

## THE AMERICAN INDUSTRIAL COMPLEX

4 January 1960

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## NOTICE

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INDUSTRIAL COLLEGE OF THE ARMED FORCES

Washington, D. C.

Mr. William C. Foster, Vice President, Public Affairs, Olin Mathieson Chemical Corporation, was born in Westfield, New Jersey on 27 April 1897. He attended Massachusetts Institute of Technology, 1914-18, leaving at the end of his junior year to serve as a second lieutenant (aviator), USA, in World War I. He received an LL.D. degree from Syracuse University in 1957. In 1922 he joined the Pressed and Welded Steel Products Company, Long Island City, N. Y. as a sales engineer, and rose to the presidency of the company just prior to resigning to enter Government service in 1946. Since that time he has served successively in the following positions: Under Secretary of Commerce, 1946-1948; Deputy U. S. Special Representative, Deputy Administrator, and Administrator, Economic Cooperation Administration, 1948-1951; Deputy Secretary of Defense, 1951-1953; president, Manufacturing Chemists Association, Incorporated, 1953-1955; and executive vice president and director, Olin Mathieson Chemical Corporation, 1955 until acceptance of his present position. He has served as a director of Pressed and Welded Steel Products Company; chairman of the board and director, Reaction Motors Incorporated; chairman of the board and director, Porter International Company; director, Detroit Edison Company; director, Marquardt Aircraft Company; member Business Advisory Council, Department of Commerce; member, Committee for Economic Development; and served in several capacities for the United States Army in World War II in the field of procurement. He served as cochairman of the Gaither Group, which in 1957 reported on the comparative military strengths of the United States and the Soviet Union. Mr. Foster has been decorated with the U. S. Medal for Merit, and has received commendations for his civilian service from the War Department and the Department of Defense. He is the author of several recent articles on Soviet and American military and economic strengths. This is his first lecture at the Industrial College.

## THE AMERICAN INDUSTRIAL COMPLEX

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GENERAL HOUSEMAN: We are getting started on the beginning of our new year, this so-called golden 1960. I don't know how much of the gold is going to rub off on us or into our pockets, particularly to the military and those people who are involved in procurement, but it has been advertised.

I am glad to see you back here. Most of you seem to have fairly bright eyes after the New Year.

This morning we are starting in again on materiel management, on another phase of it. You are familiar with the fact that we have covered certain aspects of military procurement and distribution. This morning we are going to go into certain aspects of industrial production.

We have a speaker who is very well qualified in that area. He has had experience both in Government and in civilian industry. He is quite well acquainted with both the national and the international scene. He is particularly well steeped in the economics of Europe and in the economic and the military problems of Soviet Russia.

This is the first time our speaker has been here with us, and we are particularly happy to have an opportunity to hear from Mr. William C. Foster, vice president of the Olin Mathieson Chemical Corporation. Mr. Foster.

MR. FOSTER: General Houseman, Gentlemen: I hate to start by disagreeing with the distinguished introducer, but, in reading the public press over these last few days, I note that this is not yet the sixties. The sixties don't start yet, because the 19th century did not end until 1 January 1901. So I am compelled to believe that this is not yet the sixties, but nonetheless I will accept it as the introduction of this phase of your studies.

I also note that the General referred to the holidays. I, too, hope that you had a good season. I hope you had a good wet one, because for the first several minutes, at least, I am going to use quite a few dry figures, gentlemen, if I may, simply to set a backdrop for some later comments which I will make.

The title of this lecture and the analysis of its intended scope immediately indicate that my comments can cover only broad areas which, in your later studies and visits, you will develop in detail.

The General kindly mentioned that I have had several jobs in the past; some knowledge of each, at least, may have rubbed off, so I will try to recollect for you some of the characteristics, capabilities, and limitations of this great American industrial complex. I will need to quote a few numbers, mostly from the Department of Commerce, and they are in most cases for the year 1957, as the latest complete available figures.

