

Life

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REVIEW**

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SCIENCE AS RELATED TO NATIONAL DEFENSE

A lecture delivered
at the Naval War College
on 27 March 1958 by
Mr. J. Carlton Ward, Jr.

In approaching this subject, we should try to purge our minds of the prejudices which we build up and try to look at it through the eyes of someone who has not had to deal with it, or at least had to deal with it in the highly vulnerable circumstances of a speaker before a group like this.

Perhaps we should start with trying to define the subject, so let's try to define what "science and national defense" mean.

Science is the organized body of knowledge pertaining to the behavior of the forces, materials and structure of the universe.

Engineering is not a science; engineering is an art. The reason for this is that engineering is the handmaiden of science; it attempts to take scientific knowledge and shape it to the useful purposes of man. There is a great deal of misunderstanding on the part of laymen when they are dealing with engineers and scientists, for one does not approach these two professions in the same manner.

As soon as "man" is introduced into the mold of science there ceases to be a science in the true sense. This was defined some century ago by a leading world scientist in this way: "If you cannot measure something, it isn't scientific." You cannot measure man — but of course there is a ceaseless attempt to do so. There are many people in this room, for instance, but I would defy any social scientist to say that somewhere else in the world there are so many other people who are identical with the people in this room — either in their capabilities, their knowledge, their potential, their background, their history, their bio-

logical structure, or any other criterion which you want to take. Yet, for purposes of so-called "social" science you are merely a statistic; you are a man; you are a unit of population. This statement is made as concisely as possible because we want to get on with the subject, so let's leave it with the thought that the social sciences — so-called for purely administrative reasons in educational institutions of higher learning — are not really sciences. They are bodies of incommensurable material treated by scientific discipline, such as by the use of statistics. It has been said by others that a statistician is a man who draws a straight line from an unwarranted assumption to a foregone conclusion.

A distinguished statistician and member of the social science fraternity published a very serious book entitled "How to Lie with Statistics." It is a simple thing to do. You can all do it — and maybe you have done it. If you want to prove a case to your superior officer you select data from your statistical mass which is most favorable to your conclusion. Then you present those data, duly printed or graphed in the form of a lovely curve with some selected supporting data, and the case looks substantially proven.

However, the economists in presenting these theories seemingly differ in their final conclusions. This led a distinguished educator to define these gentlemen, particularly those who were associated in Government offices (of which I believe there is quite a corps — certainly one each to an office) to say, "I have been dealing with these men and trying to come to some conclusion with respect to their work. They all deal in statistics. So my statistic for them is this: If you take all of these economists and lay them end to end, they will reach no conclusion."

I said some of these things last night at a little briefing session on this speech, and was taken over the coals by a group of pure scientists who stoutly defended social science and who thought — in connection with science and its relation to national

defense — that I was trying to say there was no role for social science. Quite the reverse. There is a tremendous role for social scientists in national defense considerations, but please do not take too literally the findings of any given social scientist.

This is best exemplified by the fact of the so-called “law of supply and demand.” In taking on the jargon of science, the social sciences have adopted the statistical procedures, laws, and principles associated with the physical sciences. The law of supply and demand was taught for years as a basic law in economics until the time of our principal dynasty in American Government, during which period we ploughed crops under and did all sorts of rather extraordinary things. It then turned out that the economists who advised us via the press, in our government, and in our legislative bodies, had seemingly done away with the law of supply and demand; it was no longer considered by them to be valid. It did go out of fashion — even many of the university professors stopped teaching it — and it is again only just beginning to take on the luster of something reasonably respectable in certain quarters. You don’t do this with the law of gravitation. If you are in the Air Force, you will find that its respectability has been fairly constant. This is the end of my remarks concerning the role of social science; it is to put you on your guard that whereas it has the trappings of science in its presentation and in its methodology, it does not possess the necessary fundamental — namely, that the data with which it deals are commensurate.

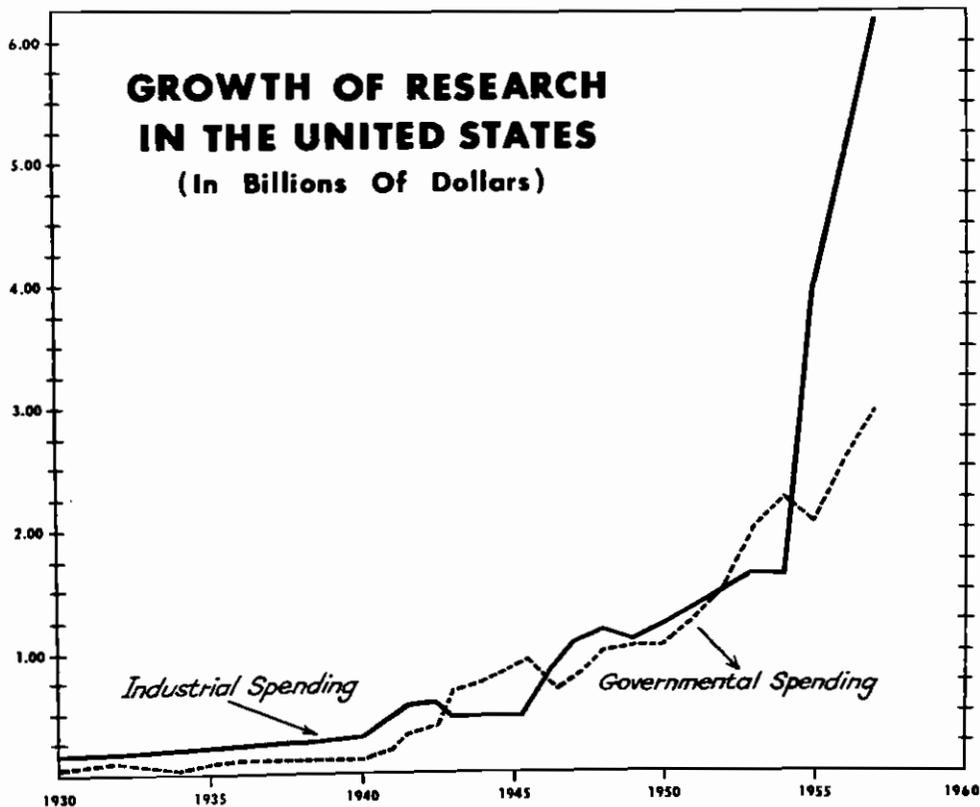
You are going to be, in a way, social scientists — in fact, you all are, because in a way you all are military engineers. You apply things to people, in combat to be sure, but, nevertheless, you apply them to people. “Military science” is a very poor name for what you practice. You practice the “art” of warfare, not the “science” of warfare. For this talk, that is the premise; not because warfare is an art is it any less important than a science. But just don’t confuse the two.

A battle commander who has to make a decision makes it partly intuitively, in part out of his own experience, and partly from data which are available to him when he makes that decision: the enemy's strength, his probable position, and his probable tactics; the strategic implications; his logistical support, and so on. He had a lot of tools with which to work, but in the final analysis he never knows what the enemy is going to do. Thus, in algebraic terms, it can be said that the whole equation representing his military problem can be no more accurate than the product of its terms. All of you studied algebra. You found that if there was one negative or indeterminate term in an equation then the answer to the entire equation was negative, or indeterminate!

What is "national defense?" I say we can define the national defense as the sum total of the nation's resources usable for the purpose of maintaining the national sovereignty intact in a competitive world atmosphere.

It is the purpose of this lecture to find the relation of science with this so-called "establishment of the national defense."

Let's start with Chart No. 1. This is to point out to you the quantitative significance of the fact that the main tool of science is research and development. This chart is a record of only recent years, or from 1930 to date. The two curves represent the government's share and that of the civil economy in this activity of research. Please remember that the end product of research is new science; that is to say, new knowledge. development has been included also in these curves, and although development is not to be confused with basic research, it is the process of taking research data and then building prototypes or models which become new weapons systems. You gentlemen then employ the new weapons systems in the conduct of the art of war. We are living in a period of great dynamism. We have now clearly discovered the need for and the value of research.



SOURCE: Industrial College of the Armed Forces

CHART NO. 1

History tells us that the first modern commercial research laboratory was not put together in the United States until 1903. Before that time there were no such things in industry as research laboratories in this country. But there were in Germany, for instance, and they helped to make Germany a world power by World War I because it was the first country to recognize research on a national scale, especially in the chemical industry. We quickly learned in World War I that we had to import or devise many military requirements to carry on the American wartime effort. Remember that we used foreign, large-calibre ordnance almost entirely in that particular conflict. It was because of the sudden emergency we faced as a nation — a typical peace-directed nation turned into a war-involved nation — that we saw clearly the role of research as exemplified in Germany's rise to power, though it was a nation as small in size as our own state of Texas. It was a nation with very few natural resources, but a nation with a high level of scientific endeavor and research.

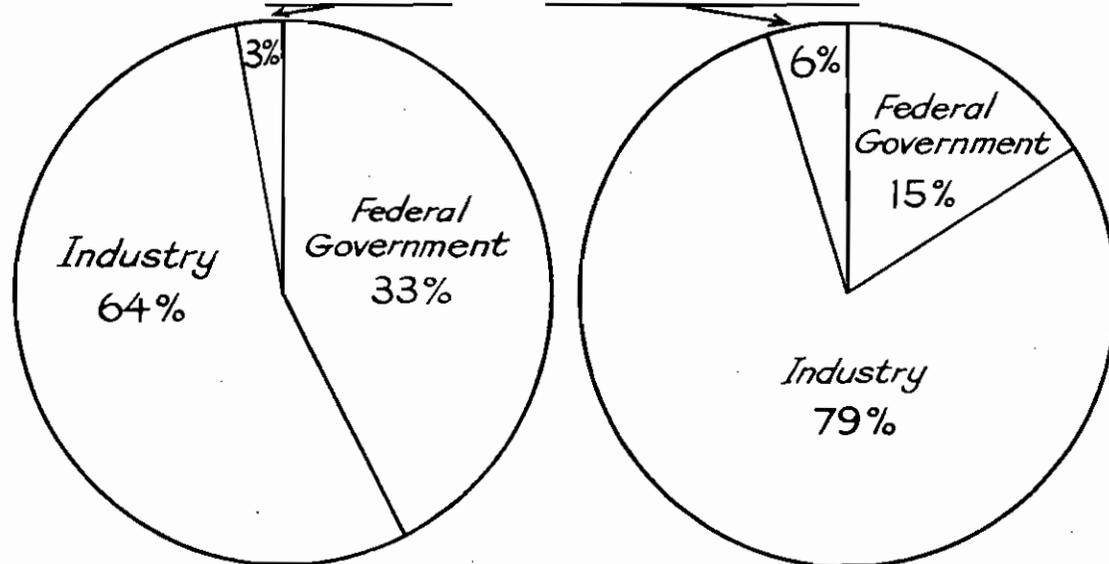
You would not even be able to find that scale of effort plotted on these curves, because we are talking here in terms of billions of dollars. You will see that just prior to World War II our total research in the United States was a quarter of a billion dollars per year. You will also see from this chart that government and industrial research have gone up 28 times since the beginning of World War II. If you want to see what is changing your profession, here it is, because it is the end product of research that is changing warfare.

Chart No. 2 shows where the money comes from for research and development and who does the work. You will see that the Federal Government supplies a third of all the money; the so-called "universities" and "research institutes" supply only three per cent. We do not have time to amplify these factors, except to tell you that the most important part of all this money is the three per cent. That is for the field of fundamental or basic research, and if there were time today we would talk more about

SPENDING FOR RESEARCH & DEVELOPMENT

FOR THE YEAR 1956

UNIVERSITIES AND RESEARCH INSTITUTES



WHERE THE THE MONEY COMES FROM

WHERE IT IS SPENT

CHART NO. 2

America's shortcomings in basic research. We would also point out to you gentlemen that in the military establishment this is a grave problem, because: (a) you are not conditioned to handle fundamental research; (b) the struggle for funds makes it very difficult to get money for fundamental research; (c) naval officers and professional military men change their duties every two to three years while fundamental research sometimes takes ten, twenty, or thirty years. When an officer leaves his tour of duty, he does not like to be engaged in an operation where he cannot leave some piece of hardware around with his earmark on it, hoping that somebody will notice it and put it on his service record. At least that is a normal human reaction.

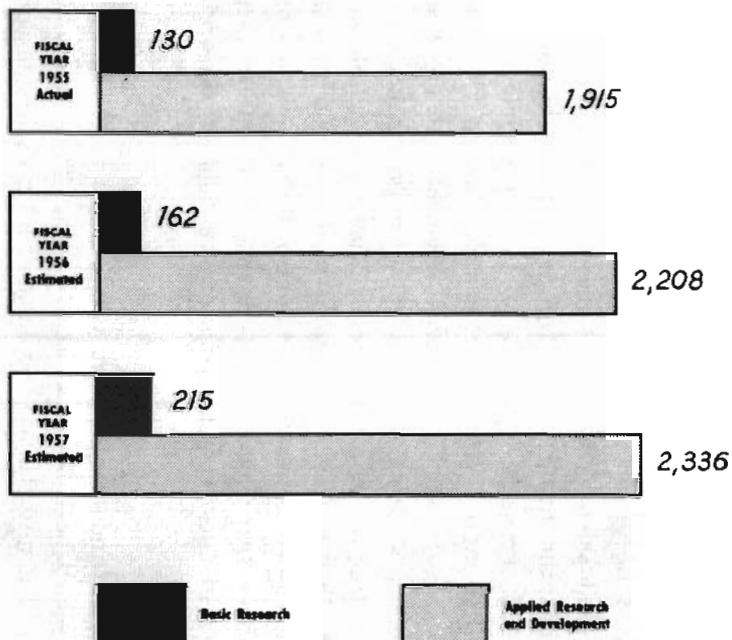
You will notice, nevertheless, that the universities spend six per cent of the research money. There are some examples in the United States of colleges of higher learning which are practically becoming laboratories, and this trend is worrying the educators. The reason for it is obviously because there are a lot of talented people in our universities. We cannot devote any more time to this subject, even though it has a very direct connection with the development of the art of war.

Chart No. 3 shows the relationship of so-called "applied research" to "basic research." You will notice that the proportion is rather startling. Nevertheless, let me point out to you that the solid black block, which is basic research, is expanding percentage-wise fairly rapidly. In that brief period shown, it has risen from \$130 million to \$215 million, which is an increase of more than 65% over a period of two years. This is important, because the lack of basic research is a shortcoming in our country's economy.

The coming of "Sputnik" shocked the noncommunist world, and in a true sense it was a startling development. The reason for this was that it directed the eyes of the independent neutral nations and the rest of the world to the fact that as a technological nation we had serious competition. The interesting thing about

**FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT
BY CHARACTER OF WORK**

MILLIONS OF DOLLARS



SOURCE: National Science Foundation

CHART NO. 3

it was that the competition existed in the area where basic research played a vital role. I may say that in the Old World there is much more natural aptitude for basic research than there is here in the United States. The reason is this: the long-haired professors who do this work enjoy a more favorable reputation over there than they do in our economy. Ours is based largely upon materialism in the sense of production — and of course you cannot look at a research paper and measure it in the physical terms of production.

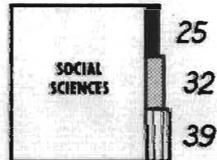
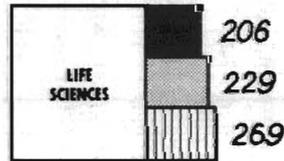
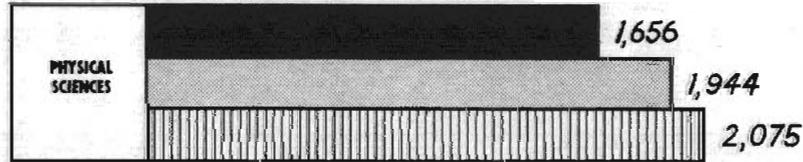
Chart No. 4 shows the principal divisions under which research and development can be classified. You will notice that the physical sciences get the bulk of the money; you will also notice that the life sciences are next; then the social sciences are last. On the other hand, do not take this division too literally because this apparent fact falls under my warning about the limitation of statistics. The social sciences do their work largely with pencils and paper. The fellows in the physical sciences require such facilities as betatrons, which cost millions of dollars, and they use other very expensive materials and resources. So dollars are not a true measure of the amount of mental product that comes out of these three activities. But this chart shows in a general way some of the characteristics of the field of research and development.

It is fundamental that you cannot wage war without logistic support, both potential and in being. Thus, many people had fallen into the unfortunate conclusion that a hydrogen-bomb armed nation has an ample national defense. But even in such a case, if you might believe that war could be over in a fortnight (as we used to hear seriously debated in some of the military colleges not so many years ago), I don't think many qualified military leaders who are knowledgeable believe it for one minute.

