

## **Cato Institute Policy Analysis No. 29: The Military Industrial Firm -- Private Enterprise Revised**

November 9, 1983

John E. Ullmann

John E. Ullmann is professor of management at Hofstra University. He is an industrial engineer and the author of texts on production management and quantitative analysis for business.

### **Executive Summary**

As President Reagan's arms race shifts into high gear indeed, as it becomes the centerpiece of his administration the industrial resources required are receiving more and more attention. As a result, many issues are raised, such as the likelihood of shortages and bottlenecks and their effects on deficits, inflation, shortages elsewhere in economy, the general erosion of U.S. industrial capabilities, and various opportunity costs, as other activities are forgone in favor of the military buildup.

Such concerns are proper -- essential, in fact -- but there is one area that has not been accorded such systematic concern. There is a danger that the military industrial firms will enlarge their share of economic activities still further and that their modes of operation and organization will become more and more a norm in the American economy. This change would be a sharp departure from what are usually regarded as the characteristic activities of the private sector. If this change does take place, private enterprise could lose many of the qualities that now distinguish it from governmental operations. Private industry could lose its claim to being the driving force of the recovery in both industry and the economy in general.

Specifically, because in comparison to nonmilitary firms the military firms use technical talent and the engineering function disproportionately, they might come to determine the technical capabilities of American industry even more than they now do. These capabilities could then change rather drastically for the worse in international competition or indeed in the unsubsidized functioning in the domestic market. A combination of financial and technical profligacy, bloated payrolls, wasted motion, unwholesome relationships with government agencies, and technical concentration away from commercial products would lead to a condition in which much of what is left of private industrial competence would be thrown out of Mr. Reagan's "window of vulnerability."

With it may well go a large chunk of the sociopolitical consensus that has nurtured the private sector in the past and given it legitimacy. No one needs much persuasion these days to be convinced that much of American industry is in parlous shape; the arguments long used to dismiss warnings of trouble ring hollow. In any analysis of what has gone wrong, the conditions identified here must take a prominent place. At the core of the problem is an unprecedented degree of direct, centralized government control that virtually institutionalizes waste by removing the firm concerned from the many ordinary checks and balances of the economy.

### **The Structure of the Military Industrial Firm**

The military industrial firm is an organization engaged in producing weapons or other specialized equipment for which the Department of Defense (DOD) is the only customer. This type of firm also does related research, development, testing, and evaluation.[1] It may be an independent corporate entity or a division of a firm that has other, nonmilitary products as well. It also may be a nonprofit organization or a specialized unit of a university. It may furnish supplies to such government agencies as the National Aeronautics and Space Administration (NASA), which requires products with similar physical characteristics -- products for which NASA is the only customer. Significant subcontractors engaged in specialized weapons work are also included in this category if such work predominates in their business.

This definition excludes nonspecialized firms, which supply their usual products (e.g., food, fuel, paper, and standard supplies) to DOD. For such firms, government business is not essentially different from the business that they normally do. The only change lies in the paperwork procedures that must be followed in dealing with the armed forces as a customer -- even at one or more removes. However, in contrast to the military industrial firm, in which specialized scientific and technical work is essential, nonspecialized suppliers do not have to do research and development in order to supply DOD. The managerial impact of DOD on such firms is small.

The foregoing is an important distinction; there is every difference in the world between a weapons supplier as defined above and (for example) a firm that supplies ready-mixed concrete both to private builders and to a local governmental unit for road repairs. In the latter case the product sold to the government is the same as that sold to the private customer. Most governmental units (other than the Pentagon, NASA, and the units of the Department of Energy that do weapons research) seldom require specialized products of the technological kind discussed above. The economic condition of both specialization and monopsonistic dependency found in these firms has led to a phenomenon that is fairly new in American life. Ostensibly, the military industrial firms are private. They have shareholders, they are organized like other corporations, and their securities are traded on the exchanges or over the counter whenever they are publicly owned. The government generally does not own a large share of such securities; it usually buys them only to bail out the enterprise. However, the very possibility that this can happen is itself a symptom of dependence on government -- dependence not generally found in the business world.

