hardly known to the public but well known to nuclear physicists. A triton is the nucleus of tritium, composed of one proton and two neutrons.

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Jan 31, 1950

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ELAIR Jr.
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Truman Asks Utility Leader To Head Top Research Body

By JAMES RESTON
Special to The New York Times

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Jan 31, 1950



OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301-1400

25 JAN 1988

Ref: 88 FOI-0052

PUBLIC AFFAIRS

Mr. Grant Cameron
649 Silverstone Avenue
Winnipeg, Manitoba
Canada R3T2U8

Dear Mr. Cameron:

This is in response to your January 6, 1988, letter requesting information concerning records of the Research and Development Board.

Records of the time period of your request are likely to be in the files of the National Archives and Records Administration (NARA), 8th and Pennsylvania Avenue, NW, Washington, DC 20408. Accordingly, your letter has been forwarded to NARA for direct response to you.

Sincerely,

A handwritten signature in black ink, appearing to read "W. M. McDonald", is written over the typed name.

W. M. McDonald
Director
Freedom of Information
and Security Review

RDB Chief

The United States' top military-scientific group has a new chief. Last week William Webster, scholarly, 40-year-old vice president of the New England Electric system, was appointed chairman of the Research and Development Board, which coordinates all military research. He has promised to serve at least two years.

Unlike his predecessors, Dr. Vannevar Bush and Dr. Karl Compton, Webster is not a scientist. He has had a wealth of experience, however, in the administrative end of research. He served as a consultant with the Joint Research Development Board in 1946, and when it became the RDB in 1947 he was chairman of its atomic-energy committee.

Webster plans to put in three days a week with the RDB during March, assuming the full-time job on April 1. All indications are that he will have his hands full with such problems as the hydrogen bomb, bacteriological warfare, guided missiles, and jet-aircraft development.

Not the least of his headaches: how to keep the three services in line under the board's half-billion-dollar budget and how to retain an already overburdened staff of first-rate civilian scientists, many of whom dislike working with the military. "Right now," said one board member, "about 20 per cent of the scientists we do have want to get out and return to civilian science."

Named to Defense Research Post

WASHINGTON, June 20 (AP)—A Pennsylvania State College scientist who was assistant director of the underwater sound laboratory at Harvard during the second World War will become executive secretary of the Defense Department's Research and Development Board Aug. 1. The chairman, William Webster, said today that Dr. Eric Walker would take over from Dr. Robert F. Rinehart, who is returning to the Case Institute of Technology at Cleveland as a Professor of Mathematics.

GENERAL SCIENCE

Board To Plan Research

Research and Development Board will be staffed with top-flight scientists and will plan use of money available for research.

➤ ONE of the boards set up in the new "national military establishment" headed by Secretary of Defense Forrestal will have more to say about the direction of scientific research and development in this country than any other group.

It is the Research and Development Board, heir to the Joint Research and Development Board which has been headed by Dr. Vannevar Bush, wartime director of the Office of Scientific Research and Development.

The Army and Navy have had large amounts of money to grant to colleges, research laboratories and industrial organizations for digging into new problems and developing applications of recent science developments. With the creation of equality between Army, Navy and Air Force, this full-scale and well-implemented research support will continue unabated.

Failure of the National Science Foundation to materialize as expected will throw a continued obligation on those military branches. They have the money and they will use it in the exploration of fields far removed from shot and shell but nevertheless essential to future fighting strength.

The Research and Development Board, with a staff of top-flight scientists largely from the wartime OSRD, has the job of allotting research fields among the various services and seeing to it that no hot leads are overlooked.

Although the unification act provided a chairman of the board, presidentially appointed from civilian life, "with compensation at the rate of \$14,000 a year," this does not mean the replacement of Dr. Bush, who has been heading the joint board on a part-time basis, just as he ran the OSRD and remained president of the Carnegie Institution of Washington as well. The way seems to be open for Dr. Bush to continue as chairman, thanks to "at the rate of" wording of the act, and he will probably do so.

It is not too much to say that the chairman of this board will be the most powerful person in the nation in the allotment of scientific research funds. He will be the only member of the board

of seven who is not a representative of Army, Navy or Air Force. He will decide differences between the three services.