In a recent meeting of a group of scientists and engineers, all of whom had had experience in major weapon's developments,

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT BY SCIENTIFIC FIELDS

MILLIONS OF DOLLARS



	1955 Actual
	1956 Estimated
	1957 Estimated

SOURCE: National Science Foundation

their conclusion was that the national defense establishment had placed a disproportionate amount of effort on the complex strategic weapons systems. It was their feeling that not enough had been done for the development of tactical weapons such as would have been employed in the Korean-type or Indonesian-type of wars. It was their feeling that we may be drifting behind our potential enemy in that type of weaponry. It is interesting that this conclusion was reached by men who have worked predominately in the nuclear-weapon fields.

Chart No. 5, gentlemen, deals with the factors which would support these other types of wars. This is a graph which is social-scientific in background and which has all of the elements of error built into such social-scientific data. Nevertheless, it does pretty well point to a specific conclusion, which is this: If you define the standard of living in any country as the total goods and services produced in that country divided by its population, if you trace this factor over a long period of fifty years, and if you then compare it with the amount of usable energy that the given economy has for the production of goods and services, you will find that the economic capability — commonly referred to as the standard of living — parallels the energy available per unit population. Thus, it is important to know the energy and power sources available in assessing defense capabilities.

Thus the engineer says that goods and services are produced by machinery which uses power, for we are no longer in an old-fashioned civilization where work is done by the physical effort of men and animals. Therefore, it is the power available that determines the sustained striking force of any given economy. Its posture in world affairs — outside of what might be its initial inventory of weapons on the day the conflict begins and on the assumption that the war is not a nuclear war ended in a fortnight — really comes back to this: What kind of an effort can you sustain? This curve tells you that the standard of living of a country which measures its economic strength in total resources is based upon the power available to that civilization.

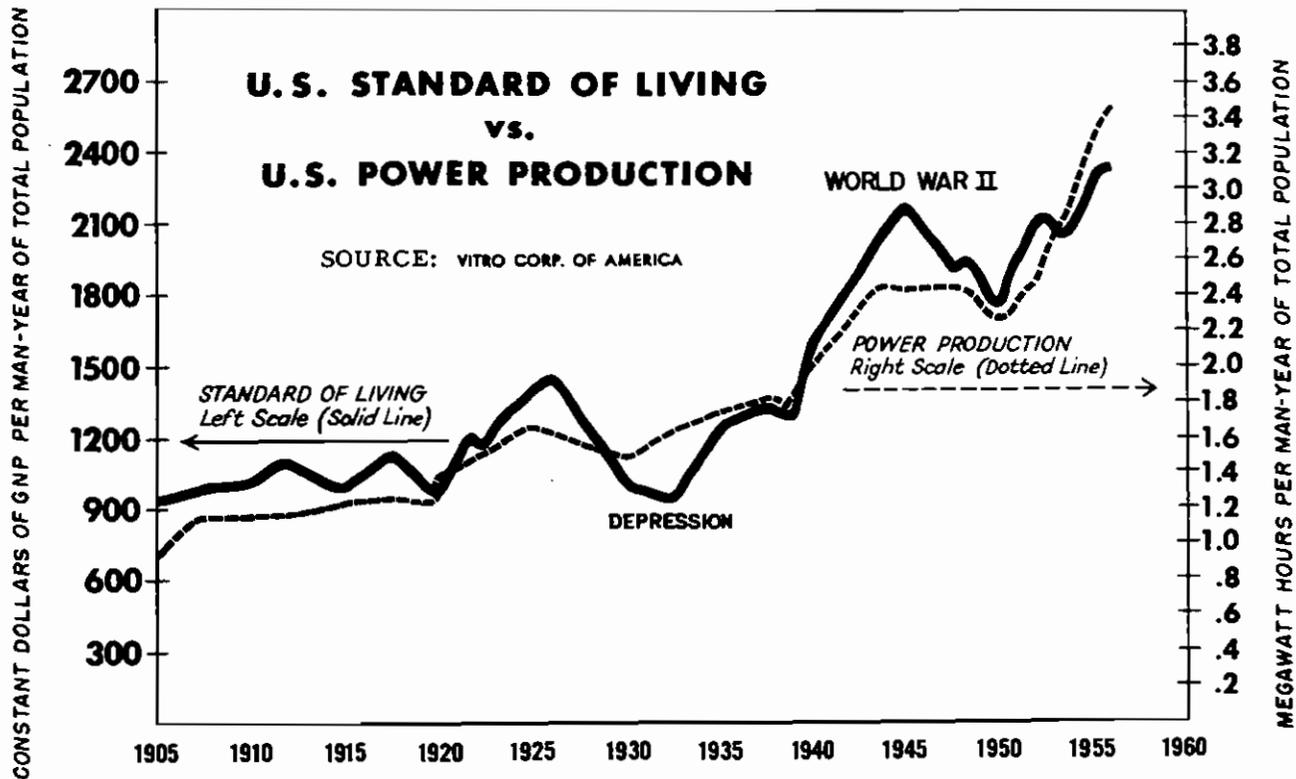
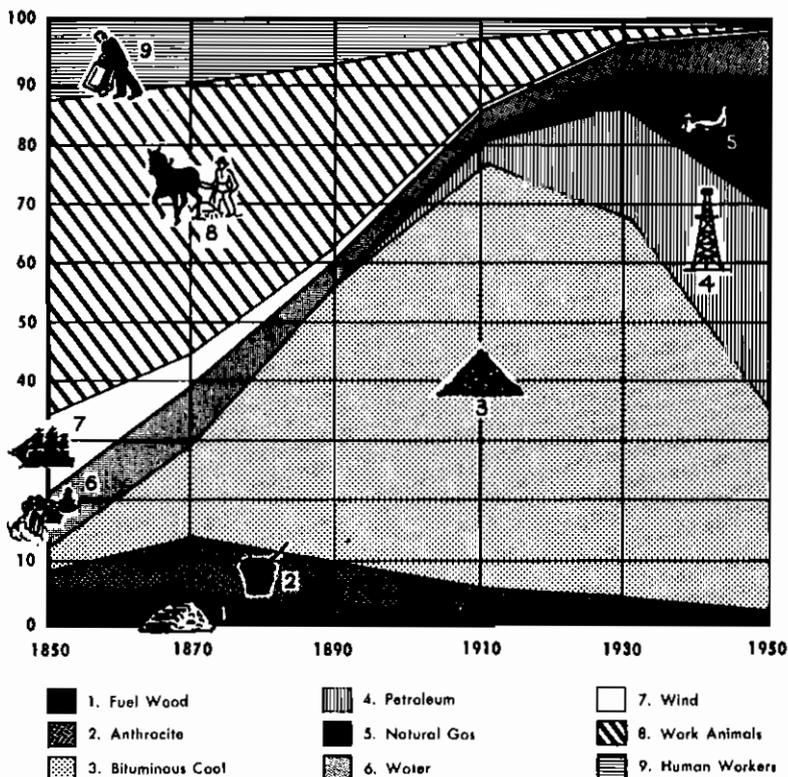


CHART NO. 5

Chart No. 6 is a very interesting graph which shows where the sources of energy, from which power is manufactured, originate. It goes back 100 years, to 1850, before the Civil War. You will notice that the *black* portion on the bottom is the energy derived from burning wood — the early Civil War locomotives, the Mississippi steamboats, etc.; above that is the *deep gray*, which is anthracite coal as a source of the total energy; above that is a *lighter gray*, representing bituminous coal — which, in 1850, yielded no more energy than anthracite coal; further above that is a *darker gray*, which is water power — at that time water power was about eight per cent of the total, a little bit more than either bituminous or anthracite coal, and about the same as wood; still further above that is the *white band*, wind — which means windmills, sailing ships, and the like — and that was a pretty sizeable factor. But the real contribution was from horses and draft animals, who pulled the plow, hauled the loads, ran the treadmills, etc. They were a large part of the transportation system, except for the railroads and the steamboats. And at the extreme top is human labor, and, as you can see, our ancestors really worked! You see by contrast how little physical work we are doing now!

Looking over at the right-hand portion of that chart, now, what do we see? We see two new energy sources: oil and natural gas. If we look only at the right ordinate, we find that there is about as much energy coming out of fuel oil as there is coming out of coal; there is also about as much coming out of natural gas as there is coming out of fuel oil, so it is about a 30-30-30 deal. These three put together are about 90% of all of the energy. Thus we find that water power is still in about the same percentage that it was in the early days, in spite of these huge Western developments of our water power resources. All of these are the sources of energy with which we will have to wage a sustained war.

ENERGY OUTPUT BY SOURCES IN THE UNITED STATES (1850-1950)



SOURCE: Twentieth Century Fund

CHART NO. 6

Chart No. 7 shows the potential consumers of energy. Thus the public utility central stations had 120 million kilowatts of capacity; then come the industrial power plants and factories, agricultural machinery and railroads. Then there is the huge consumption potential of the military establishment! And now let us look at John Q. Public near the bottom of the chart, with his two-tone convertible. Such a figure is obviously misleading, because it represents the installed capacity of automobile motive power in the United States. The utilities, for example, run seven days a week with a fairly high load factor, whereas most of the automobiles are on the road (fortunately) only a limited part of the day.

Most of the military establishment's equipment is in Army dumps for tanks and ordnance vehicles, and in transportation corps dumps, in Navy ships laid up in mothballs, etc. But we can see the effect of the military establishment in times of war in its voracious appetite for energy. And we can see why a war economy is a totally different economy than a peacetime economy.

What of the future? The Paley Report to the United States Government — which was the first time in our history that a distinguished group of men was assembled to report on the natural resources available to the United States — showed that by the year 2,020 we would no longer be able to carry forward with the dynamics of our economy. There is not enough oil, gas, coal and other energy sources in the entire world to support the increased demands for energy, which, historically, have doubled in every single decade since the earliest records of 1903. This is a fantastic challenge to science and engineering! It means roughly that without some new solution we start back on the long road to barbarism within a hundred years! This is the time when our great grandchildren will still be quite active, so, if we have any kindly feeling toward them, we have to start thinking about a solution of this problem.

APPROXIMATE INSTALLED CAPACITY OF U.S. POWER PLANTS

	MILLIONS OF KW
PUBLIC UTILITY CENTRAL STATIONS	120
INDUSTRIAL	30
AGRICULTURAL	50
RAILROAD	90
MILITARY ESTABLISHMENT	1000
AUTOMOTIVE	5000
OTHER	60
	<hr/>
TOTAL	6350

Source: Theodore Baumeister, Columbia Univ.

CHART NO. 7

Chart No. 8 was made to show that the future is a pretty hopeless sort of a situation unless we do something about it. Let's see what must be done. On the right is the block marked *Oil*; then there follows another block marked *Coal*; then still another block marked *Water Power and Other*. Water power looks high in comparison because of the fact that rain falls every year and it is not expendable, as in the case of the fossil fuels. Thus, we can multiply the available water power per year by the number of years which your chart is portraying. However, we are taking a look down a 100-year corridor of time and the tall, black bar on the left of the chart is the calculated energy needs to run our dynamic economic machine for this period. Of course, it is an estimate. The terms of energy are so enormous that the total of the energy equivalent of the oil, coal and water power available in the next 100 years represents only the little gray stripe on the bottom of the second tall bar from the left. This bar assumes the full development of atomic fission sources of energy in addition to the fossil fuels and water power. From this, we conclude that there is only a small margin of energy left for civilization of the long future, unless some new source of energy is developed.

What are these possible sources for future energy for the economy? Among them are unused solar energy, thermonuclear or hydrogen energy, either of which, if it can be harnessed, is more than sufficient by at least several orders of magnitude. Of course, they have not yet been harnessed through science or engineering but this is a job which must be done — and it must be done by starting from fundamental research, right on through applied research, then development, and, finally, to engineering application.

This accounts in part — and only in part — for the feverish activities now going on here in the United States, in Russia, in England, and other civilized countries in an attempt to solve the thermonuclear power problem. It is not difficult to dramatize this situation for it has been calculated that the deuterium, or heavy

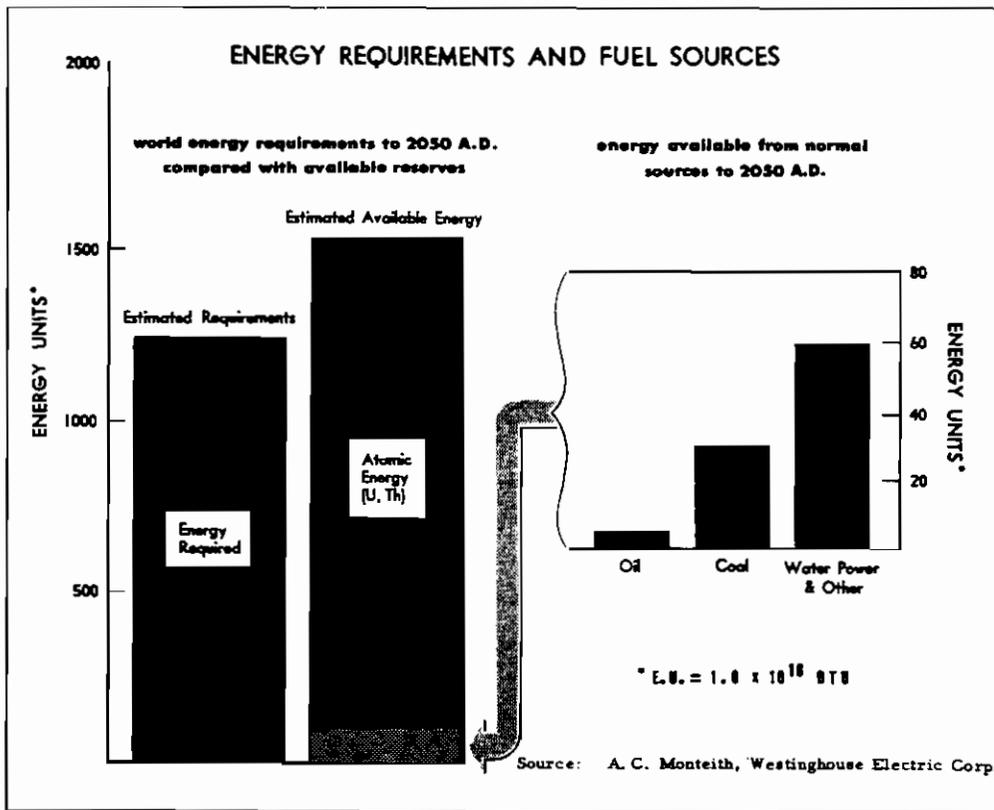


Chart: Vitro Corporation of America

CHART NO. 8

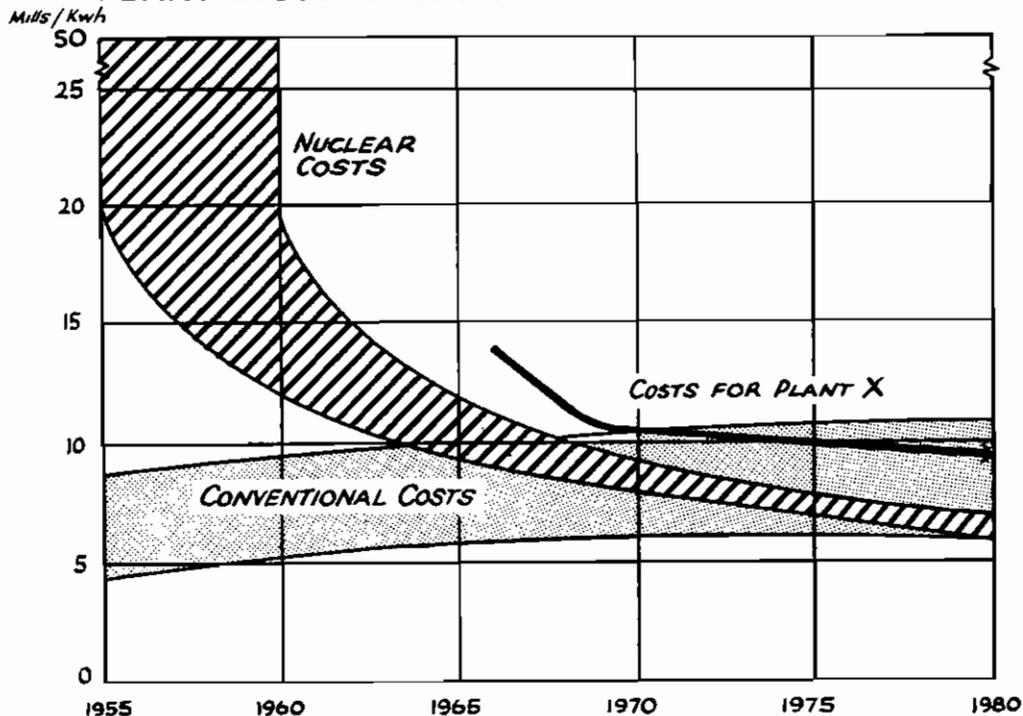
hydrogen, in one cubic mile of seawater (if it can be extracted and the energy released by thermonuclear means) would provide enough energy throughout a 1,000 years for the entire world. By then, we have only used up the deuterium in one cubic mile of seawater. The statistics for the number of cubic miles of seawater on the earth's surface would lead one to believe that, if this process can be efficiently harnessed, there is enough energy for more than a billion years. This is somewhat heartening because cosmologists have shown that the sun is capable of providing a climate on earth suitable for mankind for, roughly, five billion years into the future. Thus, if mankind does not extinguish itself, the challenge for science and engineering to provide a solution of the power needs is obvious.