There is a profound difference between the military industrial firms and the rest of the business community. Until World War II, most research and development on weaponry in the United States was done in government arsenals and research laboratories. In the years before World War II, however, the government's dependence on its own facilities was declining, especially in connection with the growing importance of the burgeoning aircraft industry. At that time, the military work could still be combined to a large degree with the production of civilian aircraft rather than being segregated, as it now is. Much of the research and development came about through the efforts of the many aircraft pioneers (some of whose names still survive in the corporate names of major military industrial firms). During and after World War II, this transfer of technology accelerated until much of the research that the government would otherwise have undertaken was delegated to private industry. Nevertheless, this process could hardly be regarded as privatization.[2]

In fact, efforts were made right after World War II to integrate the weapons supply industry more closely with the fledgling Department of Defense. In 1961, President Eisenhower was to warn eloquently against military waste and the "military-industrial complex." [3] Yet as a general in 1946 he wrote a highly influential memorandum entitled "Scientific and Technological Resources as Military Assets." One point he made in that document is especially significant. He wrote: "Within the army we must separate responsibility for research and development from the functions of procurement, purchase, storage, and distribution." [4] This arrangement, common in military industrial firms, was to have profound effects on the structure of industry. Plans such as the Forrestal Report and related documents formalized this relationship between the military and private industry still further. [5]

In the early 1960s, under Secretary of Defense Robert S. McNamara, the Department of Defense was reorganized to concentrate much of the control of arrangements with industry in the Office of the Secretary of Defense rather than in the Joint Chiefs of Staff. Much procurement authority was still delegated to the individual military services; however, centralization unparalleled in American business experience was coming into being. In December 1967, Murray L. Weidenbaum, who was to serve President Reagan as chairman of the Council of Economic Advisers, described the relationship as follows:

To a substantial degree the government is taking on the traditional role of the private entrepreneur while the companies are becoming less like other corporations and acquiring much of the characteristics of a government agency or arsenal. In a sense, the close, continuing relationship between the Department of Defense and its major suppliers is resulting in the convergence between the two which is blurring and reducing much of the distinction between public and private activities in an important branch of the American economy.[6]

This peculiar type of military-private symbiosis in business is referred to by Seymour Melman as "state-management." [7]

### **How the Military Industrial Firm Functions**

This peculiar situation of private firms operating under the close control of Pentagon managers, the "state-management," functions rather like a central office controlling a number of divisions. Each of these divisions -- meaning each military industrial firm -- may have a substantial degree of operational autonomy at the local level. Certainly each firm is operated as an individual profit center. Nevertheless, the "central office" (the military service that contracts out business) sets policy in a wide range of activities and maintains a substantial supervisory and controlling organization that sees to it that the central directives are obeyed. Indeed, it could be argued that there is more burden, as well as more detail, involved in maintaining a presence of local military controllers and observing the rules under which military procurement takes place than there is in many a decentralized, nonmilitary corporation or conglomerate. The system of rules is essentially contained in the Armed Services Procurement Regulations (ASPR).[8] A further amplification of the rules is set forth in the Defense Procurement Handbook, which serves (in part) as a training manual for people who are involved in the procurement and control process, both at the Pentagon and at the receiving end in the military industrial firms.[9]

It is convenient to discuss this controlling influence in terms of what have come to be accepted as the central characteristics of the decision power of an individual enterprise. Such an enterprise, if it is truly private, exercises a substantial degree of control over the decisions that really count: what to make, how to make it, how much to make, at what price, and with whose monetary investment to make it. In the United States, private business has traditionally resisted, with all its influence, any significant governmental controls that would encroach upon this decision power. Business leaders consider such restrictions to be manifestations of socialistic tendencies. To a degree, such restrictions occur in all capitalistic countries, but central governmental direction of industrial structure, output, purpose, and policies would most certainly not sit well with American business. Years ago, Americans voiced strong objections to adopting such ideas in the United States when France under conservative President Pompidou espoused a much higher degree of centralized industrial planning than it had had hitherto.