Of major importance are the two other boards that are created under the unification act. These are the National Security Resources Board and the Munitions Board. The Resources Board's closest approach in the past was the War Reconversion Board, headed by James Byrnes before he became Secretary of State. It is policy-making in industrial and civilian mobilization, in use of natural and industrial resources, in strategic and critical materials, in strategic relocation of all the nation's activities.

The Munitions Board is concerned more directly with procurement, production and distribution among the armed services, but it will be concerned also with the important matter of the adequate reserves of strategic and critical materials.

Science News Letter, August 23, 1947

ENTOMOLOGY

Two New Chemical Weapons Used in Mosquito Warfare

➤ MOSQUITOES have two new chemical-warfare weapons to face, that are expected to make life more miserable—and shorter—for them in future summers. Both weapons have been demonstrated by Dr. Elton J. Hansens.

The first is a pint-size, one-man version of the big insecticide fog-machines

that have come into use for large-scale attack during the past year or two. It is known as a mosquito fumer. It consists of a can containing a nicotine product, plus fuel to convert this into a thermofog. To operate, a lighter somewhat like a Fourth of July sparkler is first ignited, then pushed through a diaphragm on one end of the can. The fumes continue to be effective against mosquitoes for two or three hours.

The second device demonstrated by Dr. Hansens is called a pinstream oiler, and is intended for use against mosquito larvae or "wigglers" in marshes and ponds. Hitherto, fuel oil has had to be applied to such places, at a rate of about 25 gallons per acre, and since this work has to be done mainly on foot this is a rather terrific burden. Now, one gallon of a concentrate containing 1.5% DDT and 0.5% of a spreader will treat the same area that used to require 25 gallons of oil.

Science News Letter, August 23, 1947

HORTICULTURE

New Jersey Orchid Crop Gets Special Attention

➤ ORCHIDS, as well as peaches and tomatoes, pig rations and silo stuffing, are getting scientific attention at the New Jersey State Experiment Station. There's a reason: New Jersey is the home of the greenhouses where fully half the commercially-grown orchids in the United States are produced. The crop is worth three million dollars a year.

Under the direction of Dr. O. W. Davidson of the Station staff, studies are being made on the effects of growth hormones on orchid bulbs, stems and flowers, also on the light and humidity requirements of the temperamental plants, and the acid-alkali balance on which they thrive best.

Science News Letter, August 23, 1947



FIVE-PLACE HELICOPTER—The Army XR-12, with a top speed of 105 miles an hour, is undergoing preliminary tests. A two-bladed rotor system is used with a gyroscopic action stabilizer bar.

WHIPPLE, FRED LAWRENCE—Cont.

Studies III; The Taurid Meteor Shower" for the *Proceedings of the American Philosophical Society* (1940), "Meteor Problems and Photographs of the Perseids" for *Sky and Telescope* (1947), "Meteors as Probes of the Upper Atmosphere" for *Compendium of Meteorology of the American Meteorological Society* (1951), and "Results of Rocket and Meteor Research" for *Bulletin of the American Meteorological Society* (in press, 1952). A member of the editorial board of *Astrophysical Journal* (1952) and author of *Earth, Moon and Planets* (1942), Whipple has also written papers on orbits of comets and asteroids; spectrophotography of apheid variable stars, novae and supernovae; colors of external galaxies, interstellar medium; planetary nebulae; earth's upper atmosphere and nature of meteors by two-camera photographic method; and stellar and solar-system evolution—which appeared in *Proceedings of the National Academy of Sciences*, *Harvard College Bulletin*, *Publications of the American Philosophical Society*, and *Bulletin of the American Meteorological Society*, among other journals. He is also the author of a number of popular articles on astronomical subjects such as "The Heavens Open" for *Collier's*, March 22, 1952.