Chart No. 9 shows the economics of the fission-type of atomic power for public utility stations in the United States. Here, we see that the cost of energy from atomic sources today does not compete with the cost of energy from conventional sources — the *lower* band representing the costs for the conventional sources and the *upper* band being the same for the atomic sources.

On the other hand, we should point out that Thomas A. Edison, who built the first electric steam station in 1882 on Pearl Street, New York City, used 19 pounds of coal to make a kilowatt hour. Today, Consolidated Edison in New York claims that in their new stations they use about three-quarters of a pound of coal to make a kilowatt hour. This improvement represents the progress of science and engineering development in the period of roughly the last 75 years.

Many of the articles and speeches dealing with this subject appear to be written by individuals who have never familiarized themselves with the characteristics of scientific and engineering development. It may be fair to say that they have failed to take into account the characteristics of rapid improvement in new developments which have been reflected in Chart No. 9, drawn up by the AEC.

PLANT COSTS: *Atomic Power* vs. *Conventional*



SOURCE: Davis - Roddis, AEC, in *Nucleonics*, April 1957

CHART NO. 9

This chart is an attempt to show and forecast the natural trend in improvement in subsequent plants for the generation of atomic power from fission. Thus we see that by 1965 we should be competitive even in the United States, where traditional energy costs are very low in terms of the rest of the world. But, since it takes five years to build a plant, we must start such a plant in 1960; and since this is 1958, there isn't a lot of time left.

If we plot curves for the rest of the world, we will find the cost comparisons much closer since the fuel situation is much worse than it is here. Let us take Italy, where our company has been designing an atomic power plant. Why is it that Italy is planning to contract for three large atomic power plants — a country that presumably is poor — when we in the United States, with a much richer economy, cannot afford proportionate full-scale plants of a similar type and size? The reason seems simple: Italy has no natural fuel resources to speak of beyond water power, and she has all of that mortgaged. Her fuel needs double every ten years, as do ours. She has also learned from the Suez episode that the Arabs do not love her, or perhaps she is aware of this through her past history with Lybia and Ethiopia — two events which have not been wholly forgotten. So from the point of view of national defense she is definitely not willing to put her future in the hands of pipelines which the Arabs can choke off, or depend on the Suez Canal. If she cannot use Arabian fuel oil, she has no sources other than going way over to Venezuela or other parts of the New World. This is a long way and such lengthy fuel lines are quite vulnerable in times of stress. Then perhaps she had better think of coal. But she finds out that in order for her to get coal, which costs us as little as six dollars per ton in the Ohio Valley, it will cost her up to thirty dollars per ton delivered in the port of Leghorn. So when we have a comparative cost curve like this for the United States, let our imagination dwell on what it would be if we were in a country where coal was thirty dollars

a ton instead of six dollars and where we were not in a strategic position to put our national defense on the safety of a fuel pipeline.

Then, too, there is an added consideration for them. The purchase of coal and oil require the use of hard currencies, in which they have a deficiency. If they can secure uranium fuels by treaty with the United States or Great Britain, they can build the plants largely with Italian labor and equipment.

Chart No. 10 indicates a comparison of electric power production. It is too bad that we cannot give comparative figures for 1957, but they are not now complete. For purposes of carrying on a war, the United States plus her allies in Western Europe plus Canada represented four and one-half times the potential of their enemies, based on the production of electric power. This is not completely true, because such statistics tell "little lies." There is such a "little lie" in this graph because it does not indicate that the Russian economy, being what it is, fails to allow John Q. Public in Russia as much of a share of his power as John Q. Public in the United States gets for his personal share. Russia devotes a larger percentage of its power to industrial and military production. So, for war-making purposes the score is not quite so one-sided as we see here.

When we, even as experts in the military field, begin to assess our enemy, we must not forget that he has some fundamental weaknesses — it is "not all beer and skittles" for him. He has problems that we do not have. We don't think about these problems much because we do not have them, but when he thinks of us he thinks of such problems. And let us remember that our national sustained military capability is based on our ability to generate energy. That ability is graphically shown on Chart No. 10.

Chart No. 11 shows the standards of living as calculated by social scientists throughout the world. Again, these figures are

ELECTRIC POWER PRODUCTION

1956

	BILLIONS KWH
UNITED STATES	682
WESTERN EUROPE	403
CANADA	82
TOTAL WEST	1167
USSR	192
EUROPEAN SATELLITES	80
COMMUNIST CHINA	15
TOTAL SOVIET BLOC	287

SOURCE: ICAF, Based on Economic Indicators, U.S. Dept. of State.

ANNUAL PER CAPITA INCOME

E S T I M A T E D

(EQUIVALENT U. S. DOLLARS)

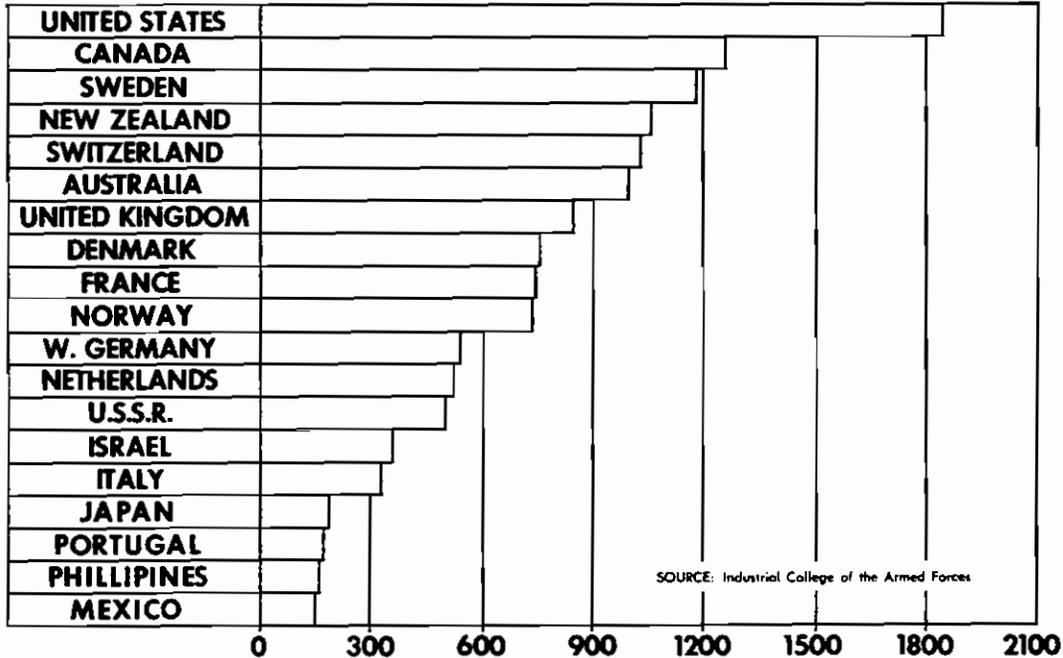


CHART NO. 11

about two years old because more recent statistics are not available. It is not necessary to tell you that there are also a few mild white lies in this chart. We used to have Burma and Ceylon included, and they hardly showed on the chart at all. In discussing this with the statisticians of the ICAF who compiled the figures, it was questioned how these peoples could live with such a standard as was shown on the chart. They replied: "Oh well, you see they go out and pull a banana off a tree or break open a coconut, and that makes their lunch. Their staples do not go through the Safeway Stores or the A & P system. Therefore, we don't get any statistics for them."

Nevertheless, this is something of interest to us because in a large measure war-making capabilities depend upon the total population multiplied by the annual per capita income. We notice that our friends in Canada are the closest to us in war-making potential capabilities per unit of population. There will not be much difficulty assessing the war-making potential in certain countries which have advanced technological civilizations, all of whom rank very high on this chart. If we were to take the statistics of power generation per unit of population in those same countries, we would find that the statistical curves are very similar. This comparison has been made. This is another way of proving the assumption in Chart No. 5, where the standard of living is based upon the power available in any economy. It applies only in technical civilizations. We could not apply such statistics to an Asiatic or an African country in which beasts of burden and men constitute the chief power resources.

Chart No. 12 is put here only to show that the United States and Europe are not far apart in atomic power approach. In other words, we have no monopoly here in the progress of atomic power. The chart indicates clearly that foreign, chiefly European, nations are fully alert to this fact, and even with more limited financial capabilities they are moving extremely rapidly into this new era of power from the atom. We are all familiar with the fact that

WORLD REACTOR PROJECTS - U.S. & Foreign

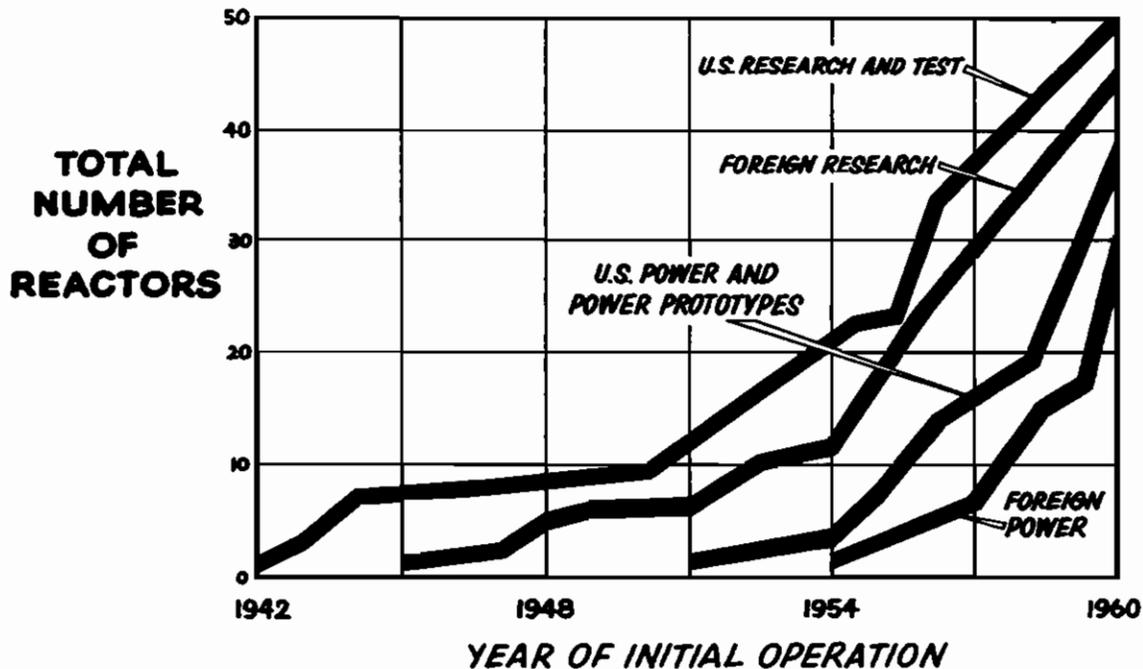


CHART NO. 12

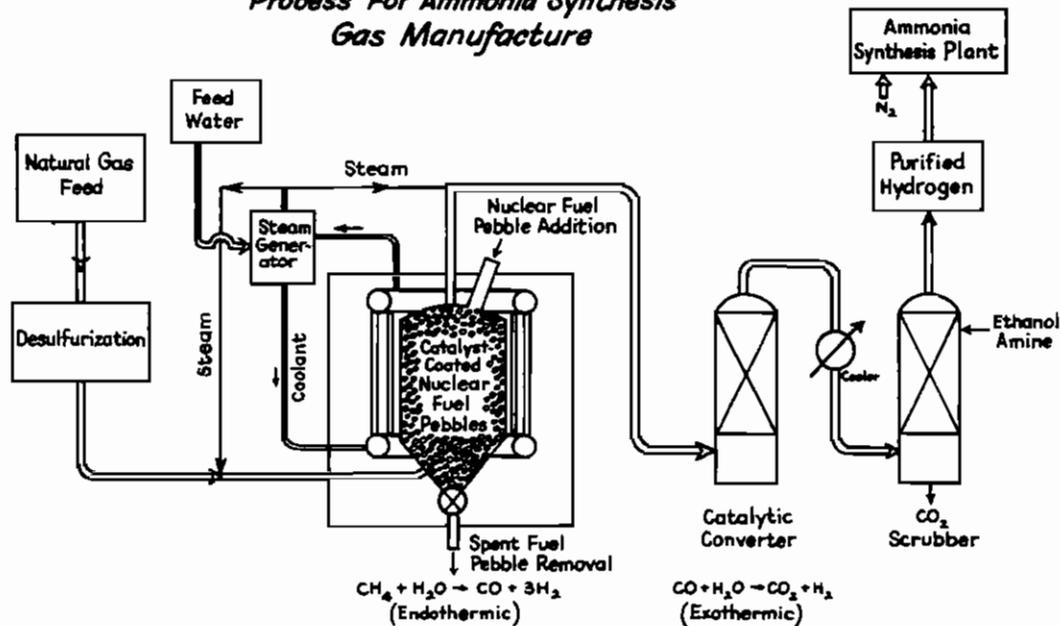
if an atomic power plant is established in a place like Greenland, for instance, the Navy does not have to transport oil drums up there in the two months out of the year when the port is free of ice, at a cost of something like two dollars a gallon for oil. Furthermore, in case of destructive bombing and fire or other enemy action, if we do not lose our atomic power plant, our supply line for energy cannot be cut off as it otherwise would be. And the fueling of such a plant would last for a period of, let's say for the moment, a year or two instead of perhaps a week or so. So there are some military advantages to atomic power which I am sure are very much in your minds.

Chart No. 13 indicates an aspect of atomic energy application for purely civil purposes. It has been put in not to confuse but to indicate another area of power about which we may not normally be thinking. It shows atomic power generation in the form of heat. Without power as heat our chemical industries would be in bad shape, our metal-processing industries would be inoperable, our food industries would be disrupted — in fact, our economy would slow down. It portrays a schematic arrangement of a nuclear reactor used for chemical purposes — it makes no power, only heat. You will note that the feed is natural gas and water, which are fed into a heat reactor, with the result that we get carbon monoxide and, finally, purified hydrogen and ammonia. This chart merely indicates that there are facets of this problem of energy which are frequently omitted in articles and in analyses of the subject. Of course, it is merely another facet of advanced science and engineering, which is our subject today.

The purpose of Chart No. 14 is to show you the interrelation between civil and war needs in a national economy. It shows a hypothetical nuclear power complex. Beginning at the top left — with the mining of atomic fuels, the milling of fuels, the refining and reduction of such fuels, isotopic enrichment, and fuel element fabrication — the start-up of a reactor; out of that power is made, to run turbines and get electricity.