The first outstanding characteristic, of course, of our economy is its tremendous size. Having 6 percent of the world's population, we have 33 percent of the world's gross national product. The U.S.S.R., with 7 percent of the world's population, has 13 percent of GNP. Western Europe, with the exception of Canada, is next most highly industrialized to ourselves. It has 12 percent of the population and 29 percent of the GNP. Canada, itself, with only six-tenths of 1 percent of the world's population, has 2.3 percent of the world GNP. This shows that Canada has a productivity only slightly less than ours, and its GNP is a little greater in total than Japan, which has more than five times Canada's population.

I quote these figures to give you an idea of the productivity of these several sections of the world. Obviously, we are well ahead of anyone else.

As a final comparison, the free world, which excludes the Sino-Soviet bloc, has 79 percent of world GNP, with 66 percent of the population. This, of course, includes India and the other uncommitted nations.

These comparisons are naturally crude, since they have to be based on a conversion of foreign GNP's into dollars, and these figures have to be based on an estimate of the relative purchasing power of the various currencies.

May we now have the slide comparing overall figures on vital commodities or services in terms of metric tons or bales or kilowatt hours, as are usual for the items? The slide shows only the U.S., Western Europe, and the U.S.S.R., and gives percentages of total world production in those commodities. You can see from the table that, with the exception of cotton, NATO, and in most cases the United States alone,

has a major share of world production. Red China has been left out of this table, since, while producing more than they ever have in the past, it had only a significant percentage in gin cotton, where it produced 16 percent of the world total, barely equivalent to that of the U. S. S. R. When added to their total, it is slightly in excess of the combined production of the West in that one item. I think that the overwhelming superiority in, for instance, steel and aluminum of the West is noteworthy. By the way, if you include Canada, you will note that the Western Hemisphere alone has 58 percent of the world production of primary aluminum. And you will note in electric power, which is another basic requirement for production, the West has 75 percent--a little in excess of 75 percent--of the world production.

Turning to another characteristic of our economy, we find that, in spite of large defense production, actually American industry serves the private consumer predominately. United States GNP in 1957 in round figures sent 64 percent plus to private consumption, 15 percent to gross private investment, just over 1 percent to net exports, and 19.5 percent to Government purchases at all levels, of which 10 percent was for defense. This split as between the sectors is fairly typical of recent prosperous years. The object breakdown of the 10 percent for defense is payroll, 3.5 percent; military construction .5 percent; military equipment 4 percent; other goods and services 2 percent. Thus, Federal defense purchases in 1957 from business, including construction, were about 6.5 percent of GNP, or roughly, \$25 billion. Many of you are familiar with the fact that in this year's defense budget the percentage devoted to payrolls and maintenance will be substantially increased.

Comparison here with the Soviet Union is difficult. If we include a large portion of their so-called industrial investment, since it is really directed to military ends, and by equating comparable costs of manpower and maintenance in their forces to ours, it appears that the Soviet Union devotes between 20 and 25 percent of its GNP to national security, or about \$40 billion equivalent. This, of course, is close to the amount of our own defense expenditures. However, this total is of the GNP in their case, which is only 40 percent of ours, and it means that their private sector has much less to eat and enjoy.

Now, for a moment let us look at U. S. goods produced. We'll take 1957 again, since 1958 was distorted by the recession, and 1959 by the steel strike. U. S. goods output was \$238 billion, comprising 54 percent of the GNP. Twenty-one percent of that was in durables, 33 percent in

nondurables. By comparison, services were \$154 billion, or 35 percent, and construction \$50 billion, or 7 percent.

What is the character of an economy that can produce all this? Perhaps most striking is the interrelationship, the interdependence of our industry. It appears to be a direct consequence of our large geographic area, with easy passage of men, money, and materials throughout the Nation. To natural resources have been gradually added over the years the finest communication systems of the world-- rail, air, water, telephone, telegraph, postal and the printed word. These provide free access and passage to the entire country. This has encouraged optimum use of resources so that many end products contain components made up in scores of different plants and gathered from a dozen or more different sections of the country, or even the world. Geography, tariffs, political barriers, language, or different systems of measurement in other parts of the world prevent this flexibility in other countries.

Prime examples, of course, of coordinated products are consumer durables, like the automobile and the refrigerator as well as major weapons.