Whipple, who was a delegate to the Inter-American Astrophysical Congress meeting in Mexico in 1942, has been since 1949 a member of the United States National Committee of the International Scientific Radio Union and is the voting representative of the United States in the International Astronomical Union in 1952. He became research associate of the Institute of Meteorites at the University of New Mexico in 1947 and in the same year was selected to deliver the Lowell lecture at Lowell Institute in Boston. Chairman of commission 22 (shooting stars) of the International Astronomical Union since 1946, Whipple is also a member of the union's commission 20 (positions and motions of asteroids) and commission 36 (spectrophotometry). Other organizations of which he is a member are the American Standards Association (committee on standardization in the field of photography), American Astronomical Society (vice-president, 1948-50), American Academy of Arts and Sciences, American Association for the Advancement of Science, American Geophysical Union, and the American Meteorological Society. At the first annual Symposium on Space Travel at the Hayden Planetarium in October 1951, Whipple advised future space travelers to equip their space ships with an outer, second "skin" to prevent meteors from damaging the ship's aluminum body.

Whipple is the recipient of an honorary M.A. degree from Harvard University, conferred in 1945. His societies are Pi Mu Epsilon, Phi Beta Kappa, and Sigma Xi. By his first marriage, to Dorothy Woods in 1928, he is the father of Earle Raymond; the marriage was terminated by divorce in 1935. In 1946 he married Babette F. Samelson, formerly a teacher at Wellesley College; their children are Dor-

othy Sandra and Laura. The astronomer turns to painting for recreation.

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WHITE, WALLACE H(UMPHREY), JR. Aug. 6, 1877—Mar. 31, 1952 Former United States Senator from Maine; lawyer; began career in 1899 as assistant clerk of the Senate Committee on Commerce; Republican member of the House of Representatives from Maine (1917-31); Senator from Maine (1931-49); majority floor leader in the Eightieth Congress; initiated legislation on shipping, merchant marine, and Federal Communications Commission. See *Current Biography*, 1948.

Obituary

N Y Times p29 Ap 1 '52

WHITMAN, WALTER G(ORDON) Nov. 30, 1895- United States Government official; chemical engineer; university professor

Address: b. c/o Research and Development Board, Department of Defense, The Pentagon, Washington 25, D.C.; c/o Massachusetts Institute of Technology, Cambridge, Mass.; h. Nashawtuc Rd., Concord, Mass.

Appointed chairman of the United States Defense Department's Research and Planning Board by President Truman on July 13, 1951, Professor Walter G. Whitman has taken a leave of absence from his position as head of the Department of Chemical Engineering at the Massachusetts Institute of Technology. In his new post he heads the government organization established to "create a complete and integrated program of research and development for military purposes" and to "advise the Joint Chiefs of Staff" on the interaction of this program and strategy. During World War II Professor Whitman was director of the Basic Chemicals Division of the War Production Board, and subsequently he headed the Atomic Energy Commission's Lexington Project for the investigation of nuclear power for aircraft.

The son of John Turner and Ida May (Alexander) Whitman, Walter Gordon Whitman was born November 30, 1895, in Winthrop, Massachusetts, and was brought up in that suburb of Boston. On graduation from the Winthrop High School in 1913 he entered the Massachusetts Institute of Technology in nearby Cambridge, majored in chemical engineering, and received his B.S. degree in 1917. Remaining to study for a master's degree, he was engaged as an assistant in chemical engineering and advanced to an instructorship in 1918. On taking his M.Sc. degree two years later he was promoted to assistant professor and placed in charge of the newly established station of

M.I.T.'s School of Chemical Engineering Practice at Bangor, Maine. In the following year he became the director of the Boston station, and in 1923 was appointed assistant director of M.I.T.'s Research Laboratory for Applied Chemistry. In that administrative post, either alone or in cooperation with his colleagues, he conducted research work in the fields of gas absorption, corrosion of iron and steel, flow of heat, hydration of lime and elimination of salt from salt water ice. Reports on these researches appeared in such publications as *Industrial and Engineering Chemistry*, *Journal of the American Chemical Society*, and the *American Journal of Science* at various intervals between 1923 and 1926.

Whitman left the Massachusetts Institute of Technology in 1926 to join the Standard Oil Company of Indiana as assistant director of research, and three years later was made associate director of research in charge of development work. In June 1934 Whitman added academic duties to his administrative functions when he was appointed head of the Department of Chemical Engineering at M.I.T. in succession to the late Professor William P. Ryan. In the course of the ensuing seven years he conducted courses and continued the study of petroleum and other fuels which had occupied him in Indiana. (He addressed the American Chemical Society on synthetic additions to petroleum products in December 1940, and in the following July published, in *Industrial and Engineering Chemistry*, a paper entitled "Synthetic Chemicals in Fuels and Lubricants.")