NUCLEAR PROCESS HEATING

*Applied to Steam-Hydrocarbon
Process For Ammonia Synthesis
Gas Manufacture*



SOURCE : Bureau of Mines and Vitro Laboratories, 1956

CHART NO. 13

HYPOTHETICAL NUCLEAR POWER COMPLEX

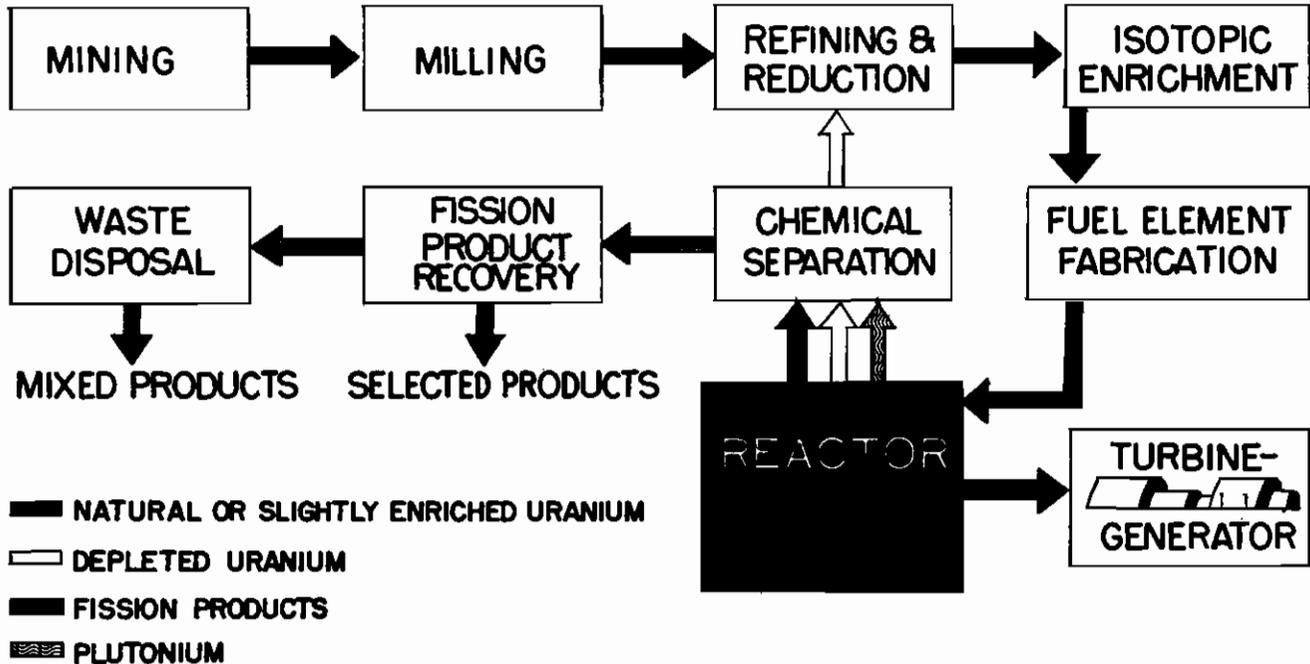


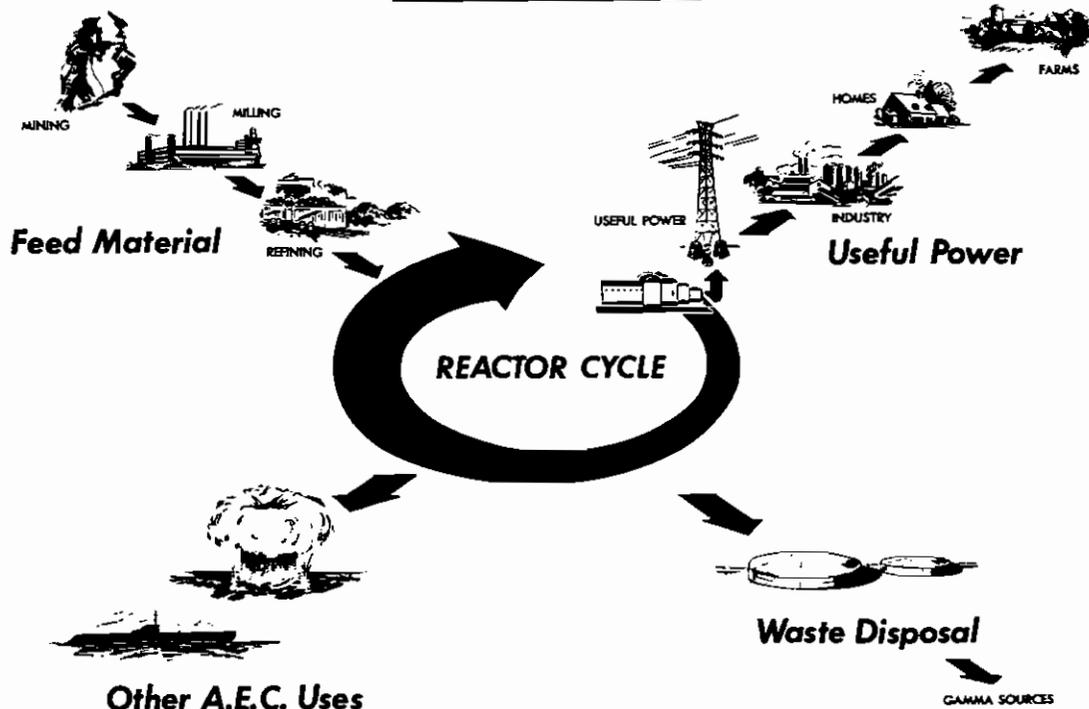
CHART NO. 14

Let us analyze the cycle. We get depleted fuel out of the reaction, which is the middle of the three vertical arrows. We also get two other items — one is plutonium (the right vertical arrow) and the other is fission products (the left arrow). Fission products contain energy — we have not yet completely learned how to harness them, but the process is well advanced. They will found a new branch of chemistry, an industry which is called radiochemical. For instance, we can make polyethylene (the substance of squeeze-bottles) out of ethylene by simply subjecting it to a three-million-electron-volt radiation, the source of which could be fission products or waste materials. Likewise, as is known, the Quartermaster Corps of the Army is doing a great deal of work in preparing food through utilizing this type of energy. So we have here natural resources which may be harnessed for military purposes so that armies can move without refrigeration and still always have fresh food.

Chart No. 15 should be of great interest to us because it indicates the basis of all our modern weapons — our new tactical weapons as well as our strategic weapons — and shows how they are tied into the process of production of commercial power. This chart shows why nations like England, which does not have our gaseous separation plant, will utilize such a system for the production of their atomic fuels. The chart shows the fuel cycle. At top left is mining, milling and refining feeding into a reactor. At top right coming out is the power for industry, homes and farms. At bottom right are the so-called “energy waste particles.” Then at bottom left is the source of all of our weapons.

Weapons for this example can be divided into two groups: one group is for transportation systems and the other is for use as explosives. You will notice that transportation, or how to get weapons and people to where you want to use them from a military point of view, is just as important as how to use them. So there are two facets to the fuel cycle which are heavily involved in the overall military concept of atomic energy and which are entirely apart from their pure competition with coal, oil and gas in a civil economy for the production of power.

FUEL CYCLE



SOURCE: Vitro Corporation of America, 1955

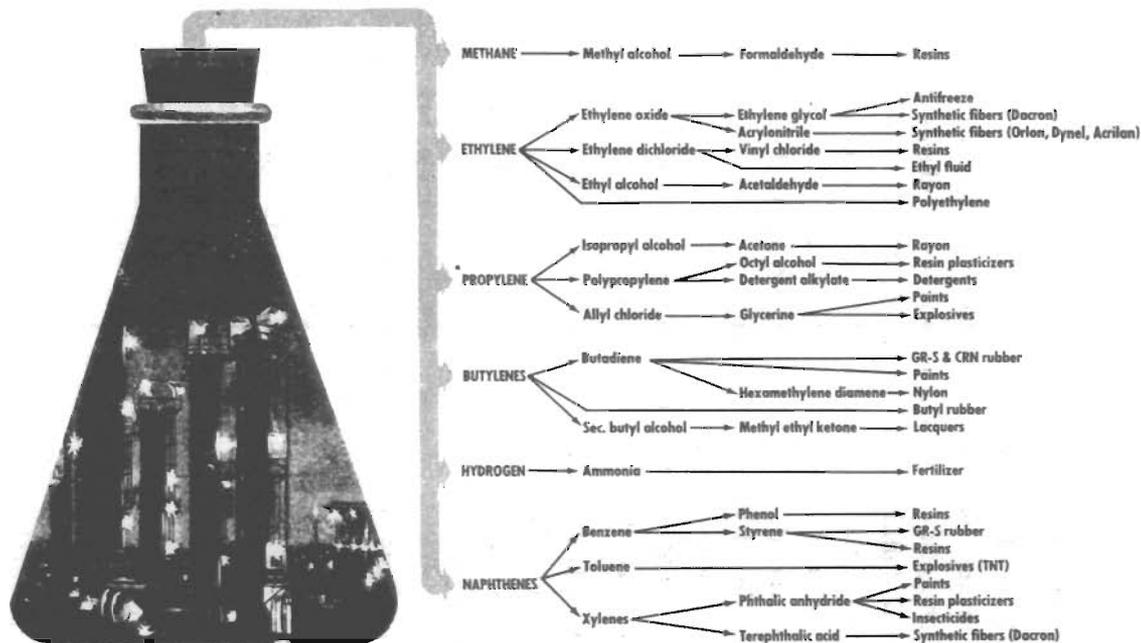
CHART NO. 15

Chart No. 16 is put in here because it is a very striking example of something frequently overlooked. It shows an abstract beaker of oil. That beaker of oil yields these base chemicals: methane, ethylene, propylene, butylene, hydrogen and naphthenes. Out of those are a whole host of so-called "chemical intermediates," as shown in the chart.

Then let us note the end products: resins (which, of course, means plastics); antifreeze compounds; synthetic fibers (like dacron, orlon, dynel, acrilan — the basis of your military uniforms and military fabrics); ethyl fluids; rayons; polyethylenes; plasticizers; detergents; paints; explosives; synthetic rubbers; butyl rubbers; lacquers; fertilizers; insecticides; and we could also say medicines and therapeutic agents. If all of these things can come out of crude oil there will come a day when laws may be passed preventing people from burning crude oil, because it is a stored-up natural chemical resource laid down by nature 300 million years ago — and it cannot be duplicated today.

Here is another pointed example of the application of science and technology. Chart No. 17 shows a display of the *Nautilus* story. We see that the *Nautilus* went 60,120 nautical miles on its first fuel charge, or two and three-quarter times around the earth, of which one and one-half times were under water. If we had fueled that ship with conventional fuel, it would have used 57,142 barrels of fuel oil. Most of us are familiar with the statistics and know that it used only eight and one-third pounds of uranium fuel. We have here, then, a military fact of great importance; not alone was the ship fueled for the year's cruise, but it operated under conditions which an oil-fueled submarine could not have duplicated with the same flexibility — under the polar icecaps and such — showing it can perform as other submarines cannot do. The logistics implication is also extremely valuable in wartime, for the Russian submarines cannot cut off its fuel supply in foreign bases since such a submarine uses only eight and one-third pounds of uranium, which will last for a year. So the implications are certainly startling and clear.

CHEMICALS FROM OIL



SOURCE: "The Lamp", Standard Oil Company (New Jersey)

CHART NO. 16



U.S.S. NAUTILUS

*TOTAL TRAVEL —
60,120 NAUTICAL MILES...*

*SUBMERGED TRAVEL —
34,500 NAUTICAL MILES...*



OIL FUEL NECESSARY TO COMPARE WITH NAUTILUS' CHARGE OF U-235



CHART NO. 17

Chart No. 18 is to show the effect of science and engineering on war. The upper left section shows the first 25 years of aviation from shortly before World War I (and we see what happened afterward). The early part was the famous age of country fair barnstorming, athletics on wingtips of old tired Jennies and such. In 1934, when the Government decided military planes were a good way to fly the mail, there were some good military flying officers killed, which only proved that military establishments are specialized and not necessarily designed to do civil component work — and so there sprang into being a use for aviation other than war. Up until this point, aviation was merely a stunt or a sport. If we turn back to the Wright Brothers' flight of 1903, when *The New York Times'* editor refused to publish the news of the flight on the basis that it was too ridiculous and never could have happened, we can see that it took some years for fundamental science and engineering in the aviation industry to become a real factor in the civil economy.

Picking up this curve on the upper right, we see the growth of the airlines, or aviation that is concerned only with the civil economy. It starts with the year 1920 (although the Wright Brothers flew in 1903), as there was no real development of aviation for civil transportation until 1920. The first upward turn indicates the period of early air mail and the beginning of passenger traffic. We can see the setback to commercial aviation early in 1934, when President Roosevelt and the Postmaster General attempted to make civil aviation a government operation. Then you see the continued growth and where aviation has now reached today, as well as the nature of its growth. What is important for us is the nature of this civil aviation curve and its relation to wartime use. The left box shows the development of aviation for war, and the right one shows how aviation is harnessed into the peacetime economy. This also indicates the interrelation between science and engineering for war in the use of a wartime development in the peacetime economy.

AVIATION vs. ATOMIC ENERGY

Growth Patterns of the First 25 Years

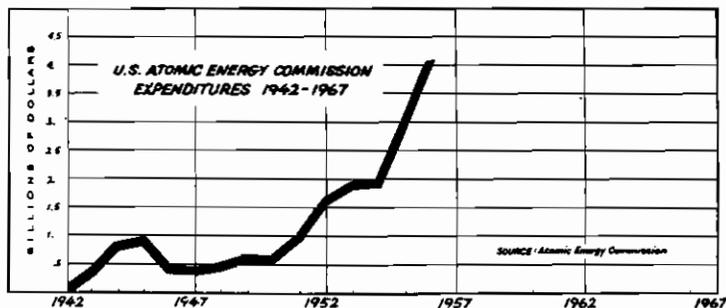
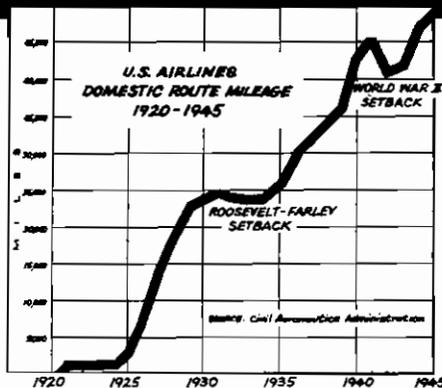
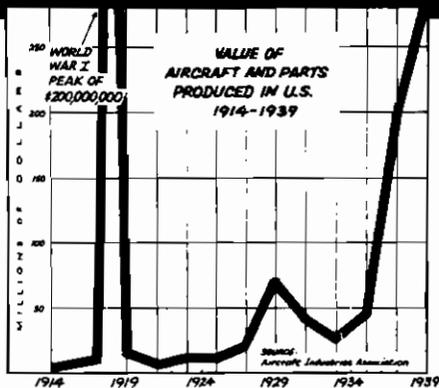


CHART NO. 18
CHART NO. 18

Below is plotted the start of the atomic industries as measured by the only statistic available: the money which we spend as taxpayers through the Atomic Energy Commission. It started in 1942 and has come a long way in its first 15 years. It should be noticed that this curve has almost identical characteristics with the aviation development curves up above — it has even the same kind of a “bump” in it for the period of indecision. We can easily compare the fantastic development of atomic energy in its early years with the equally fantastic development of aviation.

What are we trying to say? We are trying to say that these fundamental scientific developments — which grow up with such startling rapidity and which become such important factors in the economy and in war — start from scientific endeavors of many years before that time. Atomic science might be said to have really begun with Dr. Heinrich Hertz in 1890, with his electromagnetic waves; then it went on through a period with Dr. Antoine Becquerel of France in 1896 (radioactivity); with Sir Joseph J. Thompson of England in 1897 (the electron); with Marie and Pierre Curie, the French-Poles (radium and radiation); with mathematician Max Planck in 1900 (the quantum theory); with Albert Einstein in 1905 ($E=MC^2$, etc.); right on down through Lord Ernest Rutherford and his discovery of the nucleus of the atom and the transmutation of elements in 1919; then on into 1932, with the discovery of the neutron by Dr. James Chadwick in England and Enrico Fermi's work in the 1930's. Then quite suddenly, after Hahn and Strassman in Germany and our reactor in Chicago, we have an atomic science! But it was all based on fundamental science developed during all of those years.

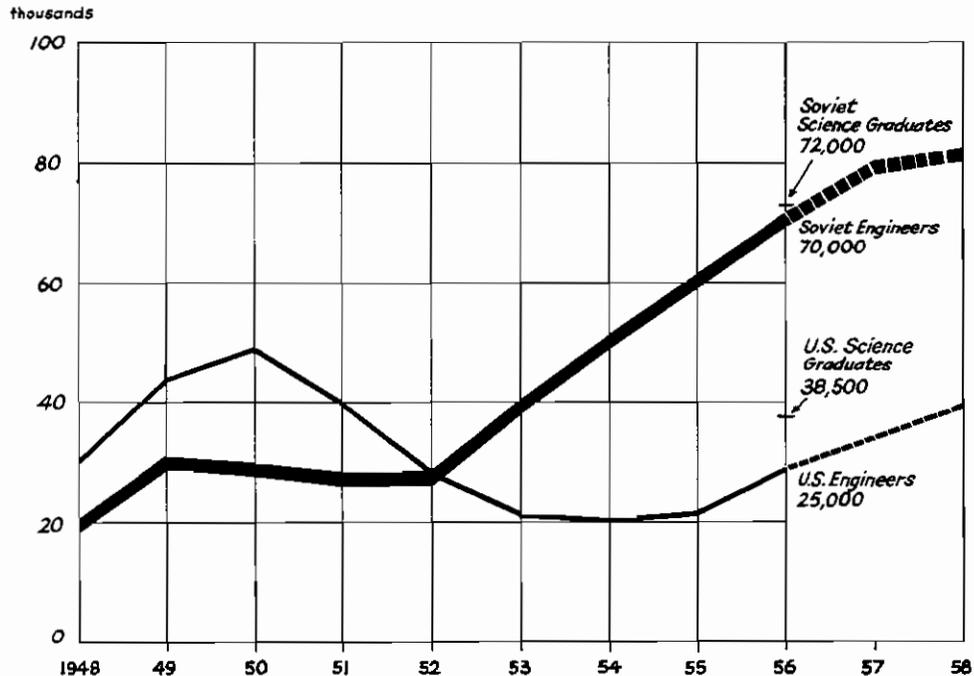
This short history of basic scientific work and discoveries developed into vast new weapons systems and engineering developments of fundamental importance to the civil economy. Starting with the work of Eiffel in France and others, a similar course can be shown for aviation with its vast military and civilian applications.