Our system permits building great markets through large quantity production, and consequently ability to price within reach of most Americans. Its efficiency depends on uninterrupted flow of all parts. The system results in strength, based on good planning, and coordination. However, it may also result in a structure ultrasensitive to major breakdown if subjected to massive attack, or for instance, if exposed for any extended period to a major strike in a sector such as steel production or rail transportation.

It seems wise, from a national defense viewpoint, that we develop self-contained manufacturing plants for certain most essential defense and survival items, and that we protect these plants and their most important resource--human beings--so that production could be continued under fallout conditions. In view of circumstances under which our most complex products have developed, not many self-sufficient plants could be economically justified; but the problem requires that there certainly be some.

I am reminded of an experience in Indochina in 1952, I doubted that the substantial amount of automotive equipment and tanks there which I had inspected after damage by the enemy could be made

serviceable unless returned to the United States, which was obviously impractical. But, under the leadership of some ingenious and determined United States military advisers, I later saw a complete reassembly line set up in the open, on the outskirts of Saigon, with no machine tools, but with logs and levers, hammers, wrenches, and wedges, and much indigenous hand labor. This line produced usable vehicles, which went directly back into service. It obviously took more than 10 wrecked vehicles to make 10 good ones, but, putting it mildly, under a massive nuclear attack and fallout, we would have plenty of damaged equipment. I hope there would be enough people left with the strength and spirit to put the essential things together.

I'd like to dwell here on fallout protection, since the United States should do much more about it, not only because it would save millions of lives but because it would also make the cost of an attack much higher if the attacker planned, as he would have to, for a quick victory. Time and my assigned subject do not permit my developing this. So, now let's take a look at the manner in which large and small businesses make up our industrial complex and give it vitality. These figures which follow are generally taken from an article in the September, 1959 "Survey of Current Business" of the Department of Commerce. Generally these figures are 1956, since they are the latest detailed figures available. The percentage of relationships within the broad outlines of the breakdown of size have remained pretty stable over these years, even though the totals have varied. The makeup within, particularly the small firms, is very fluid. There is a great deal of turnover, as you would be aware. From 1951 to 1955 the average number of new businesses for each year was 360,000, and the number of those that went out, for one reason or another, was 370,000. The total firms, however, by mid-1959, without much change in percentage as to size, had come to 4.659 million, the increases being largely made up in increase in the number of somewhat larger businesses. There were in 1956, 4.38 million firms in operation, excluding agriculture and excluding the active proprietors of unincorporated businesses. These firms accounted for 41 million paid employees, out of 61 million employment, again excluding the proprietors.

Now some figures on the size of these firms: 4.34 million of these had under 100 employees and included 99 percent of the total firms. These were actually 3.3 million which had less than three employees. However, the 99 percent of the firms included 41 percent of the labor, whereas the firms from 100 to 500 in number of employees which are still classed by some as small business, were only 31,300

firms, and, with 9 percent of the total firms, they had 15 percent of the labor. The balance of the firms, employing over 500 persons each, were only 6,400 in number, and they make up one-sixth of 1 percent of the total number of firms; and yet they account for 44 percent of the employment. In this last group 6,400 firms with over 500 employees, 200 firms only had over 10,000 employees each. These made up only five-thousandths of 1 percent of the total firms, yet they employed 18 percent of all the labor.

Another interesting fact on these sizes is that in firms with under 50 employees, retail trade and services by far dominate in the number of firms. On the other hand, where there are over 1,000 employees manufacturing firms dominate.

The fastest growing industries in numbers over a period of about 20 years, from 1939 to 1957, roughly, were contract construction, manufacturing, communications, public utilities, and Government. This is the area, of course, of most interest in your studies. The largest percentage increase of all manufacturing was in transportation equipment, excluding automobiles. The index as a percent of 1939 was 752, or a growth of 7.5 times in that 20 years.