Some analysts of the Japanese industrial success have attributed it to the control exercised by the Ministry of International Trade and Industry (MITI), especially through its decisions on priorities and its "targeting" of promising new areas of expansion. However, while the role of MITI was certainly important -- and on a larger scale than comparable efforts in the United States -- its role was actually less integral than the initial American reports asserted. Predictably, advocates of similar arrangements in the United States accorded MITI the highest praise.[10]

In any case, because of their strong traditions of centralized government, in both France and Japan a centralized direction in business planning appears more compatible with the political institutions than it would be in the United States. Perhaps such a term is actually misleading in describing American arrangements; in reality it is not a question of centralization at all. The relationships in Pentagon business arrangements tend to be symbiotic and collegial rather than adversarial. Therefore it is surprising that over the years American business has strained at many a regulatory gnat but has swallowed the camel of Pentagon state-management. Let us consider in turn each of the critical aspects of control.

### **What to Make**

Essentially the Department of Defense decides what products it wants industry to make. To be sure, there is a mechanism for feedback from the suppliers; and follow-on ideas that develop from existing contracts certainly may make their way to the top of the procurement process. No major weapon is yet recorded as having been the result of an unsolicited bid. The system does have a mechanism for submitting unsolicited bids, but in the industry that is regarded

as the longest of long shots. In practice, the military services put out orders for specialized products to be bid upon. Often, however, contracts are negotiated without bids -- after having been specified in the greatest detail. Some of the details are results of the research contracts originally awarded, perhaps to the ultimate producer. Sometimes the high level of detail is specified for less proper reasons. In any case, the power to decide on every detail rests with the DOD.

This is different from the type of control exercised by the head office in a decentralized, multidivision firm. This control by the Pentagon is much closer and tighter. Within a private company, each division has a department for product development that works closely with engineering, marketing, and production for the division. Such a department is responsible for constantly watching the product line, identifying opportunities, and directing the development of products. Although divisions in large firms are constrained by a central office as it determines what business the company is to be in, the firms are now so often variegated conglomerates that specifications for a product are likely to be deliberately vague. Old and cynical definitions, such as the one describing oceanography as anything that is wet and makes money, would not be out of place in the overall guidelines. At any rate, no company headquarters would attempt to set requirements for a new item with the specificity of technical detail that is usual in military procurement.

The methods of awarding contracts for research and development reflect an even sharper departure from regular business practices. Again, some of the basic ideas may have been produced by cooperation between the prospective contractor and the scientific branches of the armed forces in which such requests originate. However, eventually the job is put out for proposals (which are major engineering tasks in themselves). The need to produce proposals has had a profound effect on the employment structures of military contractors. Technical proposals must be quite detailed. In them the prospective contracting firm gives an overview of its understanding of the job, describes the methods it would use to solve the problems, and tries to impress the government with an elaborate presentation of previous experience. That kind of exercise resembles the proposals that universities submit as part of grantsmanship more than any normal kind of business negotiation. In any case, the details of facilities and managerial organization that bidders must include in proposals of this sort go far beyond what a business would normally submit in contracting privately. (The government's power over the firm's internal affairs affects not only what is made but also methods and quantities as well, as will be explained later.)

A good technical proposal alone, however, is not all there is to winning a contract. To be considered eligible to submit a bid, a firm must be on the list of approved bidders. Inclusion in a list depends upon various considerations; one factor appears to be that certain firms are thought of as "belonging" to a particular unit of the armed services. For one of these regular bidders, it might be considered real diversification to supply a different command within the Air Force, or perhaps the Navy rather than the Army. In practice, each firm functions as an unofficial division of the Pentagon conglomerate or one of its parts.

The relationship between a contractor and its military sponsor is a peculiar one. For the company, having once won a military contract puts it in a position tantamount to engagement, or at least going steady. Once a unit of a company has become dependent upon military orders, its military controllers view with disfavor any efforts to diversify into commercial areas. The company is supposed to stay true to its military benefactor and grateful for a glance of favor. This outlook epitomizes the usual negative reaction of military industrial contractors to the subject of possible conversion or diversification away from dependence on the military.

## **How to Make It**

The control of the "state management" over methods of production is at least as pervasive as its control over products. The ASPR takes four pages to list the areas over which the government exercises direct control. More than just technical surveillance of the item is concerned; one would expect technical standards to be imposed for any specialized, technically oriented equipment. Machine firms, for example, are certainly used to having customers' inspectors on the premises to see how the job is progressing. Engineering firms doing work on contract have customers' representatives among them to keep track of the design and procurement. Technical specifications often go into considerable detail on materials to be used and standards for quality, inspection, and performance.