Obtaining leave of absence from M.I.T. for World War II service, he joined the War Production Board, first as assistant director and later as director, of its Basic Chemicals Division, and concurrently was chairman of the Subcommittee on Aircraft Fuels and Lubricants of the National Advisory Committee for Aeronautics. As early as November 1942 he opposed, in his official capacity, the granting to the liquor industry of a suggested "vacation" from wartime regulations banning the use of alcohol for distilling purposes; and again in May 1944 he was "understood" to be the "lone dissident among Federal officials to a plan suggested by the liquor industry as a means of replenishing stocks, whereby the Petroleum Administration . . . would allot 25,000,000 gallons of gasoline in exchange for Cuban industrial alcohol" (*New York Times*). Whitman told a special Senate committee investigating the industry that developments during the coming months might double the country's estimated requirements of industrial alcohol for military and lend-lease purposes, and added that "we are not going to be caught with 'too little, too late.'"

After the war Whitman returned to his teaching and administrative duties at the Massachusetts Institute of Technology, where in 1948 he was put in charge of the Atomic Energy Commission's Lexington Project for the investigation of nuclear power for aircraft. In September 1949 he became a member of the Research and Development Board's Committee on Fuels and Lubricants, and a further out-



WALTER G. WHITMAN

come of his work in this field was the publication, in the American Petroleum Institute's *Proceedings* for November 7-10 of that year, of the paper of which he is said to be especially proud—"Liquid Fuel Supply and National Resources." It estimated "the probable requirements for liquid fuels in another war" and "possible techniques" for supplying them; and already (according to an article in the *Chemical and Engineering News*) has proven in some respects prophetically accurate. On August 11, 1950, Whitman was appointed to the General Advisory Committee of the Atomic Energy Commission. At M.I.T. in the meantime he became the first chairman of the institute's committee on undergraduate policy, the mission of which he has defined as "to improve the scope and depth of general education for undergraduates."

The Research and Development Board of the Department of Defense, to the chairmanship of which the chemical engineer was named by President Truman on July 13, 1951, was created by the National Security Act of 1947 as a part of the National Military Establishment; it took over the personnel and records of the Joint Army and Navy Research and Development Board instituted in the previous year. The National Military Establishment became the Department of Defense on August 10, 1949, and the Board's functions are now defined (in part) by the *United States Government Organization Manual* as to "prepare a complete and integrated program of research and development for military purposes," to "recommend measures of coordination . . . among the military departments," to "consider the interaction of research and development and strategy, and to advise the Joint Chiefs of Staff in connection therewith." The Board is responsible to the Secretary of Defense, and consists of the chairman, two representatives each of the Army, Navy, and Air Force, an executive sec-

WHITMAN, WALTER G.—*Continued*

retary and his deputy, and the directors of the Board's planning and programs divisions. Whitman's appointment as chairman, which was confirmed by the Senate on July 27, followed the resignation of William Webster, vice-president of the New England Electrical System, whose tenure of the post dated from March 1950. (Earlier chairmen were Professors Vannevar Bush and Karl Compton.)

Commenting editorially on the appointment of the M.I.T. professor, the *Washington Post* pointed out that "RDB is potentially one of the most important agencies in the defense setup, albeit at the policy rather than the operating levels," but that recently it had "been next to impossible to get decisions" out of the Board, which had already lost the services of an able executive secretary, Dr. E. A. Walker, as the result of friction. "It is time this costly hiatus was ended," this editorial continued. "The new chairman . . . will have a big job in knitting the pieces back again—but it is a task which, in view of the enormous defense expenditures, is increasingly vital." Whitman was sworn in on August 1, 1951.