Chart No. 19 shows the production engineering graduates in the United States and in Russia. This graph has a very sobering influence. It shows the U. S. engineering graduates right up until 1956, when we graduated 25,000. The Soviets, however, turned out up to 70,000 per year by the end of the same period. Their projection is for a total of 80,000 per year or more and our projection is only for half that many. Science graduates in the U. S. are estimated at 38,500 per year; Soviet science graduates, about 72,000. This comparison should be the subject of a special investigation and we can only refer to it here. But let it be said that in this fact lies the proof of Russia's realization of what makes civilization tick and what makes a war potential. It is unlikely she is doing this by chance — she doesn't do things by chance! She is doing it because she knows that if she is going to keep her military posture she has got to have the people who will do the things you have seen represented on the earlier curves — the people who know how to do the research and development and engineering.

Chart No. 20 shows a new atomic instrument in Russia, called a proton synchrotron. We do not have an instrument of this magnitude and size and a number of our scientists have been invited to see it. It has 36,000 tons of steel in its magnet, while our largest instrument has 6,000 tons of steel. Often we like to talk about "size" in the United States. Well, here we are one-sixth of Russia's size in this instrument. This instrument is for nothing more or less than pure science. It does not make a weapon; it does not make material; it does not make any product. But it increases knowledge, and here is where we have got to watch Russia!

Chart No. 21 shows the control panel — and we must note that we have nothing more modern than this function-control-designed switchboard, with its automatic controls and its central instrumentation. Chart No. 22 shows the way in which the Russians house it. The people there may live in shacks and have only 100 square feet per person for living accommodations, but this is a

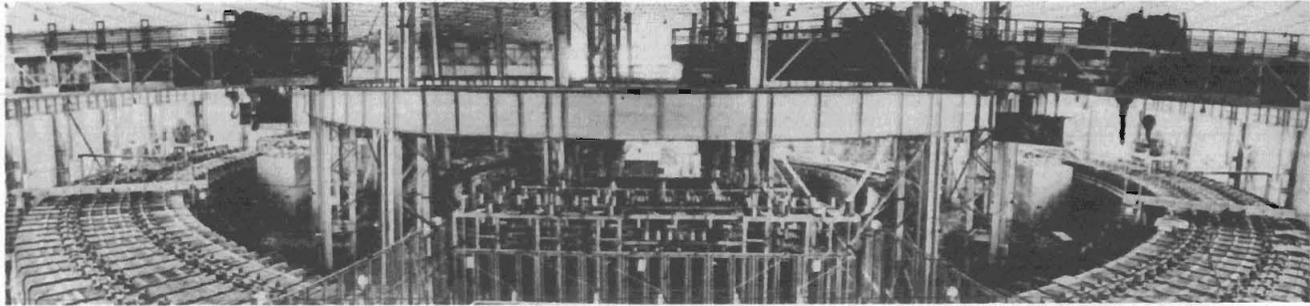
ENGINEERING GRADUATES IN THE U.S. AND RUSSIA



1956 { ESTIMATED SOVIET ENGINEERS 670,000
ESTIMATED AMERICAN ENGINEERS 698,000

SOURCE: McGraw-Hill, 1957

CHART NO. 19

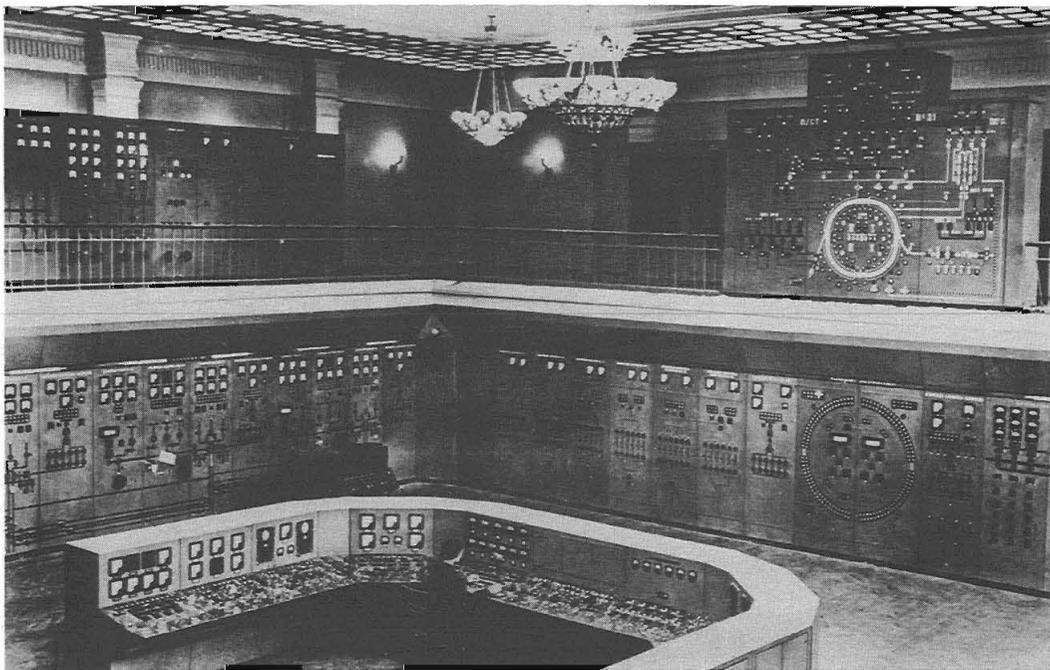


SOVFOTO, 1956

*10 BEV Proton Synchrotron at Central Institute of Nuclear
Research, Bolshoya Volga, Near Moscow.*

Weights 36,000 tons. 200 ft. in diameter

CHART NO. 20



SOVFOTO, 1966

Central Control Panel of Soviet's 10-BeV Proton Synchrotron

CHART NO. 21



SOVFOTO, 1956

*Electrophysical Laboratory of the U.S.S.R. Academy of
Sciences, which includes huge 10-BEV Proton Synchrotron*

CHART NO. 22

symbol of the manner in which the government of Russia values fundamental research in science for the protection of Russia's future. We don't have a corresponding viewpoint over here.

Chart No. 23 records the history of fission development versus fusion. The top area of the left column represents the period during which there was development of the basic science underlying fission, the important factor being the accidental discovery in 1939 by two Germans, Otto Hahn and Fritz Strassman, of the first fission experiment. Below can be seen the time that it took to harness the proof of experimental verification that fission would work. Getting down to the late 60's, we expect to have the development as an economic competitive force. Remember Chart No. 9, which showed us the graph indicating about when atomic power would compete with other forms of power. This, then, is the period of gestation for fission development. We will see that from the time when basic science was developed — beginning way back in the 1890's — it will take from the 1940's until about 1968 to have it a competitive force in our economy. Twenty-eight years!

Let us turn to the thermonuclear power problem shown in the right-hand column. We will notice something here that has not been apparent to many: that the science of fusion in this case, or thermonuclear power production, was known before the science of fission. Let us examine the next stage. We have never reduced fusion to a mechanism, like the mechanism built for fission in the first reactor at Stagg Field. At Princeton University, the Government is spending some 35 million dollars to make a "Stellarator, Model C" in an attempt to get fusion into a mechanism stage. We have all been subject to a barrage of dramatic headlines in the newspapers about fusion "breakthroughs" and such — they are not breakthroughs. Having had access to briefing on the United States' progress in the field of fusion experiments and having taken note of the statements of scientists who are associated with this program insofar as they can speak publicly, it is proper to

FISSION vs. FUSION

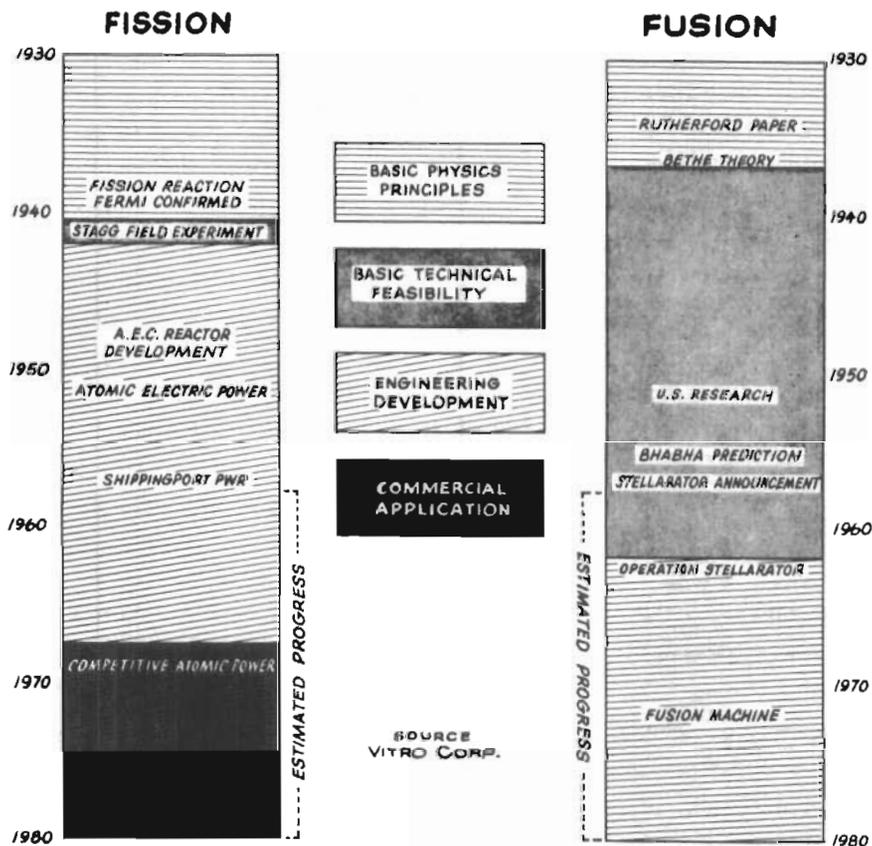


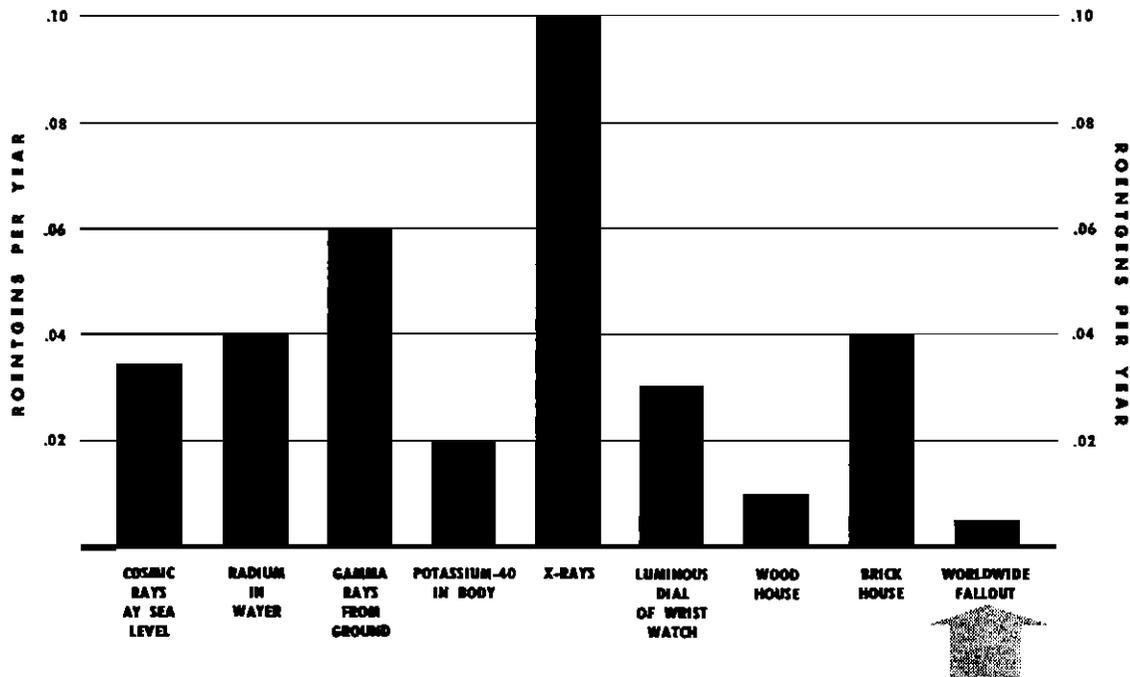
CHART NO. 23

say that the work being done in England, Russia and the United States has not, as yet, led to any "breakthrough" in this field. The announcement made by a British newspaper that there had been a breakthrough on their zeta instrument has since been officially played down. It now seems clear that the neutrons produced in this experiment cannot be identified as fusion neutrons.

The power of the press and radio is apparent when it is noted that here in the United States the uranium companies practically fell right out of bed in Wall Street when the false news came over the ticker. In many ways, atomic power developments founded on fission are, by many observers, considered only temporary in view of their assumption that fusion is now imminent. In our opinion this certainly is not the case, and this chart has been presented in order to try and furnish some of the factors that are involved. Therefore, by turning to the column representing "Fusion Developments," it is indicated that the estimated period to be needed to perform the function of generating useful power is still a very long way off, and even in this assumption it is based on the fact that the Stellarator, Model C — or the present California mirror machine — actually works. The Stellarator cannot even be completed for some few years yet and, even as an instrument for research, it will be a long time before its results can be known. Perhaps the way to look at these instruments is that they are scientific devices for the extension of knowledge and not early engineering or development steps toward the useful application thereof. Thus, at the earliest, it would be difficult to assume a development will be available before 1980, and, in the opinion of many of the scientific workers associated with the project, statements have been made signifying "not before the end of the century."

Chart No. 24 is to put at rest this terrifying paper-and-ink campaign about the fall-out from atomic bomb tests. This chart is taken from a book published by Drs. Edward Teller and Albert Latter (Dr. Teller is often described as the father of the hydrogen

COMPARATIVE EFFECT OF RADIO ACTIVITY



Source: "Our Nuclear Future" by Drs. Teller and Letter

CHART NO. 24

bomb). The first bar shows the radiation equivalent on a human being from cosmic rays at sea level — and we are getting this amount of radioactivity while we are sitting right in this room. Next is what we get when we drink water (we are 98% water, according to the biochemists). Third is what is called “gamma radiation” from ground elements, or potassium-40, another naturally radioactive material like uranium thorium, and so forth, from the earth’s crust. There is potassium-40 in our own bodies —we store potassium-40 because our biological-chemical plant likes a certain amount of it, so it absorbs and holds it.

The next bar shows what we get when we go to have a chest X-ray. And when the dentist tries to see the nature of our sore tooth, he puts five roentgens of radioactivity into our mouths — which is about half of that amount. Then comes the luminous dial on our watch — incidentally, it would be much worse if we wore the crystal next to our wrist. Next is shown the radioactivity which we get from the wood in the house, because trees pick up radioactive elements in the soil and from the air. Then, next, is the brick house which shows more radioactivity because there is radioactivity in the clay and mineral contents of brick materials which naturally come from the earth. Finally, we compare the total fall-out per person from all of the atomic tests in the world to date. It is the least and the most insignificant of all these factors.

Fundamentally, the difficulty lies in the fact that too many qualitative statements have been made which cannot be borne out by quantitative data. This leads to controversy which can only yield to a statement of fact.

This, then, is the truth of world-wide fall-out by the men most competent to tell you, and that is the reason for including it here. From a purely military point of view, we could go right on testing all of the bombs needed if we can improve them and make them “cleaner!”

It is true, however, that we are in an age when new science and new development are made to seem highly dramatic. The effect of Sputnik, for instance, is a dramatic symbol of the role of advanced science in national power. Rightly or wrongly, its influence on the neutral and friendly nations was portrayed as being shocking, if not catastrophic. Of course, the sober facts would not have borne that out. Nevertheless, to assume that a nation can have international prestige without the backup of advanced scientific and technological capabilities has been clearly demonstrated as utterly unthinkable.

Modern weapons systems are ideal examples of science and technology at work. Any military posture without the backup of advanced weapons systems would be completely ineffective. Science is no longer a mere handmaiden of the military art; it is the substance of it.

As present and future military leaders, your role must be that of sympathy and of understanding for the part that science will play in your professional responsibilities, and without which your endeavors are inviting failure.

BIOGRAPHIC SKETCH

Mr. J. Carlton Ward, Jr.

Mr. Ward received his M.E. degree from Cornell University. In 1914, he was development engineer for the International Paper Company, and from 1915 to 1917 he was assistant to the works manager of the Niles Tool Works Division of Niles-Bement-Pond Company. The following year he was production engineer for the United States Ordnance Department at Watervliet, New York Arsenal.