However, the government control over military contractors goes much further than that. Not only are technical aspects

covered in minute detail, but aspects of the operation of the firm (such as wage structure, insurance, benefits) are also fair game for the government to evaluate and inspect.[11] (These considerations affect quantity of output required as well.) To some degree, this watchfulness on the part of the government could be attributed to the fact that the contracts are on a cost-plus basis. But the functional controls appear to go beyond even that. The subcontractors are all subject to similar rules, varied according to the nature of their work. The controls may apply only to the prime contractor if the item being supplied by the subcontractors is a standard one, similar to their usual commercial product. The control structure is so marvelously pervasive that it is worth studying carefully. Many a firm made up of many divisions would consider such a centrally determined and controlled list of characteristics an extremely onerous form of centralization of the kind that has been heavily criticized in textbooks on management. Be that as it may, this control is certainly unparalleled elsewhere in the American economy.

## **How Much to Make**

Concerning the quantity of items to be manufactured for the military, three considerations diverge radically from determinants in the commercial sector. As mentioned, the functions of research and production are kept separate. This means that regardless of what organization did the research, another may eventually be responsible for production. This separation is conducive to inefficiency, wasted lead-time, and even outright flaws of production. Costs and quantities may be disproportionate to effort, and accurate projections of amounts are out of the question.

The government gains further control as it prescribes precisely how much of each item is to be produced. Normally, private management jealously guards the prerogative of deciding the quantity to be produced. The decision is reached by assessing such factors as the needs of the market to be served and its prospects for expanding, or the likelihood of new markets or market segments opening. The most important single variable in making the decision is the physical scale of manufacture.

In military procurement, however, the firm enjoys no such discretion. Unless the government alters its requirements, there is no way of changing the quantities. Although it may at times be possible for a firm to alter specifications slightly, there is no way of changing the size of the market except by political process. A limited market thus sets limits on production.

But perhaps most important, in a military setting the quantity to be procured cannot be determined rationally. The quantity depends upon a great many extrapolations, particularly in a time when (as government leaders are constantly assuring us) the product is designed solely to deter something or other, rather than to be used. Such overkill as has been endemic to military procurement for more than 25 years precludes using market saturation as an overall limit, so items are ordered to some extent just to maintain the industrial base. Some of that reasoning appears to hark back to the dear dead days of Rosie the Riveter in World War II, when a major war could be won on the production lines of America. Here, of course, enters the military predilection for refighting an old war.

In a demonstration of the extent of its control, the Defense Procurement Handbook requires that such policies as assistance to small or minority business and labor surplus areas be taken into account in determining the quantities of items that the military industrial firms may make. Thus government purchases are used as levers to control social policy.

The industrial base is naturally subject to political manipulation -- part of the lard in the pork barrel. In response to that type of abuse, Secretary of Defense Robert S. McNamara declared to the House Armed Services Committee in January of 1964:

The Department of Defense cannot and should not assume the responsibility for creating a level of demand adequate to keep the economy healthy and growing. Nor should it, in developing its programs, depart from the strictest standards of military need and operating efficiency in order to aid an economically distressed company or community.[12]

This principle is, of course, violated continually; at any rate, whenever a weapon is proposed, its proponents invariably contend that it will produce jobs, and politicians present it as a plum for their constituents, even though most other activities are well known to produce more jobs for a given investment. Keynesianism is evidently alive and well at the Pentagon, whatever stern supply-side or monetarist precepts are in favor elsewhere.

## At What Price

One of the tiresome clichés of recent times is, "If they can send a man to the moon, why can't they . . . ?" It makes its way into all kinds of discussions of industrial change, and even into advertising copy. It was used for the original promotion of Brim, the decaffeinated coffee, with the reassuring voice-over, "Consider it done."

The principal fallacy in this comparison, of course, is that there is no way of determining ahead of time how much a trip to the moon ought to cost, whereas other technically oriented developments (such as techniques of desalinating seawater) require precise economic parameters if they are to compete. In the case of weapons, as with lunar flight, no such assessment is possible in a rational way, even though it is obvious that there is some limit to the resources that can be devoted to military purposes. The price that society is willing to pay for progress is thus essentially a political decision. It simply is not an economic decision that can be based on needs and demand; decision makers, whether managers of enterprises or individual citizens, cannot verify possible results in advance.