As chairman of the Research and Development Board, Whitman is *ex officio* a member of the National Advisory Committee for Aeronautics. Nongovernment organizations to which he belongs include the American Chemical Society (the industrial engineering division of which he is a past chairman), the American Academy of Arts and Sciences, and the American Institute of Chemical Engineers (council member). His fraternities are the Tau Beta Pi, Alpha Chi Sigma, and Sigma Xi; his clubs are the Chemists in New York and the Social Circle of Concord, Massachusetts, where the Whitmans live; his church is the Unitarian. Mrs. Whitman was Martha Thurmond Key; married in 1921, they have one daughter, Elizabeth Ann (Mrs. Sam Hosmer), and two sons, John Turner 2d and William Key. The scientist finds diversion in playing his guitar, and he names as his hobby the collecting of phonograph records of all kinds.

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WILLIAMS, CAMILLA Singer

Address: h. c/o Columbia Concerts, Inc., 113 W. 57th St., New York 19; h. 4826 Aspen St., Philadelphia 39, Pa.

Acclaimed as one of the finest Cio-Cio-Sans in recent years, Camilla Williams created a sensation at her debut with the New York City

Center Opera Company on May 15, 1946, as the first Negro soprano to sing with a major opera company in the United States. Besides the *Madama Butterfly* role, she has appeared in *La Boheme*, *I Pagliacci*, and *Aida*, and concert tours have taken her to cities in the United States and other countries of the Western Hemisphere.

Camilla Ella Williams was born about thirty years ago in Danvill, Virginia, the youngest of the four children of Cornelius Booker Williams, a chauffeur, and Fannie (Carey) Williams. Her grandfather, Alexander Carey, was a singer and a choir leader. She herself was singing in the Danville Calvary Baptist Church at the age of eight. "All my people sing," Miss Williams has said. "We were poor, but God blessed us with music." She also describes Danville as a "singing, musical town."

Upon her graduation in 1937 as class valedictorian from the John M. Langston High School in Danville, Miss Williams received an Alpha Kappa Alpha scholarship and went on to Virginia State College. There her major was public school music. She was named the outstanding graduate of her class when she received her bachelor of science degree in 1941. During the four years at Virginia State she served as president of the women's senate and as secretary, in her junior year, and president, in her senior year, of the college choir. She was a member of the Lindsay Treble Clef Club and Alpha Kappa Alpha Sorority. In 1942 she took a postgraduate course in Italian at the University of Pennsylvania.

Miss Williams, whose initial goal was teaching, was appointed a third-grade teacher and an instructor in music in the Danville elementary school system. In 1942, after her one year of teaching, the Virginia State College *a capella* choir invited her to be the guest soloist in a concert in Philadelphia. This was followed by an offer, from the Philadelphia Alumni Association of the college, of a scholarship if she chose to come to Philadelphia for voice training. Accepting the opportunity, the young soprano began her studies under Madame Marian Szekeley-Freschl in 1943. During 1945 and 1946 she took further training, in New York under Cesare Sodero; and she has continued to coach or study with Ralph Berkowitz of Philadelphia, Rose Dirman of New York City, and Borislava Bazala of East Orange, New Jersey.

While she was preparing herself for the concert stage Miss Williams supported herself by working in the evenings as an usherette in a Philadelphia theater. She also received assistance from Dr. W. R. Laird, a former employer of her mother, and from Virginia State College, which established the Camilla Williams Fund at the suggestion of Miss T. P. Whiting, the dean of women. In 1943, shortly after she began her studies, and again in 1944, Miss Williams won the Marian Anderson Award (of \$750), given to outstanding young musicians. Also, in 1944, she signed a contract to record exclusively for RCA-Victor, and she made her radio debut in July of that year as a guest artist on Victor's *The Music*

WEBSTER, MARGARET—*Continued*

secretary-treasurer. A permanent acting company of thirty-eight, headed by Miss Le Gallienne, Walter Hampden, Victor Jory, and Ernest Truex, was then assembled. The enterprise was launched in November 1946 with three plays: *Henry VIII*, Barrie's *What Every Woman Knows* (both directed by Miss Webster) and Ibsen's *John Gabriel Borkman* (in which she played Mrs. Borkman), all of which were warmly received by the critics. More popular was her staging of Shaw's *Androcles and the Lion*, later added to the repertory in a double bill with O'Casey's *Pound on Demand*.