After serving as works manager for the Pratt and Whitney Division of Niles-Bement-Pond Company from 1915 to 1925, Mr. Ward was vice president, general manager and director of the Hartford Machine Screw Company until 1929. From that time until 1934, he was general works manager for the General Cable Corporation, after which he served for one year as vice president of the Rome Company, Incorporated.

From 1935 to 1940, Mr. Ward was Vice President, general manager and director of the Pratt Whitney Aircraft Division of the United Aircraft Corporation, and was also in charge of the Advisory Mission to the French Government on airplane engine production in 1940. Mr. Ward served as president and, later as chairman of the board of the Fairchild Engine and Airplane Corporation from 1940 to 1948, and from 1950 to 1953 he was chairman of the board of Thompson Industries, Incorporated.

At present, Mr. Ward is president and a director of Vitro Corporation of America, in addition to the following positions: president of Heavy Minerals Corporation; director of Stanrock Uranium Company; director of Cornell University Aeronautical Laboratory; chairman of Flight Safety Foundation and chairman of the Cornell University Engineering Council.

THE U. N. AND THE U. S. NATIONAL INTEREST

A lecture delivered
at the Naval War College
on 23 January 1958 by
Doctor Lincoln P. Bloomfield

Gentlemen:

I propose this morning to use you as guinea pigs. Like yourselves, I have only recently stopped flying by the seat of the pants, so to speak, and, in a scholarly setting, have been attempting to sort things out in a reasonably ordered and orderly way. Like many of you, my efforts for some years have been in the realm of tactics rather than strategy. Even policy-planning, in days and years of crisis, tends to become tactical and day-to-day.

My new assignment is to take a fresh look at the relationship between the U. N. and the U. S. national interest over a time span that sees ahead to the next three to ten years. This differs from my previous responsibilities primarily in its longer range character. But there is another even more profound difference. For eight months now, I have been looking out over the Charles River rather than the Potomac, and the contrast is tremendous. You will understand me when I say that much of this past eight months has been a necessary period of "brainwashing" in reverse; or, if you will, a trip through the decompression chamber. In this process some of our better bureaucrats-turned-scholars have gotten a nasty case of the bends, and I am sure it happens the other way round, too. Apparently, to change the metaphor, there is a definite gestation period for research, and nature cannot be rushed, but even now some things are beginning to fall into perspective.

It is far too early to announce any final results, however, so what I am about to do here today will show how thin is the veneer of scholarly respectability I have been so far able to acquire.

What I propose to do is to share with you some of the perspectives that have begun to take form in a re-examination of the strategic uses of the U. N. for U. S. foreign policy in the years immediately ahead.

I would like to do this in three stages: *first*, I shall sketch out the strategic background setting as it seems to shape up in retrospect; *secondly*, I shall attempt to define certain overriding policy objectives of this country for the years directly ahead; *finally*, I shall try to match up some present or potential U. N. capabilities against these strategic imperatives.

The first part — the background or strategic setting — needs to be drawn in with some care. In this field, as in any other, how you frame questions often can determine the answers to those questions. Here, I wish to pay special attention to changes in the situation which have posed, and will pose, special new problems for the United States in this field. This selective background picture divides into five primary facts.

The first fact is the “cold war” in the U. N., and the changes that extraordinary battle has undergone. From the outset it became apparent that all nations were going to pursue their own policies and beliefs in the U. N. on issues which they felt affected their vital interests. American interests centered around the desire to see the world settle down, in order that we might take up where we left off in 1941. The Soviet Union’s interests were, from an international standpoint, essentially destructive and revolutionary. The conflict broke out in the U. N. at once.

For many people, especially Americans, the conversion from prewar isolationism to full commitment had taken place in the best revivalist tradition. It was enthusiastic, a trifle flamboyant, optimistic, deeply sincere, and overlaid with powerful moral and religious feelings.

The appearance of the global power struggle in the U. N. came as a profound shock to many. The result has, of course, been

a profound and world-wide disappointment in the capacity of the U. N. to achieve its supposed ends and a generalized downgrading of the very concept of multilateral collaboration on common problems. But we know now that some of those supposed ends were unrealistic in the extreme. There was no future for the expectation that the qualities of violence, power, and conflicting ideology could somehow be totally eliminated from the world scene. False illusion was, in this case, followed by equally hollow disillusionment. The U. N., by its very nature, has constituted a well-lit stage on which the Great Powers have acted out the drama of conflict which goes by the name of the "cold war."

I shall not go into detail, but within a very short time the two superpowers stood in hostile confrontation within the U. N. as well as outside. This fact alone tended to paralyze all the functions of the U. N. that depended on cooperation between these two. And if the U. N. could not force cooperation, neither could it punish lack of cooperation.

The U. N., in essence, consists of three things: a number of sovereign states; a written charter; and some machinery, whose use is purely optional. Now, these three elements can and do fuse into a higher order of purpose and action, but *only* when leadership is explicitly furnished to define and uphold a specific common interest. The U. N. *by itself* was, of course, incapable of any action to stop the Russians or punish the Russians when this meant an action which the U. S. and its allies were themselves unable or unwilling to take.

Even in this stalemate the principles of the Charter, and such machinery as the majority of nations was willing to use, were applied to the "cold war." U. N. action played a significant role in getting Russian troops out of Iran in 1946, in ending the communist guerrilla attack on Greece, and in throwing back the communist invasion of South Korea. In a more marginal sense, the U. N. was instrumental in terminating the Berlin Blockade

and in keeping the spotlight of world condemnation on the Soviets for their rape of Hungary in 1956. It was not much, but it was a faithful mirror of the degree of will and capacity of the Powers to take overt action in the growing deadlock.

The presence of the Soviets and the Americans under one roof posed a novel problem for Western diplomacy. It meant that during a period when the U. S. was struggling to organize a world-wide defensive coalition against the communist threat, it had to meet and negotiate with its allies in the presence of the enemy. The U. N. was the one place where we continuously met the Russians in the company of the entire Free World. Thus, each issue and each vote came to represent a separate test of Free World unity.

During the period 1946-1952, it was commonplace to achieve votes on important East-West issues with only the Soviet bloc in opposition. But, as time went on, Free World unity was put under an increasing strain by the growing split between what we might call North and South on issues arising primarily in the colonial field. Still, the alliance was held together, and at times it was even cemented by such Soviet actions as the Berlin Blockade, the Korean attack, and the generalized attitude of implacable hostility.

Since 1952, however, the visible nature of the communist threat has seemed to change, and the effect has posed acute new problems for the West. Starting with the 19th Party Congress in that year, even while Stalin was still alive, the decision was apparently taken to substitute for the military battlefield the arena of political and economic warfare. The tone and mode of Soviet diplomacy in and out of the U. N. began to change. From an embattled and hostile minority, the classic pose of Soviet Russia, the Soviets set about to create a new image that had three facets: a successful system of organization and production; a world-wide "anti-war" movement; and a source of verbal and tangible support

for countries striving to reduce their political, economic, and cultural dependence on the West. Whether this shift was purely a tactic to buy time until nuclear parity could be achieved is, for our purpose, unimportant.

The political effect was profound, and it came at a time when the bipolar political world itself was beginning to splinter. As the purely military component of power became the background rather than the substance of politics, forces within both the two coalitions began to assert their freedom of maneuver and to move toward positions independent of the two leader states. Britain, India, Yugoslavia, Poland, Egypt, perhaps China and Germany — these and others suddenly began to merge as foci of new leadership and of potentially independent directions. Clearly, the rest of the world was changing — and the U. N. was changing with it.

This leads to the second great fact in recent history. It has been given a number of names, but it is summed up by three of them: "Revolution of Rising Expectations"; "Neutralism"; and "Anticolonial Revolution Against the European West." All three forces were rapidly coming to full flower in the great arc stretching from North Africa across to Polynesia. This great rip tide of nationalism and of explosive economic and social demands flooded in even while Western military defenses were being hurriedly girded against the Soviet military threat. The result, both in and out of the U. N., has been that Western success in mobilizing the noncommunist world became increasingly dependent on the stand which Western nations adopted on issues of primary importance to the peoples of that third world — issues not of capitalism versus communism, or of European settlement, but colonialism, self-determination, economic development of underdeveloped territories, racial discrimination, and the like.

The U. N. Charter, in one way or another, calls for practically all of the things which this group of countries seek. We

may think of them as hopes rather than legally-binding commitments to action. But there are approximately 45 countries out of 82 in the U. N. today which, for one reason or another, see these as the crucial issues, and which put the U. S. to the test in regard to them with increasing frequency. Often the issue is purely symbolic, as in some of the debates with heavy racial overtones or in seemingly pious wishes for the ultimate independence of nonself-governing territories. But politically speaking, they can have the force of high explosives. And it is in the U. N., above any other place, that these issues take concrete shape in the form of resolutions and action programs in which Russian and American performance is constantly made the measure for a host of other attitudes.

My impression is that this country has done remarkably badly in this battle, given the many initial advantages possessed by our side. The reasons for this are several. Cheap promises of all-out support are vastly easier for the Russians to make than for us. For one thing, we have to consider our NATO relations on every single colonial issue that confronts us; for another, we take Assembly resolutions very seriously, even though they are not legally binding. Also, the legacy of resentment against White Europe is not something America itself can escape. But it must also be said that to some observers American diplomacy often has seemed inflexibly focused on the Soviet military threat, paralyzed by economy-mindedness, and incapable of getting off the defensive by offering new and appealing pathways of action to the rest of mankind.

The net effect of this development has been a general deterioration in this country's relations, both in and out of the U. N., with the underdeveloped, neutralist and anticolonial countries of Asia, Africa and, to an increasing extent, Latin America.

In this situation, the way we have restructured the U. N. itself has added to the American dilemma. It was the U. S. that

urged an ever greater role for the General Assembly (where each nation, however small, has an equal vote), in order to Offset the impotence of the Security Council. This was done largely, if implicitly, to enhance the capabilities of the U. N. for military collective action against the communist world. But those capabilities have, if anything, deteriorated inside as well as outside the U. N. The Assembly has, as a consequence, become the prime political forum for that third world which stands aside from the East-West confrontation and pursues its own goals of political independence, economic improvement, and racial dignity.

This, then, is the second paramount fact about the U. N. — the conflict between North and South, if you will, which cuts right across the East-West conflict and makes its own powerful demands on American diplomacy and initiative, while offering heaven-sent opportunities for the Soviets to seize and hold the political initiative.

The third background fact is a function of the military situation. It is commonly believed that the anticipated military function of the U. N. lost its future when the Soviet Union and the U. S. failed to agree on a formula for contributing forces to the Security Council for enforcement action. Given the types of situations in which enforcement action would have actually been considered — Korea, Hungary, Suez — it is clear at once that the lack of a formula, like the use of the veto, merely reflected the overall political cleavage.

In 1950, the U. S. sponsored the "Uniting-For-Peace Resolution," under which the General Assembly can recommend the same sorts of emergency actions which the Security Council is supposed to be able to order. Advance commitments have been as scarce here as under Article 43.

I would like to suggest that there has been a rather fundamental defect in our thinking about the military uses of the U. N. The notion of collective security which looks for an abstract commitment to fight anyone, anywhere, anytime, on call of a majority,

is not a legitimate expectation, given the present lack of a true world community. Such collective security against the Soviet Union as has been achieved has been through regional and other special organizations where a community of purpose exists based on a community of specific interests.

The real life military situation between the Soviets and ourselves has, of course, been a growing stalemate in which the freedom of each side for military action has been steadily narrowed. The political *status quo* of the West is anathema to the Soviets, and the territorial *status quo* of world communism is unacceptable to us. Yet, as general war becomes an increasingly unattractive proposition for both sides, the *de facto* line between the two worlds has become relatively inviolate. When it is crossed, as in Korea, the entire world recognizes it as a profound violation of the peace, and counteraction becomes politically feasible. Even India and Egypt voted, initially, to oppose the communist aggression in Korea. In Hungary, on the other hand, world-wide counteraction was politically quite impossible even if the U. S. had been willing to lead it — which we were not.

The U. N. military potential has followed the trend of weapons development and military policy among the Great Powers. The U. S. has, on all the evidence, seemed to adopt a policy of renunciation of force in resolving political differences. Steps that could lead to general war are explicitly avoided. We have applied this to ourselves as a self-denying ordinance, as in the case of Communist China, the Berlin Blockade, the crossing of the Yalu, Indochina, and, most recently, Hungary. Needless to say, in the Hungarian situation the U. N. would have been able to do something militarily only if the U. S. itself had been willing to do something militarily. The decision at the highest level of American government was that we would not take the risk, whatever expectations we may have aroused in the past.

We have also applied this policy to our friends, as in the Suez crisis of 1956. American motives toward the Israeli-British-

French invasion of Egypt were uncommonly mixed. But the President was being entirely consistent in refusing to lend himself to a local military action that could lead directly to world war, however great the provocation that animated our allies. A significant result of the Suez fiasco is the realization that both the U. S. and, it might be added, the U. S. S. R. are actively exercising a veto over military action by third parties that might commit them to an expanding and potentially uncontrollable situation. This last fact has great significance for U. S. foreign policy, and for the ways it can — and should — use the U. N. in pursuit of national policy objectives.

This leads to fact number four in the background. It is often forgotten that, apart from the "cold war" and the anti-colonial revolution, all nations, like their individual citizens, have their traditional and continuing problems and differences, acting and reacting in the context of an ongoing and dynamic political life. One consequence of this continuation of life as usual, so to speak, is that disputes among nations over territories, boundaries, minorities, trade practices, and the host of other elements that traditionally make up the fabric of international relations have gone on and periodically reached the point where third-party intervention becomes necessary. Some cases in point are the Indian-Pakistani dispute over Kashmir; the Palestine case in all of its ramifications, including the new issue of the status of international waterways; India versus South Africa, over Indian minority rights and racial discrimination; Greece versus the United Kingdom, over Cyprus; Indonesia versus the Netherlands, over West New Guinea. Each has the potential of "going critical."

As Suez illustrated, a non-East-West dispute can very quickly pose life-and-death questions for the entire human family. The control rods of this particular pile, to continue the metaphor, are now held by an international brigade of U. N. troops. The chain reaction can start again out there, but the world is meanwhile buying time with the help of a variety of U. N. instrumentalities

for pacific settlement, including U. N. E. F., the U. N. Truce Supervision Organization, the Secretary-General, and Egypt's declarations to the U. N. about the uses of the Canal. If Kashmir should be the scene of renewed fighting, and if the Soviet Union backed India and we backed Pakistan, the chances of a direct Soviet-American confrontation would be that much greater, given the geography and the stakes.

The U. N. role in all these cases has been accentuated by the American disinclination to become involved in intrafamily disputes in the free world. Whenever possible, we have preferred to leave them to the U. N. It is among this range of issues, primarily involving noncommunist nations, that U. N. machinery for the pacific settlement of disputes has been brought into play. It is here, for example, that some few steps have been taken to submit disputes to legal adjudication, however feeble these steps may have been. And it is here that the opportunities for involvement in a general war perhaps become greatest as the chances of deliberate East-West hostilities diminish.

The fifth and final background fact is another consequence of the truism that life goes on, continuously presenting us with problems, inspirations, challenges, and opportunities in areas that have nothing to do with the "cold war," colonialism, or any of the revolutions and religious wars of our epoch. I refer to the whole realm of life where man as man confronts nature as nature. The U. N. and the specialized agencies have done good and important work in this realm, which only time forbids me from cataloguing here. As the "space age" comes upon us, it may well be that the most important thing the U. S. could do — both as a community of human beings and as a nation seeking to ensure its future security — would be to press vigorously for a U. N. regime for the control and utilization of outer space for peaceful purposes only. Because of time limits, I can only urge that this fifth fact be kept in perspective as we move on to complete our analysis.

I have taken great liberties with a highly complex situation in order to bring out, in this limited time, what seem to me the prime elements in the background picture. How do we relate this set of facts to the development of U. S. policies over the next few years? One prefatory word is necessary. Unquestionably the very existence of the U. N. and the profound impact it has had on world-wide opinion and action have given an extra dimension to the world of diplomacy. For the purposes of our inquiry here, however, I am going to disregard this dimension and, in effect, look at the U. N. as strictly two-dimensional. My approach is consciously based on the premises of U. S. foreign policy rather than the premises of the U. N. itself. In order that we can get as clear a picture as possible of the true relationship, we must ask what some of the overriding purposes of American foreign policy are today and what help the U. N. might be in achieving those purposes. This is, of course, another way of inquiring what the national interest is with respect to the U. N.

To keep our discussion relatively simple, I must bypass a great deal of reasoning and argumentation and spell out what I consider our most acute operational policy objectives. For purposes of this argument, I shall stick to those directly relevant to the paramount political and military crisis of our age. I shall take advantage of my command position here to suggest my own definitions, which are, of course, by no means all-inclusive. In doing so, I shall try to avoid generalities so far as possible, and shall try to limit objectives to those I believe to be realistic in a foreseeable time span. Prefacing all that follows is the overriding and obvious objective of *securing the kind of world in which we can cultivate our own society without fear of harm or disruption from the outside*. Everything else falls within this governing purpose.