There is an irony, also, that invalidates the cliché. The cliché implies that the moon landing was an unqualified success. However, since putting a man on the moon, NASA has had considerable difficulty in finding a suitable product. There have not been any moon shots for quite a few years, and the declining number of interplanetary shots has patently failed to produce the same popular interest. Missions such as the space shuttle have turned out to be every bit as militarily oriented as the critics of the space program maintained all along; the horrendously expensive "Star Wars" proposals are more of the same. In short, the economics of military programs are very different from those of ordinary consumption, unless one views pricing in general as simply a game of "chicken" under essentially monopolistic conditions. But this conception, in an economy such as that of the United States, is clearly absurd -- even though pure competition as defined by economists is found only in their theoretical formulations.

Even if competition were fully feasible, however, the fact is that for many years, some 80 percent of all contracts have been negotiated rather than being put out for competitive bidding. Even with bidding, the specifications for the job (especially in research contracts, but also in manufacturing) are often written after the buying agency has consulted with a favored prospective bidder. Any other firm whose proposal is solicited is thus trying hopelessly to guess the punchline of an incompletely told joke. Such a firm, referred to as playing second fiddle in a one-man band, has no real chance, but must nevertheless bear the very real costs of competing.

The different form of pricing of military economics is imposed upon society mainly through the system of using cost-plus-fixed-fee contracts, customary in military procurement. In settling a price for a negotiated contract, the prospective contractor and the contracting officers have a mandate to base their final agreement on reasonable costs plus a standard fixed fee for profit. During World War II, contracts based on cost plus a fixed percentage led to considerable abuse; such contracts have long been illegal. However, now considerable leeway is allowed for engineering changes; these are the main cause of cost overruns. Once a large amount of money has been expended on a project that falls short of expectations, it becomes difficult and embarrassing to simply abandon it. Instead, more and more money is pumped into it by way of engineering changes -- which in many cases include a provision for additional profit. The job thus seems to continue, in Jonathan Swift's apt phrase, "driven on equally by hope and despair."

The original estimates of costs are thus generally regarded as polite fictions. As investigations of such spectacular flops as the TFX fighter (later to become the extremely problematic F-111) and the C-5A transport have shown, this state of affairs is recognized by all parties. In situations where competitive bids are possible, as they were in these cases, awards are based in part on who is likely to be least egregiously wrong in the cost estimation.

All of these special considerations have had the effect of starkly distinguishing the military industrial firm from the conventional private enterprise. The latter is, broadly speaking, a cost-minimizing and profit-maximizing entity, regardless of long-range and short-range effects. By contrast, the military industrial firm maximizes sales or subsidy. The contract structure itself is a disincentive for cost saving. Occasionally the government has made attempts to provide incentives for performing on time and within budget. For some contractors this has meant juggling costs between various accounts so that as many accounts as possible could qualify for the incentive payments. This finagling is of great concern to the government auditors (who, consistent with the general head-office-versus-division

arrangement, are a strong presence among the major military contractors). The emphasis in such firms on maximizing subsidization is the reason that they stockpile engineering talent. As long as it can reasonably be charged to a job in house, the stockpiling costs nothing extra -- and having the resources available may help in securing a new contract. Overemployment is thus endemic in the military industrial firm.

With all these problems, it is not surprising that the history of weapons procurement is replete with exceedingly expensive product cancellations and cost overruns of horrendous proportions. In 1981, when President Reagan announced that he was proposing to spend \$1.5 trillion on the arms race, that too was regarded by many -- including some Pentagon analysts -- as the same kind of polite fiction that tends to determine initial contract awards. The figure of \$2.1 trillion soon surfaced, much to the chagrin of the Pentagon's top management, which promptly proceeded to institute the use of the lie detector (the first of the Reagan Administration's plentiful uses of this method) in order to run down the unseemly leak. Budget proposals from the Pentagon have justified the estimate of \$2.1 trillion through 1987. If such budgets are ever approved, the estimates would no doubt go even higher.