I'd like to develop some further points on this small business sector. Particularly since the beginning of World War II, there has been a growing legislative interest in their so-called special problems. Both temporary and permanent committees have been set up in congress to look into them. Small business administrations, small war plants and corporations, special financial arrangements, regulations for procurement favoring small business, small business procurement departments in large firms, all have been established and have highlighted these activities. In many cases this emphasis has accomplished good. There were, during World War II, and undoubtedly still are large concerns which felt that using small suppliers gave them more trouble than doing the work themselves. In many cases during World War II and later, this was probably true, and yet, using small plants meant widening the pool of skills, equipment, and labor available for the needed rapid increase of war production. It is my belief that the availability of millions of centers of initiative represented by small, independent enterprises is a basic strength of our free, competitive economy. Out of these units come many new products, many new methods, since not only are managers or owners of these concerns uninhibited by existing massive investments and equipment for distribution facilities, and thus freer, perhaps, to make radical changes,

but they are not usually narrowly specialized in a way that prevents their conceiving out-of-the-ordinary, new items.

The new emphasis on the importance of small business can be helpful to improve relatively weaker management and financial skills which, unfortunately, sometimes also handicap these small concerns. We felt, in my own prewar small business company, that we had advantages over our large competitors in being faster on our feet with reference to decisions and improving designs. However, our best customers were large concerns. Many large concerns have always used small companies as part of their supply claim. Adding small business versatility and flexibility and its subcontracted parts to the research and development, the financial, the engineering, the managerial, and the mass-production skills of the large company should continue to provide the product leadership which the United States has held for the last three or four decades.

To be sure, we are not happy presently about our situation vis-a-vis the Soviet Union in certain items, such as space and missiles, but we have not lost the industrial base from which to drive ahead if our resources are forcefully directed that way. Both large and small industry, however, may have looming up before them a real problem in connection with industry's part in providing our Nation with its security needs both in production of equipment and in scientific and engineering development of new methods and devices.

There are many parts to this problem from a long-range view-point-- whether we are devoting enough or the right kind of resources to education; whether long-range planning procedures are adequate; whether top-level decisions will be sound and prompt; whether expenditure limits are adequate yet moderate enough to encourage growth; whether cooperation in providing the Nation's security requirements between Federal Government and private, competitive, profitmaking enterprise can be harmoniously productive. All these parts of the problem are mixed up with the economic, political, psychological, and military aspects of the future.

Without minimizing the importance of others, let me dwell for a moment on the last point, namely, close cooperation between the Federal Government and industry in this vital field of national security. For a generation, or perhaps two or three to come, security is the top-level task to which we must devote our national effort. In so stating I am mindful of current emphasis on disarmament. Agreement to disarm, or,

more realistically, acceptance of limitation or reduction of arms, as you gentlemen so well know, should be entertained by us only if it is based on dependable means of observation and control, and only if it gives us greater security than we now have against aggression and destruction, or, at the very least, as much.

Before we can make progress in this field, much more preparation and study and research are required by scientists, engineers, military experts, diplomats, and political leaders. Until we make dependable progress in disarmament and, in fact, for many of its scientific and production requirements, we need continuing emphasis on security and close and rewarding cooperation between industry and Government.

I am troubled that, unfortunately, more and more officers and directors of some of our most competent and public-spirited companies are beginning to feel that, in their discharge of responsibility as trustees for stockholders, they should either minimize or avoid contracts with the military. Having been on both sides of this fence, in Government and in private industry, it seems to me that many procedures which have been developed in utilizing private industry, instead of taking advantage of its demonstrated ability, appear to have been designed to limit both its contribution and its adequate compensation. Procedures have become restrictive, specifications unnecessarily rigid, and freedom to make suggestions and utilize the initiative of private industry has been reduced. Business, to grow and prosper, must have the hope of reward in the form of profit if it does the job. This provides the strength of business. This is the nature and the basis of our whole economy.

However, there appears to be a growing state of mind, perhaps politically nurtured, that profits are bad. This spirit is leading to sometimes over-stringent review by the GAO or by Congressional committees and staff members. Procurement officers, in between the contractor who is attempting to obtain his lifeblood of profits and the review authorities, naturally become somewhat saddlesore in this situation. There has developed, particularly in the research and development field, what appears to many in business as an attempt to get something for nothing or for very little. To be sure, sometimes a business may seem to have at Government expense an opportunity to push back the frontiers of science. In our company's case, we so far usually found that we ended up by paying a deluxe, first-class fare for the ride.