These, then, are the objectives for the United States:

1. Reduce the generalized threat which Soviet communist power presents to the U. S. and Western society; this means —

- a. to reduce Soviet capabilities of inflicting intolerable physical damage upon us.
 - b. to moderate Soviet intentions.
 - c. to limit and, if possible, reduce the present international support for the Soviet Union.
2. Reduce the possibility of a general war developing by a chain of inadvertent circumstances.
 3. Find means of limiting warfare, if it does break out.
 4. Ensure, in the event of general war, that we rally maximum political support to our side, in order that we may fight with clear consciences and have the best chance of organizing the postwar world in an acceptable way.

With regard to 1-a, *Soviet military capabilities*, the U. N. has in fact no more to bring to bear than the U. S. and a few others are willing to provide: at the moment, it adds up to nothing; in the event of an all-out Soviet aggression, it probably would add up to everything. The question is not really meaningful because of the nature of the U. N., which, except in limited ways, possesses no tangible power or life outside that furnished by its most powerful members. The one concrete utility of the U. N. in limiting Soviet military capabilities in the foreseeable future lies in the variety of forums it can provide for negotiations on limitation and regulation of armaments. Specifically, the aim is to reduce the possibility of a surprise attack which might overwhelm a nation's retaliatory capabilities. This is the current focus of U. S. policy, and I believe it should be pursued relentlessly and without ever giving up hope.

Realistically, disarmament negotiation may be viewed, at root, as bilateral between the U. S. and the U. S. S. R. But the

wide choice of negotiating means and devices should not be discounted. The provision of a neutral U. N. corridor was most helpful when Russia wanted to talk privately with us about liquidating the Berlin Blockade. On balance, the U. N. can affect Soviet capabilities only indirectly by furnishing a negotiating vehicle.

Objective 1-b, *affecting Soviet intentions*, is more complex. At its least complicated level — military intentions — Soviet policy since Korea seems to have consciously excluded overt military aggression in favor of the far more profitable and acceptable techniques of political and economic warfare. I have heard Secretary Dulles on several occasions say that if it were not for the U. N., we would be in World War III. I believe he had in mind, at least in part, the deterrent effect of the commitment taken by eighty-one (81) nations — including the Soviet Union — to refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state. Perhaps the chief significance of this prohibition is the assurance that any warlike act will immediately be brought before eighty (80) other nations who have bound themselves by the same inhibition.

I would not compare that deterrent with the deterrent furnished by SAC. But we have seen too many examples of Soviet sensitivity to world public opinion to write it off as meaningless. It is not always remembered that the U. N. resolution condemning the U. S. S. R. in Hungary was supported by fifteen (15) Afro-Asian States, with none in opposition. The Soviets periodically stumble hard simply because of the difficulty of sustaining a soft line in the U. N. when the line outside hardens. Soviet troops are still in Hungary, but the Soviet reputation was gravely tarnished at a time when its efforts to woo the uncommitted nations were at a peak. On balance, the existence of the U. N. is probably a consideration; but it is hardly a prime factor in affecting Soviet calculations with respect to the profitability of military operations.

If, however, we think of intentions in the context of encouraging the evolution of Soviet society into something internationally more tolerable, there are additional dimensions that we may not have fully grasped. The U. N. certainly cannot significantly transform the nature of Soviet communism, but let me suggest a few ways in which it might create some favorable civilizing influences.

The U. N. is one of the few continuous contact points between East and West, and this fact may have special new significance in a changing situation. A generation of technicians and bureaucrats is moving into range of real power in Russia. The United Nations Economic Commission for Europe, for example, has served to expose many of them to an otherwise unavailable vision of the West. At some moment of possible choice in the future, it may have been indispensable to maintain bridges such as this. They furnish a way for the West to give continuous assurance that the Soviet Union can be readily accepted into a community of nations as a Great Power, although not as a Messianic and apocalyptic force. At the same time, U. N. membership can have the effect of sustaining and perhaps encouraging the independent identity of such satellites as Poland.

We should thus continue to create alternatives that may one day appear realistic and attractive to the Soviets. With or without the Russians, we should continue to work toward institutionalizing areas of common action. We have already done this in many nonpolitical fields such as health and technical assistance, which the Russians, for many reasons, ultimately came to join. In a different sense, this is true of disarmament. It may also be true with respect to peaceful uses of outer space. Evolution can stimulate evolution; but, conversely, the failure of the free world to grow and mature can be a signal for renewal of the most unacceptable kinds of developments in the Soviet world. I would not overrate the capacity of the U. N. to affect the nature of the Soviet system, but I would say that if Russian communism

is in a period of deep-rooted ferment the West should not neglect any external influences that may be constructive — and the U. N., properly viewed and employed, may be one such influence.

There is one final dimension that, for convenience, I place under the “intentions” heading, although it is not directly related. The U. N. is a demonstration and testing point for the unity of the free world. As that unity sharpens, Soviet estimates have traditionally seemed to become modified. Conversely, Western disunity encourages the Soviets to calculate their opportunities as more promising. The U. N. has sometimes become an embarrassment to us when it was used as a place for airing “dirty Western linen.” It is, by the same token, a place where the Russian can stimulate Western disunity. The simple answer is for us to pick up our marbles and walk off — but this, of course, is not only wholly undesirable but wholly unrealistic. The net effect, by any educated calculation, would be to leave approximately half the free world in a Russian-dominated U. N. — apart from its total unacceptability to the American people, who show consistent support for U. N. membership in poll after poll.

To live successfully in the kind of U. N. that has developed, the U. S. must do a number of new things. First, we must be prepared to go a great deal further than we have with our friends on issues which are of great political importance to them but of only slight importance to us. I have in mind essentially procedural issues, such as: elections, minor budget differences, composition of committees. These have been the source of perhaps more interallied friction than any substantive policy issues — apart from the Suez case — except, possibly, the issues of Chinese representation. On these procedural issues, we might better keep U. S. prestige disengaged and save it for the big ones.

We should also plan to exist gracefully in an occasional minority position on some issues where we genuinely differ, rather than insisting on having our own way, or going over the heads

of friendly delegates, or threatening retaliation — however subtly. In short, it means more perceptive and more truly democratic leadership on our part and far less pretended omniscience — based, so far as I can see, not on necessarily superior wisdom but, at least primarily, on greater material strength.

Objective 1-c is to reverse — or, at least, *to limit the trend of international political support for the Soviet Union*. This support is coming primarily from the underdeveloped, neutralist, anti-colonial countries and territories of the world. We spoke earlier of some of its causes; it is not at all clear that actions of ours can wholly reverse this tide until it has run its course. Nevertheless, it is here that the battle is being fought. I don't think we want to fall into the fallacy of the "belly communism theory," considering the number of well-fed intellectuals who tend to lead communist movements, but we want to find ways to divert local forces of discontent into constructive channels. To do this, we must furnish incentives for native leadership to harness the blind force of nationalism to tasks of building, rather than the paths of destruction and hate that are so often followed.

The prime factor here is economic. I would not want to predict our conclusions as to the proper amount of international economic assistance that should be channeled through the U. N., but — even apart from the vitally important question of financing — there are profound psychological factors involved. Here, as with interallied relations, the style and sensitivity of American diplomacy can be crucial. We cannot disregard such subtle factors as the way we handle the legacy of bruised feelings left by centuries of Western claims to racial superiority; or, the understanding with which we meet the ambition of Asians or Latin Americans to catch up, to become industrialized, to be less dependent on a peasant economy that promises only more of the same human misery and poverty.

The U. N. happens to be the one place where all of these tensions and claims and expectations come into focus in full view

of virtually all nations of the world. The uncommitted nations have found their place in the sun in the U. N., where the concept of legal equality of states offers them the self-respect and the dignity which they seek. Above all, it furnishes them with a parliamentary strength that is entirely disproportionate to the amount of real power they command in the world. Their new power is used primarily to bring before the rest of the world the ambitions and grievances about which they feel strongly.

The same opportunities to exploit this situation exist for us and for the Russians, but — taking all the evidence into consideration — the one which will ultimately succeed is the one which most successfully relates own interests to *their* interests, *their* aspirations, and *their* goals. What do they seek? Freedom from foreign domination; economic assistance — specifically, grants and low-interest loans for economic development and fair capital investment; protection of their exports from fluctuations in world prices; racial equality; freedom for remaining Western colonial possessions; international recognition of human rights — in short, equality with the rest of the world.

Some of these are things which we believe in, too; others are borderline; some are merely vague symbols. Most of these issues present us with exquisite political difficulties both at home and abroad. But if this analysis is correct, it suggests that we have not yet grasped the really crucial significance of the U. N. as an agency to reach these people on the issues of vital significance to them. In many cases, as with some of the colonial issues, it would be easier if we never had to stand up and be counted as between Europe and Asia or Africa. But, since we do, the logic of the situation demands that we find better ways than we now have to identify ourselves with these countries and their problems as those problems become issues in the U. N. setting.

The unity of the free world, which we discussed earlier in terms of our alliance systems, has a broader meaning here. In

the continuing political warfare with world communism, the ultimate test of American policy will be its ability to hold together the industrialized half and the underdeveloped half, and find new avenues to cooperation and unity. Where the U. N. provides the only agency acceptable to the latter half, it must be utilized to the utmost.

Objective 2 is to reduce the possibility of general war developing by a chain of inadvertent circumstances. It may well be that this should be the first of our priority objectives, practically speaking. If general war by design is not a lively possibility, barring a dramatic shift in the power equation, war by inadvertence becomes the chief object of concern for responsible statesmen.

Suez showed the practical operation of this country's determination to minimize risks of general war. That being so, the most profound significance of U. S. Suez policy has not really been faced up to, which is this: to the extent that we rule out remedies by force for the legitimate grievances of states, to that extent we shall be obliged to find other, nonviolent means for the solution of those problems. It is a simple problem in physics: as we hold the lid on, the temperature rises; and, as the temperature rises, the pressure increases. This fact has confounded all past human attempts to outlaw war; all of them failed to provide means for peaceful change so that the dynamics of international political life might be peacefully rather than violently expressed and contained.

It is here that the U. N. has possibly the most vital task in the future in terms of our national security. This country — and I mean its political and intellectual leaders — is going to have to attach a wholly new order of importance to the realm of peaceful settlement of disputes and means for peaceful change. These are now roughly in the same category as Mother's Day and the need for new schoolhouses: no one speaks against them, but our high command has so far by no means concentrated the

same intensive effort here as for our military preparations. Even when our very noses are rubbed in the problem, we, so far, have not seemed to be able to generate the common sense and the political muscle that is increasingly going to be needed on this front.

Let me illustrate. With all respect to the President and his Secretary of State, the classic example of American error was, in my judgment, furnished by the so-called "Eisenhower Doctrine for the Mid-East." It is not that a U. S. "Keep Out" sign in the area was not worth posting in front of the Red Army, but that this was our *only* real suggestion for remedying a whole set of local situations which were not primarily of the East-West variety, a forcible solution to which we had just foreclosed. The basic sources of violence — starting perhaps with something so specific as the Palestine refugee problem — have been once again passed over, and it can confidently be predicted that the next local explosion will be that much more potent. There is no question but that a crash effort is going to be needed to break through into new ground in the pacific settlement of dispute and peaceful change every bit as much as in the field of missiles — perhaps more so, because the missiles will be used only when diplomacy fails. If war is too important to be left to the generals, the specific multilateral techniques of peace are surely too important to be left to the legal theorists and the political scientists.

All logic, then, points to the need for greatly expanded efforts to eradicate the causes of international instability — and the political, the economic, and other causes as well. Here, the U. N. offers us a wealth of tested and thoughtfully conceived instrumentalities, and the future may well rest on the initiatives which the U. S. takes to move the stubborn political and territorial disputes of the world toward solution by diplomatic, conciliatory, legal, and other similar means. Wholly apart from the Soviet problem, the world is full of situations which, if left unchecked, could spell major trouble for us and for world peace as a whole.

Indeed, our motivation in working with great purpose and effort on the chronic causes of instability and friction should not be seen as arising only from the Soviet threat. Granted that in moments of pessimism it sometimes seems impossible for us to justify to ourselves any decent or sensible or humane international act on its own merits alone. But refer back for an instant to the general statement that preceded our catalogue of policy objectives. There is every justification for devoting more than the present lip service to the profound problems of international order, completely apart from the Soviet — U. S. context. The justification is that these problems threaten our ability to fulfill the internal promise of our own society. Our own role in the world must be more than that of a powerful negative force. Our own development as a people has become dependent on the development of other peoples in the direction of stability and satisfaction with the fairness of the existing order. If the threat of small wars mushrooming into big ones gives that continuing task added urgency, so much the better.

Perhaps the most disabling political factor in world peace today, apart from the “cold war,” is the colonial problem. Until it is finally liquidated, there will be friction and hatred. Afterwards, to be sure, there will be other problems — such as keeping new, weak nations afloat and in the camp of freedom — but if any one thing is true it is that the unsolicited presence of foreign rulers and military forces on the territory of a nation is guaranteed to bring trouble, whether in Cyprus, or Algeria, or, for that matter, Hungary, or even Okinawa. The U. N. provides the only agency through which the U. S. can continually keep pressure on its allies to move toward freeing their dependencies, while at the same time keeping pressure on the anticolonial forces to act in moderation; and, in general, ensuring that this vital process of evolution stays peaceful, moves at a proper pace, and stays out of the hands of those who would cynically exploit it. The role of “middleman” is at times excruciating, but it is unavoidable for us and indispensable for responsible solutions.

There is a great need for new formulas here that will satisfy these substantive requirements, while easing the burden on the U. S. — which, even more than its allies, must keep the overall world situation in focus. There are no “gimmicks” here, but there may be legitimate new modalities — perhaps like the new U. N. Commission on Africa — which we can use to improve the whole atmosphere of the colonial debate.

Objective 3 is to find means of limiting warfare, if it does break out. For our purposes here the general military issue has three parts: (1) the explicit avoidance of direct military confrontation between the Soviet Union and the U. S. (which I have already spoken of); (2) the practical problem of keeping such a confrontation within tolerable bounds, if it happens; (3) the problem of keeping outbreaks within the noncommunist world from spreading into a general war.

Take, first, the case of East-West hostilities of a local variety. The scope of such hostilities would undoubtedly take its shape from the estimates which each side made of the intentions and capabilities of the other. Given the will to keep such hostilities limited, the U. N. can then offer the advantages it did when the U. S. unilaterally decided to resist the Russians in Korea.

These advantages are several. First, the U. N. furnishes one means of securing maximum world-wide political support. Such support is indispensable to prevent us from isolating ourselves from world opinion and from losing that sense of legitimacy and moral right without which we as a people could not, in my opinion, sustain a military effort. The second advantage is the exploitation of the commitment to assist the Organization in any action it takes in accordance with the Charter. With the constitutional development of the U. N., this no longer has to mean “action” in the legal sense of Security Council enforcement. Even marginal offers of bases, transit rights, or even “a sharpshooter on a camel,” can pay heavy dividends in demonstrating the breadth of international disapproval of a Soviet act of limited aggression. The

technical difficulties of a unified type of command are great, but it has been demonstrated that they can be overcome.

The other situation, which seems the more likely one, deals with military hostilities not directly involving the U. S. or the U. S. S. R. I have already enumerated some of the likely candidates for this sort of local explosion in the future. I have also made reference to the U. N. Emergency Force, which, literally overnight, provided a means of separating the combatants in Egypt — making trained manpower available to supervise the ceasefire and withdrawal of troops — and now stands as a guarantor against any but the most reckless renewal of hostilities between Egypt and Israel. This was possible only because a conscious decision was made to exclude great power contingents from the force. In this way, the wound was cauterized and made relatively sterile. Great Power participation would, at best, have made the force inoperative, and, at worst, precipitated just the kind of direct confrontation on the ground which we wished to avoid.

There are many possible types of U. N. forces that might move into such trouble spots before or after hostilities. Their effective utility probably hinges on the exclusion of the Great Powers — limiting the conflict literally, as well as figuratively. Perhaps the most practical way to bypass the budgetary difficulties, which are great, would be to set up a training command — possibly renting a Swedish or Swiss training facility — and, with a small permanent cadre, rotate in and out selected units from the member countries, which would then be held in reserve at home. Perhaps the most important point is that we should stop judging the U. N. and its potential by a sterile and unrealistic image of collective security through a world police force, an image whose cost is world government which we ourselves seem to find wholly unacceptable. Realistically, the practical military contribution of the U. N. in this age doubtless lies in the kind of limited “brush-fire” prevention and clean-up squad which I am describing. Its

importance may be absolutely critical in preventing or pacifying another outburst like Suez.