High operating costs soon forced the three managing directors to abandon the weekly rotation of plays under the repertory system in favor of offering a single play in a regular run; and fund-raising efforts were made by a committee of well-known actors. A revival of *Yellow Jack* and a successful run of *Alice in Wonderland* failed to recoup the company's initial investment. (In that play Miss Webster played the Red Queen, giving, said Howard Barnes, "solid support" to Miss Le Gallienne, the White Queen.) After a tour of *Alice* and a limited engagement of Miss Le Gallienne in Ibsen's *Ghosts* and *Hedda Gabler* (staged and supervised by Miss Webster) during the 1947-48 season, the American Repertory Theatre was dissolved with a considerable financial loss.

Refusing to abandon the repertory principle, Miss Webster undertook her most unusual Shakespearean venture in 1948. She sent out questionnaires to 500 universities, colleges, and cultural centers, asking if they would subscribe to a traveling repertory company of Broadway caliber. The response was so enthusiastic that she obtained an initial capitalization of \$42,000 and set up the Margaret Webster Shakespeare Company, which was booked with a guaranteed weekly minimum. *Hamlet* and *Macbeth* were the two plays chosen for the 1948-49 season. The troupe traveled as a self-contained unit with its own truck for scenery, a station wagon to carry the technical crew of three, and a chartered bus for the twenty-two actors. Giving an average of five to six performances a week for twenty-nine weeks, it played in college auditoriums, high school gymnasiums, and public halls to large audiences, many of whose members had never before seen a Shakespeare performance on the stage. During the first season the company played 116 times in 36 states and three Canadian provinces; it followed a similar itinerary in 1949-50, offering *Julius Caesar* and *The Taming of the Shrew*. The group spent the summer of 1950 at the Woodstock (New York) Theatre, playing summer stock and preparing a wider repertory for its third touring season. As stage manager of *Don Carlo*, she prepared a new production of that opera, which was the opening presentation of the 1950-51 Metropolitan Opera season.

A Shakespearean scholar, Miss Webster has made lecture tours and is the author of *Shakespeare Without Tears* (1942), which includes chapters on general principles of Shakespeare production, notes on Elizabethan stages and actors, and comments on the problems of indi-

vidual plays. Mark Van Doren called it "One of the best books written about Shakespeare in this century"; other critics commended the author for her scholarship and readable and quotable style. Elected one of the ten outstanding women of the year in 1946 by the Women's National Press Club, in the 1940's she received honorary degrees: from Lawrence College, Russell Sage College, and Rutgers University the Litt.D.; from Smith College the L.H.D. She is a council member of Actors' Equity Association and a board member of the American National Theatre and Academy. Blue-eyed and brown-haired, she has been described as a "tall, slender, attractive" woman with a hearty laugh. She does not care about clothes, and dislikes parties. Gardening, swimming, horseback riding, and writing articles are her recreations. Her dream is to live in the country, raise cabbages, study Russian, and walk the dog; but, she adds, "I also have to eat. Hence Shakespeare."

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WEBSTER, WILLIAM Dec. 6, 1900-
United States Government official; utilities executive

Address: b. c/o Research and Development Board, Department of Defense, Washington, D.C.; c/o New England Electric System, 441 Stuart St., Boston 16, Mass.; h. 5 Upland Rd., Wellesley, Mass.

William Webster, chairman of the Research and Development Board in the United States Department of Defense, holds a position which has been described as the "Government's top scientific job" (*New York Times*). His duty as chairman of the RDB is to work with the Military Liaison Committee, the Atomic Energy Commission, and the Departments of the Army, Navy and Air Force in developing an integrated, well-balanced military program and national defense policy. This means testing and evaluating new techniques and new weapons, including the hydrogen bomb. When President Truman asked him to take the post, Webster was granted a leave of absence from his position as executive vice-president of the New England Electric System of Boston. Webster, who is a Naval Academy graduate, has been with the New England public utilities company since he left the Navy in 1928, after having served in the capacity of a naval constructor since 1922. His Government administrative experience has included service as consultant to the Joint Research and Development Board, chairman of the Military Liaison Committee to

the Atomic Energy Commission, and chairman of the AEC's New England Council.