A notable recent example has been in high-energy boron fuel, where the direct financial loss for us on a seven-year ride, with 24-hour-or-less notice of intent of cancellation, has been \$9 million. This is seven years of work with up to 1,400 people working on this thing. There may be a little personal feeling in this particular example.

In R&D, business has to put a disproportionate number of its best men on the task of developing new products that meet new objectives of the military services. When the finding has been made, the production contract sometimes goes to another company. Perhaps there is a way to help this. Perhaps a royalty could be given to the developing company, even though it is unsuccessful in obtaining the production contract. The Government cannot expect the best results unless it gives incentives for the greatest application of energy and skill to companies which it brings into research and development.

Our company, Olin Mathieson Chemical, has been active in many new fields, particularly metallurgy and chemistry. We have assigned a number of our best people to fuels, to nuclear energy, to ballistics, to propellents, and to chemicals, where a need for new products has been indicated by the Government. We have also, in a way that I think business has generally found wise, enlisted the services of universities on basic research where we felt it important to support and enrich our own thinking. Contributions, too, have been made by small business subcontractors, both in early development stages and in later production. Many times small companies possess brilliant people at the top who would not otherwise be available in developing these things, since the programs many times are much too large for these small companies to handle.

Some might feel that, where a supplier can be led to finance facilities, as we have sometimes done, it is good business for the Government. But, with the risk of rapid change and obsolescence, only adequate incentives can continuously encourage industry to take such risks. There are fields where this pays off.

Congress and the executive have been too conservative in their willingness to make incentives possible because of political timidity about these same profits. On the other hand, as corporate citizens of these United States, management and the owners of business have a clear understanding of the necessity of being willing to cooperate with the Government in security programs where particular businesses are best qualified to serve.

We have had instances where it appeared obvious that, if our executive and operating personnel had been devoting their time to commercial products, the stockholders might have felt that their short-term interests were better served.

This potential divergence cannot be allowed to widen and yet abrupt cancellations do raise the problem, not only in our company, gentlemen, but in many many other companies, with which you are all familiar. This, if carried too far, can well prevent optimum utilization of the industrial complex on which we depend so much.

Now, may I speak of a first-hand example of an industrial development, because it might prove useful in studies which you will later undertake in the field and here on productivity, on management, and on industrial readiness. It is used to illustrate the interrelationships between finance, raw material sources, foreign policy, engineering, research and development, transportation, economics, Government relations, taxes, personnel, procurement, and other items.

Our company has for many years been a producer of brass and copper sheet and strip of high quality and precision. Economic studies by us and others in 1954 and 1955 indicated a rapidly growing long-term market for another nonferrous material, aluminum. Based on favorable projections as to sales and capacity in the summer of 1955, our board of directors initiated a careful review of costs, financial requirements, and potential profits with a view to building our own plants. We decided that, in view of some disappointing experience on availability of raw material, as a nonintegrated brass-copper producer, we would attempt in aluminum to control activities from raw material through the consumption of sheets, bars, strips, and other fabricated products. Our next step was a major engineering and cost study including 5-, 10-, and even 20-year projections based on alternative processes, locations, and product specifications. The generally encouraging prospects indicated by these reports were such that we authorized negotiations to acquire long-term sources for raw materials and the best available sites.

Surveys were made of types, costs, and methods of transportation and other related items. This preliminary work took several months.