The force I have in mind is not a fighting force, although it can defend itself against small-scale attack. It is a force in aid not of full-scale military action but of peaceful settlement procedures, either before or after fighting actually occurs. Perhaps it should be called the U. N. Corps for Observation and Patrol — UNCOP. We could spend the entire hour discussing it. It is enough to say, however, that it seems to offer a ready-made means for dealing with those situations which call for pacification procedures on the spot, but where U. S. or Russian involvement would spell nothing but greater trouble.

Our final objective deals with the uses of the U. N. in a general war situation. We are prone to believe that general war will mean the end of the U. N. This may be so — but if all our weapons are to be brought to bear, the U. N. umbrella could be a vitally important political weapon for legitimizing and maximizing a U. S. military response, just as it was in Korea. Certainly our war planning must not throw away this possibility, particularly if doing so would give the U. N. to Russia on a silver platter. There may be no postwar world to organize, but we must assume there will be. We must finally learn the lesson that war is a prelude to the politics of peace, not an end to all political problems. In this connection, I take a very dim view of proposals to expel the Russians and their satellites from the U. N. on the assumption that a total break is ultimately inevitable. Apart from all the other reasons for keeping contact, exposing Soviet policies to the light, and holding the U. N. together as a means of conducting the necessary business of nations, the U. N. could, at the very outset of a general war, provide a means for according legitimacy to non-communist representatives of the Soviet bloc and thus supply a vital political focus for the political aims of the war.

In conclusion, I repeat what I said at the outset. This analysis is fragmentary and incomplete, and, in the time available

to me, only some highlights could be touched upon. Perhaps the most that can be claimed for it lies in its suggestions for fruitful lines of action that seem worth exploring. But if it has any validity, it also strongly suggests that we may be prisoners of outmoded ways of thinking about and using the U. N.

Perhaps the Suez case of 1956 sums up much of what I have said about our peculiar misuse of the U. N. and of diplomacy itself. Throughout the period of intense and futile negotiations during the summer of 1956, we rigidly shunned any positive use of U. N. instrumentalities. Hard as it is to believe in the light of the subsequent disaster, our primary motive in avoiding such use throughout that period was to avoid any possible public discussion of the Panama Canal by association, as it were. Consequently, we relied exclusively on the so-called "London group." We thereby insisted on a forum that was unacceptable to Egypt. At the same time, we failed to avail ourselves of the wide range of U. N. possibilities, including appointment of a U. N. mediator; or a U. N. agent general to operate the Canal in the interim without prejudice; or a joint regime; or, at minimum, recognition that the Canal had international character. Reasonable proposals with heavy U. N. support could conceivably have altered Egypt's intransigence. When the British and French finally went to the U. N. in early October, it was, in retrospect, obviously to clear the way for unilateral action. Only when fighting broke out did we turn to the U. N. to stop it. And this was, of course, the one thing that the U. N. was able to do in any way — apart from its purely moral force and apart from outside, unilateral action, such as that taken in this case by the Russians and ourselves.

As I have shown, there may be extremely important ways of using the U. N. that are realistically supportive of our true concrete interests in the period now and immediately ahead. Some of the specific directions which I have pointed to must be set against the less useful shibboleths, stereotypes and symbols about

the U. N. that we still cling to — expressed in terms of universal collective security, the “misuse of the veto,” the need for rigid U. S. control over multilateral funds and programs, the popularity contest theory, and the persistent expectations about altruistic international behavior. The game is too important, and the stakes too big, to misuse any instrumentality that offers genuine opportunities to advance our national prospects and the prospects for a tolerable world around us.

BIOGRAPHIC SKETCH

Doctor Lincoln P. Bloomfield

Doctor Bloomfield received his B.S., M.P.A., and Ph.D. degrees from Harvard University in 1941, 1952 and 1956 respectively.

From 1942 to 1946, he served in the United States Navy, consecutively: in the U. S. S. RANGER; as Officer in Charge of Navy V-12 Unit, University of Illinois; and in the Office of Strategic Services as Deputy Chief, Research and Intelligence Service, China Theater.

He was with the Department of State for the following year in these capacities: Assistant and, subsequently, Acting Executive Officer in the Office of Special Political Affairs; Staff Assistant to the Assistant Secretary for United Nations Affairs; a member of the Disarmament Staff; and Special Assistant to the Assistant Secretary for International Organization Affairs (responsible for policy planning on United Nation's problems).

Doctor Bloomfield is currently the Senior Staff Member at the Center for International Studies, Massachusetts Institute of Technology, and Director of the United Nations Project.

RECOMMENDED READING

The evaluation of books listed below include those recommended to resident students of the Naval War College. Officers in the fleet and elsewhere may find them of interest.

The inclusion of a book or article in this list does not necessarily constitute an endorsement by the Naval War College of the facts, opinions or concepts contained therein. They are indicated only on the basis of interesting, timely, and possibly useful reading matter.

Many of these publications may be found in ship and station libraries. Books on the list which are not available from these sources may be obtained from one of the Navy's Auxiliary Library Service Collections. These collections of books are available for loan. Requests from individual officers to borrow books from an Auxiliary Library Service Collection should be addressed to the nearest of the following special loan collections:

Chief of Naval Personnel,
(G14)
Department of the Navy
Washington 25, D. C.

Commandant ELEVENTH Naval
District (Code 154)
937 North Harbor Drive
San Diego, California

Commandant FOURTEENTH
Naval District (Code 141)
Navy No. 128
Fleet Post Office
San Francisco, California

Commander Naval Forces,
Marianas
Nimitz Hill Library, Box 48
Fleet Post Office
San Francisco, California

U. S. Naval Station Library
Attn: Auxiliary Service Collection
Building C-9
U. S. Naval Base
Norfolk 11, Virginia

Title: *NATO and the Future of Europe.* 263 p.

Author: Moore, Ben T. New York, Harper, 1958.

Evaluation: This book is a study of NATO. It concerns itself with the revolution in military technology, the role of nuclear weapons in strategy, and the changing functions of national states, considering economic and political aspects as well. After presenting an historical analysis of the attempts to unify Europe and discussing the several organizations which link together the free European community, the author sets forth the requirements for European and Atlantic union. He then advances the thesis that the integration of Europe is possible, desirable, and in the U. S. interest. He shows that the United States can assist in accomplishing the union of the European nations in an organization controlling the entire range of modern military power, including nuclear weapons. This union would be strong enough to deter Soviet aggression and to resist its pressures. The inherent risks in this course of action are described, but it is shown that they could be reduced by fitting the European strategic nuclear force into the broader NATO framework. NATO would then become an alliance with two partners, each with nuclear retaliatory capabilities to employ against any aggressor. The author makes a good case for European military, political and economic integration, thereby establishing a third world power and reducing the potential of the U. S. S. R.

Title: *Strategic Surrender.* 287 p.

Author: Kecskemeti, Paul. Stanford, Calif., Stanford University Press, 1958.

Evaluation: *Strategic Surrender* is an extremely interesting, timely, informative, and thought-provoking book in the field of national strategy. The style is unusually simple and clear: the subject matter should be easily understood, even by the layman reader. The book opens with an examination of "surrender" as a concept. The implications of the problems in policy of the strategic concept of surrender, as opposed and interrelated to those of the political concept, are highlighted. This academic study is followed by a gripping presentation of the four surrenders of World War II. These case studies are: the French surrender (June 1940), the Italian surrender (September 1943), the German surrender (May 1945), and the Japanese surrender (August 1945). These studies reveal a lack of realism on the part of the allies in their policy

of unconditional surrender, and the next chapter analyzes that policy. It is demonstrated that the great fallacy was that a defeated enemy would be left with zero bargaining power. The analyses show that in each of the case study surrenders, and in fact in any hypothetical case which can be developed, the losing side always possesses a bargaining power which is greater than zero. The conclusion, as drawn, appears to be incontrovertible. The last chapter examines the concept of surrender in the future. It argues convincingly that for the future, even more so than for the past, there is no place in United States' policy for the concept of unconditional surrender.

Title: *Soviet Strategy in the Nuclear Age.* 283. p.
Author: Garthoff, Raymond L. New York, Frederick A. Praeger, 1958.

Evaluation: This is a study of the Soviet idea of military strategy at the present time and in the near future. It provides a guide to thinking by those who would experience and counter this Soviet approach to gaining these objectives in the world arena of conflict. The essence of the Soviet attitude, as treated in this book, is that their preparations for general nuclear war do not commit them to this form of warfare. They retain diversified capabilities for all sorts of wars. *They are not tied to an overspecialized capacity which permits only a narrow choice, or none at all.* The Soviet armed forces are each discussed in this relation to the overall military strategy, preceded by a general discussion of policy and politics. The portions on Soviet sea power are especially interesting.

Title: *The Affluent Society.* 368 p.
Author: Galbraith, John Kenneth. Boston, Houghton Mifflin, 1958.

Evaluation: This book is for the reader who has up to now steered clear of writings on economics on the basis that they were too dry. It is eminently readable, is written in a lively, witty style, and deals with items of current applicability to our lives. Doctor John K. Galbraith, one of the famous "cheaper by the dozen" clan, and now Professor of Economics at Harvard, has no reluctance about tilting at many of our currently economic windmills. His chief opponent is what he calls the "conventional (economic) wisdom." This he traces back to the

writings of those predecessor literary economists, Adam Smith, Ricardo, and Malthus. He develops the theme that their principles, although generally applicable in their times, which were periods in which "poverty had always been man's lot," nevertheless need modification in our present era of affluence. This, then, is the mission he assumes for himself, and he implements it with critical appraisals of the "urgent production myth"; the "social imbalance" between our private and our public standards of living (e.g., two cars and longer vacations versus education, slum clearance, and municipal services); the liberal attitude vis-a-vis the sales tax; present concepts of unemployment insurance; the importance of gross national product in the arena of national security; and other issues equally vital and relevant to the mid-twentieth century western world.

PERIODICALS

- Title: *Global Mobility for Missile Strategy.*
- Publication: INTERAVIA, August, 1958, p. 812-815.
- Annotation: Argues that the realization of a concept of global mobility as the basic requirement of a new missiles' strategy will require strenuous efforts from both the United States Air Force and the U. S. aircraft industry.
- Title: *After a Test Ban.*
- Publication: THE NEW REPUBLIC, September 1, 1958, p. 3-4.
- Annotation: An editorial stressing a little publicized argument for the controversial ban on nuclear tests, and offering an alternative means of reducing armaments by means of regional systems of arms limitations that would not directly affect the global balance.
- Title: *Halting H-Bomb Tests — What's Involved for U. S.*
- Author: U. S. NEWS AND WORLD REPORT, August 29, 1958 p. 27-29.
- Annotation: Compares the world's atomic arsenals and discusses the arrangements and controls necessary for a year's suspension of weapons testing, giving the text of the President's statement.

Title: *Moscow and the Changing Nature of Communist Ideology.*

Author: Riefe, Robert H.

Publication: JOURNAL OF INTERNATIONAL AFFAIRS,
Vol. XII, No. 2, 1958, p. 159-168.

Annotation: Considers the readjustment of the doctrinal base of communism for the sake of new successes in the political field, resulting in the open door to deviation.

Title: *Communism in China.*

Author: Harrington, Michael.

Publication: THE COMMONWEAL, August 29, 1958, p. 535-538.

Annotation: Follows the development of Communist Chinese rule, its shifts in course from moderation toward greater and greater extremes of exploitation and state control in the new classic Stalinist phase. Concludes with a look at American policy as it relates to the future of Asia: What are we offering the new democratic governments in Asia as an alternative to the Communist way of industrialization and seizure of power?

Title: *Why We Are Losing the Ruble War.*

Author: Nielson, Waldemar A.

Publication: HARPER'S, September, 1958, p. 25-31.

Annotation: The author shows how Russia's skillfull maneuvering on the world trade scene — unhampered by any idealistic program for the underdeveloped nations — may defeat the present ineffective United States aid program, and suggests seven fundamental steps for U. S. action in combating Soviet economic warfare.

Title: *The New Europe.*

Author: Spaak, Paul Henri.

Publication: THE ATLANTIC, September, 1958, p. 37-41.

Annotation: After reviewing the political, economic and social decline of Europe, the author expresses enthusiasm for such functional methods of achieving European integration as the Coal and Steel Community and, especially, the Common Market.

- Title: *War in the Far East?*
- Publication: U. S. NEWS & WORLD REPORT, August 22, 1958, p. 33-35.
- Annotation: Describes the most recent war scare in the Far East, and stresses the importance of the Seventh Fleet in this area.
- Title: *The Neglected Deterrent.*
- Author: van de Velde, R. W., Colonel, United States Army, (Ret.)
- Publication: MILITARY REVIEW, August, 1958, p. 3-10.
- Annotation: Argues that guerrilla warfare is a relatively inexpensive weapon of great potential, equally adaptable to conventional or nuclear warfare, and that the United States should adopt a policy toward the U. S. S. R. satellites which would encourage their peoples to revolt against their Communist leaders in the event of war between the U. S. and the U. S. S. R.
- Title: *Polaris.*
- Publication: INTERAVIA, August, 1958, p. 807-811.
- Annotation: A brief unclassified description and history of the birth of the Polaris Weapons System.
- Title: *The Shipbuilding Industry: Past and Present.*
- Author: Eikichi, Azami.
- Publication: JAPAN QUARTERLY, July-September, 1958, p. 370-380.
- Annotation: Gives history and statistics of Japanese shipbuilding from its beginnings, showing its striking development since World War II to the point where it is approximately equal to the capacity of the United Kingdom, which is the largest in the world.
- Title: *The Navy's Moral Leadership Program.*
- Author: Gates, Thomas S.
- Publication: MSTs MAGAZINE, September, 1958, p. 9.
- Annotation: A partial reprint of Secretary of the Navy Gates' address, explaining why moral leadership is essential to sea power and national security.

- Title: *Nasserism.*
Author: Bagley, F. R. C.
Publication: JOURNAL OF INTERNATIONAL AFFAIRS,
Vol. XII, No. 2, 1958, p. 150-158.
Annotation: Nasser's action toward too much, too quickly makes him actually an obstacle to Arab unity: he appeals for solidarity, but in important issues acts independently of other Arab governments.
- Title: *An Analysis of Neutrality and Modern Neutralism.*
Author: Frohman, Herman.
Publication: JOURNAL OF INTERNATIONAL AFFAIRS,
Vol. XII, No. 2, 1958, p. 187-192.
Annotation: Interprets the differences between neutrality and neutralism, citing examples of each policy in international situations.
- Title: *Chinese Oil Hopes Soar.*
Publication: THE OIL AND GAS JOURNAL, August 18, 1958,
p. 124.
Annotation: A report on China's new oil strike and its importance in the country's industrial development.
- Title: *Russia Eyes Major Oil Exporter Role.*
Author: Brandes, Ely M.
Publication: THE OIL AND GAS JOURNAL, August 25,
1958, p. 62-65.
Annotation: A comprehensive report on the possibilities of Russia's extensive stepping up of oil exports in the future as a political weapon in the cold war with the West.
- Title: *The Challenge of Asia.*
Author: Daly, John C.
Publication: VITAL SPEECHES OF THE DAY, August 15,
1958, p. 654-658.
Annotation: The Vice President of the American Broadcasting Company's address on the conflict of art, aid and armaments in the cultural war being waged by Russia in Asia.

- Title: *Soviet Seapower on Rise From Czars Until Now.*
Author: Foss, William O.
Publication: NAVY TIMES, August 9, 1958, p. 6-7.
Annotation: First of five articles on the Russian Navy, its history and present state of development.
- Title: *The Challenge of the Space Age.*
Author: DuBridge, Doctor Lee A.
Publication: MARINE CORPS GAZETTE, August, 1958, p. 20-25.
Annotation: The President of the California Institute of Technology examines the scientific uses of space travel and provides a realistic view of its military value from the standpoint of a physicist. Concludes that the new technologies of space travel should be used for peaceful scientific purposes rather than wild programs of pseudo-military Buck Rogers expeditions.
- Title: *Missile Strategy: 1968.*
Author: Waddington, C. H.
Publication: THE NATION, August 16, 1958, p. 70-72.
Annotation: Discusses the "Fort Knox" strategy — both sides possessing a deadly stock of solid-fuel rockets buried deep in the earth and, it is hoped, never to be used — and proposes an international Planning Office for Peace.
- Title: *The Navy Takes Up Russia's Undersea Challenge.*
Author: Hessler, William H.
Publication: THE REPORTER, August 7, 1958, p. 24-26.
Annotation: Discusses our ASW potential and its vast importance in the face of Russia's huge submarine fleet today challenging sea power vital to the NATO alliance.
- Title: *Why U. S. Stands Firm On Not Recognizing Red China.*
Publication: U. S. NEWS & WORLD REPORT, August 22, 1958, p. 94-97.
Annotation: The text of the official paper of the State Department declaring U. S. policy on China and why she is not recognized by this country.