A son of Richard Henry and Harriet Archer (Williams) Webster, William Webster was born December 6, 1900, in Bel Air, Maryland, not far from Baltimore. His forebears had come from the British Isles, Germany, and Sweden, to settle in northeastern Maryland, and in Delaware and Pennsylvania before 1700. Young Webster attended St. James School in Hagerstown, Maryland, and, upon completing his high school studies there in 1916, entered the United States Naval Academy. After receiving his commission in 1920 he attended the Naval Academy's Post Graduate School in 1922, and subsequently, in 1924, received the B.S. and M.S. degrees from the Massachusetts Institute of Technology. As a lieutenant (junior grade) he submitted an article, "The Cruiser," in the Navy's Prize Essay Contest for 1926. While the article (in which he analyzed the requirements of the cruiser and its place in national defense) did not win a prize, it was ordered published in *United States Naval Institute Proceedings* in April 1926. Webster resigned from the Navy in 1928.

A long affiliation with the New England Electric System and its subsidiaries began when Webster became assistant to the general manager of the New England Power Association of Boston in 1928. He held the office of assistant to the president of the association from 1933 to 1935; assistant district manager of the Narragansett Electric Company in Providence, a subsidiary, from 1935 to 1942; and thereafter was vice-president of the New England Electric System; president of the Narragansett Electric Company and United Electric Railways; and executive vice-president of the New England Electric System.

While continuing to be a utilities executive, Webster worked in a number of administrative and advisory positions for the Government. From 1942 to 1945 he was management consultant in the Office of Price Administration; with the National Defense Research Committee from 1943 to 1946 he served as assistant chief of transmission. He was consultant to the Joint Research and Development Board (predecessor of the Research Development Board), created by charter in 1946 to coordinate research and development activities of common interest to the War and Navy Departments. As first chairman of the Military Liaison Committee to the Atomic Energy Commission he headed an organization "responsible for providing liaison between the National Military Establishment and the AEC on the military applications of atomic energy and for serving as the primary staff agency of the Secretary of Defense in atomic energy matters" (in the words of the *United States Government Organization Manual*). At one time he held the post of chairman of the AEC's New England Council.

Nomination of Webster to the post of chairman of the Research and Development Board was announced February 8, 1950. This board was created in 1947 by a National Security Act transferring to it all records and personnel of



U. S. Army Photo.

WILLIAM WEBSTER

the Joint Research and Development Board which had been created in 1946. According to the *Government Manual*, the duty of the board, under the direction of the Secretary of Defense, is "to prepare a complete and integrated program of research and development for military purposes; to advise with regard to trends in scientific research relating to national security and the measures necessary to assure increasing progress; to recommend measures of coordination of research and development among the military departments, and allocation among them of responsibilities for specific programs of joint interest; to formulate policy for the National Military Establishment in connection with research and development matters involving agencies outside the Establishment . . . and to advise the Joint Chiefs of Staff therewith." The chairman of the board is assisted in the performance of his duties by an executive secretary, a programs division, a planning division, and various research and development committees. (On August 10, 1949, the National Military Establishment was transformed into an executive Department of Defense, a measure designed to strengthen armed forces unification.)

Secretary of Defense Louis Johnson⁴⁰ in recommending Webster's appointment to the post, emphasized the importance of the board, stating that the security of the country depended on having defense "planned in terms of significant new technological advances." Since the end of World War II, military expenditures on research and development have averaged more than \$500,000,000 a year; it is the responsibility of the board to eliminate duplication of research among the three defense services in the interests of economy and efficiency. The establishment of the Weapons Systems Evaluation Group in the Department

WEBSTER, WILLIAM—*Continued*

of Defense was a recommendation of the Research and Development Board.

Commenting on Webster's nomination, *Time* pointed out that the executive was "more an administrator than scientist . . . an old hand at controlling the explosive combination of scientists in Government." The New York *Times* reported that he is "known at the Department of Defense as a capable administrator with considerable experience in the Defense Department and with the Atomic Energy Commission." As chairman, Webster succeeded Dr. Karl T. Compton, former president of the Massachusetts Institute of Technology, who resigned November 1949 (Dr. Vannevar Bush had been chairman the preceding year). Webster's nomination is unique in that he is not primarily a scientist as were his predecessors. An appointment, supplementary to his main office, was made by President Truman on March 18, 1950, when the Chief Executive signed a commission naming Webster a member of the National Advisory Committee for Aeronautics.