Now let's take a look at the findings--first in raw materials--bauxite. This usual source of aluminum oxide from which pure aluminum is produced exists more generally in the earth's crust than

any other ore. However, grades vary and good grades in the United States are pretty well worked out. Good grades around the Caribbean, the next nearest source, are mostly controlled by our competitors. We finally worked out a supply contract for the first 10 years for Surinam ore. Ore from there required two expensive transshipments before reaching our plant. We progressively have eliminated extra handling by designing and having built for us special shallow-draft, ore-carrying ships. The next important item was power. Aluminum requires 9 to 10 kilowatt hours of electricity per pound, which, of course, makes it a very major factor in cost. It also must be noninterruptable power, since stoppage would solidify the entire in-process material, with almost impossible repair costs. We checked the great waterpower developments in the Northwest and TVA. We considered Canada, Venezuela, British Guiana, and West Africa for thermal power. We examined the cheap coal in the subbituminous fields in Wyoming, Montana, and the Dakotas. Yes, there is cheap power at the mine head, but there is usually a major collateral investment for equipment, for roads, for railroads, and, in the case of foreign countries, of course, you have to build jungle cities and there are other basic development costs.

In the case of the United States Great Plains sources, the cost for long-distance transportation of both raw material and finished material become excessive. An economic plant must be on navigable water and have cheap power as well. We appraised more than 60 possible sites. We resolved variables covering local taxes, adequate size of unencumbered sites, type of cooperation by State and local officials, transportation of raw material, getting finished goods to market, location of coal of the right carolic content, proximity to rail, water, and highway, and location on a major public utility system with willingness to manage and operate our company-owned generators, and yet with adequate standby of their own to avoid interruption. '

We located the site with the best resolution of all these factors for an integrated plant, on a coal mine, at the entrance to which a major power-generating thermal plant was built, on a major rail system, above flood level, suitable for a barge terminal, and located on the Ohio River 150 miles from the plotted center of our market. We had to build a new town so that our personnel could buy or rent homes nearby.

Next came enlisting of plant executives and operators, who had to come from a close-knit industry where each of our prospective new

competitors was already a valued customer for Olin Mathieson chemicals. Their personnel could not be raided, but we gradually built a staff through, shall I say? turnover. Then we proved to our bank and insurance friends that we planned to make profits so that we could justify what started at \$100 million borrowing and which, with enlargement of capacity, ultimately ran to several times that. We had no company engineering staff adequate for supervision of such a project, so at first we used several firms of consulting engineers, and finally purchased a substantial equity in one. We had them do the building job. We had to select the best technical processes for reduction of bauxite to alumina and for reducing alumina to aluminum.

With all this behind us, one of our esteemed brass and copper contemporaries who had watched our efforts, asked to join us. After extensive legal research on antitrust implications it looked all right. We had tentatively laid out two additional increments of expansion in our original studies, so that by, you might say, selling our friend one increment it allowed us to proceed at once with all three, since our engineering studies showed that additions gave substantially lower production costs. This increase in size, however, led, for reasons of space, to some shifting of the integrated plant, so that we moved the alumina plant nearer the mouth of the Mississippi.

To assure our supply of high-grade bauxite over the years, we searched further and found a massive reserve in the then territory of France called New Guinea. Many of you know that the President's Science Advisory Committee recently decided that perhaps its most important area for future consideration concerns raw materials--better types, greater quantities, better processing, and completely new sources. Our company, recognizing that our present source, Surinam, might begin to run low in availability in 5 to 10 years examined many alternative sources. Further analysis supported the promising source, however, in Guinea.

After much negotiation we developed a long-range plan with the consortium of four foreign companies to mine the substantial deposits, to produce the alumina at the spot, thus getting rid of bulk, to transport the alumina in special cars over an as yet unbuilt railroad to special ocean-going carriers at a shallow port, Conakry, and thus to reduction plants in the United States or elsewhere. We built the 65-mile railroad through the jungle, paralleled by a road from the port to the plant, with a nearby new city to house 15,000 people, with air-conditioned houses,

shops, and offices. We have had to set up schools to train these people, many of whom were literally right out of the jungle. But I will tell you that, with training, these people are producing very well indeed, and it indicates again that, if you have proper education and training anywhere in the world, you can get people to do this kind of production.

On top of this we suddenly found ourselves dealing with a newly independent, highly nationalistic head of state with few resources; so that we had to institute a small Marshall plan to help the new nation after it was cast adrift by France. We also, temporarily, here in Washington had to sub for an embassy of the Republic of Guinea. You may remember Sekoutouré was here for a week or 10 days recently, and we had to set up a great many things, such as his luncheon for the President of the United States. He did inspect our new plants on the Ohio, because he was very much interested in them. He also was very, very anxious to go to a southern city, for obvious reasons. This gave us some concern, but it worked out very well indeed. He went to the University of North Carolina at Durham, and he was well received, and everything went well. He left the U. S. with a very good opinion of it and of its welcome to him. He did also go, as you have probably noted in the papers, to Moscow, to Czechoslovakia, and to Poland. He has had great assistance from the East, much more than he has had from the West, so far, but he is at this point, as near as we can tell, living up to every commitment he has made to us. We are proceeding right ahead with this development and it is going well.

All this did represent a challenge for management in finance, engineering, and diplomacy. We will have, however, assuming political stability, almost unlimited alumina as far ahead as one can see, and at the lowest cost. More of this kind of pioneering will surely be required in other materials to meet industry demands. You have heard about similar ventures by others in getting metallics, such as iron ores, and manganese ores from Canada, Venezuela, the Gold Coast, and other sections of the world.

Our joint company in four years has from a standing start become the fourth largest American aluminum company. This has taken several hundred million dollars of investment, and the strenuous efforts of many men. It was done with no Government help, except necessity certificates for faster partial write-off.

Aluminum production interrelates well with the rest of our company. It uses tons of caustic soda and aluminum fluoride, as well as smaller quantities of other chemicals. It supplies on a captive basis tons of aluminum sheet and strip for products such as our fabricated Roll-Bond evaporator sheets for refrigerators and the like. It helps us to use much of our packaging material.

These are all part of the Olin Mathieson complex, which is akin to others in the United States and akin to the overall. We have in the United States 53 plants. This covers 30-some States, and materials in some cases flow entirely across the country, and in other cases, of course, they are used locally, depending on whether it is a bulk or a quality product.

This is an example, and this is the reason I have used it, an example of the kind of industrial complex on which the efficiencies of our country are based.

To sum up, I have tried to give you an idea of the immensity of our Nation's capacity and some comparisons with our friends and our enemies. I have tried to indicate in very general terms some inter-relationships of industry, small and large. I have expressed concern over the possibility of the Government losing the willing cooperation of good companies in tackling research and development, as well as production, of technologically new or existing weapon systems. I have tried to illustrate some complexities of trying to establish a new source for an important material that can be used in either peace or war.

On you, gentlemen, will rest a responsibility for planning how best to use and preserve our strongest national asset, our industrial base, knowledgeable and available to help meet whatever challenge we may face in security in the years ahead.

Thank you, and God bless you.

CAPTAIN SMITH: Mr. Foster, on behalf of the Commandant, the faculty, and the students, thank you very much for coming down here, taking time out of a very busy schedule, and giving us your views on "The American Industrial Complex." Thank you very much.

MISSION AND FUNCTIONS OF THE BUSINESS AND DEFENSE  
SERVICES ADMINISTRATION

5 January 1960

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INDUSTRIAL COLLEGE OF THE ARMED FORCES

Washington, D. C.

Mr. H. Herbert Hughes, Deputy Administrator of the Business and Defense Services Administration, a native of Williamsport, Pennsylvania, was graduated from Penn State College with a B. S. degree in 1926. After serving in the Pennsylvania Geological Survey and as graduate assistant at the University of Pittsburgh Oil and Gas School he came to Washington in 1930 and for nearly 11 years was in the Bureau of Mines as mineral economist and chief of the Mineral Production and Economics Division. In March 1941 Mr. Hughes joined the Washington staff of the Automobile Manufacturers Association of Detroit, and three years later became Washington representative of the Studebaker Corporation of South Bend, Indiana. Late in 1948 he went to Paris in charge of strategic materials for the Economic Cooperation Administration, and then in early 1951 returned to Washington as Studebaker's representative here, remaining three years. Since then and prior to joining C. M. Hall Lamp Company of Detroit he served as vice president for Europe of Porter International Company with headquarters in Brussels, representing various American companies to establish manufacturing licenses abroad. Mr. Hughes was appointed to his present position 6 January 1958. This is his first lecture at the Industrial College.