Webster is a member of the United States Naval Academy Graduates Association. He is a vice-president of the American Institute for Counseling and Personnel Research; a trustee of Bates College (since 1946) and of Moses Brown School (since 1941), he is also a member of the Advisory Committee of the Woodrow Wilson School of Public and International Affairs, Princeton, New Jersey. His fraternity is Delta Psi, and his clubs are the Union and the University clubs of Boston, Wellesley Country Club, Agawam Hunt Club of Providence, the Turks Head Club, and the Providence Art Club. He is a director of Edison Electric Institute and of the American Transit Association. In religion he is an Episcopalian. Webster, who is six feet tall, weighs 180 pounds, has brown hair and hazel eyes. He married Eleanor Blodgett on April 21, 1924; the Websters have one son, Richard Henry. Badminton, bridge, and astronomy are named as the administrator's favorite forms of recreation.

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WEETER, DIXON Jan. 12, 1906—June 24, 1950; American historian and educator; instructor, then professor of English at universities of Denver and Colorado, 1933-38; joined faculty of the University of California in 1939, and since 1949 occupied the Margaret Byrne chair of history there; among his books on American history are *The Saga of American Society*, *When Johnny Comes Marching Home*, and *The Age of the Great Depression*; literary editor of the Mark Twain estate since 1946,

and author of several books on Twain. See *Current Biography*, 1944.

Obituary

N Y Times p27 Je 26 '50

WEILL, KURT (wil) Mar. 2, 1900—Apr. 3, 1950 Composer; studied in Berlin with Humperdinck and Busoni; director of the Lüdenscheld (Westphalia) Opera House in 1920; composed in Germany prior to 1933, in the United States since 1935; has written symphonic music, opera, songs, popular hits, for the theater, radio, and films; among his best known works are *Die Dreigroschenoper* (*The Three Penny Opera*; 1928), *Johnny Johnson* (1936), *Knickerbocker Holiday* (1938), *Lady in the Dark*, *One Touch of Venus*, *Lost in the Stars* (1949). See *Current Biography*, 1941.

Obituary

N Y Times p29 Ap 4 '50 por

WELLMAN, WILLIAM A(UGUSTUS) Feb. 29, 1896— Motion picture director; author *Address: c/o Metro-Goldwyn-Mayer Corp., Hollywood, Calif.; h. 410 N. Barrington, Brentwood Highlands, West Los Angeles, Calif.*

The director of *Battleground*, considered by the critic of the New York *Times* to be "the best of the World War II pictures that have yet been made in Hollywood," is William A. Wellman, who has worked in the film capital since 1919. During his three decades in that industry, Wellman has directed more than sixty feature-length films, gaining a reputation for "documentary realism" in his treatment of such themes as war and aviation, for pioneering in the use of Technicolor, for his "instinct for casting" which has led him sometimes to choose comparative "unknowns" for major roles, and for the speed with which he usually shoots a scene, often finishing pictures four or five days ahead of schedule. He is also the author of several screen plays, including *A Star is Born*, for which he and the co-author won the 1936 writing award from the Academy of Motion Picture Arts and Sciences.

A New Englander of Irish-English parentage, the film director was born William Augustus Wellman on February 29, 1896. His parents, Arthur Gouverneur and Cecilia Guinness (McCarthy) Wellman were residents of Brookline, Massachusetts, at the time of Wellman's birth. He attended a public elementary school in Brookline, and was graduated from the high school in Newton, a neighboring community. When World War I broke out young Wellman joined the Norton-Harjes Ambulance Corps being formed in New York City for service in France. This was in April 1917. In June, after arriving in France, he entered the Foreign Legion of the French Army. Later, the United States having become a combatant, Wellman joined the Lafayette Flying Corps (Escadrille No. 87) as a pilot of a pursuit plane. He was shot down in battle and invalided home with an injured back. After his recovery he was as-