These constant upward changes have been associated with such bizarre examples as the Aegis cruiser program, which by 1981 had accumulated a cost overrun of \$8.4 billion. As it happens, at that time Aegis cost about as much as the comprehensive research and development of producing cars that would get 80 to 100 miles per gallon (an alternative but forgone project that would have enhanced national security much more than large surface vessels in the missile age).[13] In fact, that \$8.4 billion by itself is approximately equal to 3.9 percent of investment in producers' durable equipment for 1981. That much money could have financed more than half of the 5-percent personal income tax cut of 1982, without adding to the deficit.[14] And this amount is only an overrun on just one weapons program!

The Aegis was still going strong in the spring of 1983. In April, a CBS "60 Minutes" program gave details of contract switching that had added substantially to the cost. The program also revealed such touches as a \$14,000 couch and \$90-per-yard carpeting for the captain's quarters, whose costs the most baronially inclined interior decorator would find difficult to justify, even after allowing for the need to use fireproof materials.

The effect of such policies is a sustained escalation in the costs of weapons -- an escalation that is not often discussed. There is no consistent price index for weapons, but in 1980 the Defense Science Board estimated that prices were increasing at 25 percent a year.[15] An earlier study by the Senate Armed Services Committee had come up with a rate of increase of about 15 percent a year in 1970.[16] When the military budget is presented as a certain percentage above inflation, it refers to the overall producer price index, which covers only commercial products. It says nothing about the physical volume of weaponry actually procured. The physical quantity per dollar for procurements has thus been falling. This fact has caused consternation among some military planners; the more extreme among them speak of unilateral disarmament.[17] Some political leaders, notably Senator Gary Hart (D-Colo.), hark back to the assembly lines of cheap weaponry of World War II, with the kind of nostalgia that an earlier generation of military men had for the horse cavalry. Nostalgia, however, will not amend our circumstances.

These problems are of course partly the consequence of the increasing technical complexity of weapons and American progress in the new fascination with high technology. Still, precisely the special advances brought about by computers arise from their capacity to increase output (and quality) constantly for a fixed amount of money. If it carried a Pentagon price tag, we would not be paying as little for a calculator as the \$4.99 that it costs on the market. Technical complexity is thus not a sufficient reason for the soaring price of military procurement. The successful (albeit increasingly Japanese) firms in fields like commercial electronics and computers managed to cut costs and prices. Part of the explanation for the exploding costs must therefore be sought in the professional and organizational arrangements of the military industrial firms. We will examine these setups later in this article.

### **With Whose Money**

The military industrial firm obtains much of its working capital and sometimes many of its facilities directly from DOD. Progress payments or other partial payments supply the working capital that maintains the cash flow for the military industrial firm. By contrast, in the commercial sector, cash flow has proved to be a major problem in times of high interest rates, inflation, and shortages of capital. The military industrial firm manages to sail along without such problems. Only when its activities are affected by losses in its general business does a serious danger of insolvency

develop, such as occurred with Lockheed. Predictably, this militarily important firm was bailed out of its difficulties by the government.

A second source of capital is the outright ownership of contractor facilities -- buildings, machine tools, other processing equipment -- by the DOD. This is yet another manifestation of stockpiling and overcapitalization, but it comes directly from government funds, rather than being charged to the government whenever the military industrial firm charges depreciation in the usual way. Outright DOD ownership of equipment has fluctuated somewhat. Among other factors, it is affected by the practice of ultimately selling the facilities to the contractor. In many cases, such sales were made at fire-sale prices. A good many facilities, especially older ones, that contractors now own, were acquired almost free of charge from the government.

The largess of DOD also led to the introduction of numerically controlled machine tools long before they were economically feasible in commercial work. Items such as machine tools specified for use in government contracts or perhaps even a specific contract are not supposed to be used by the contractor for other purposes. This provision is hard to enforce. This stipulation shows yet another way in which the military industrial firm is different from the commercial firm. There are few, if any, headquarters of a multi-unit firm that would allow a client to proscribe the use of any piece of equipment.

Military industrial practice has many ramifications that lie far beyond its original purview. For a long period, military contractors were almost the only major market in the United States for the new high-technology, numerically controlled machine tools. In this market, U.S. producers were protected from the need to make cost-effectiveness the first criterion of design. They were subsequently vexed to discover that Japanese firms were able to make the same products as they did -- and reliably, at a reasonable price, and on time, to boot. The competitive advantage that Japanese firms enjoyed in international markets proved extremely troublesome to U.S. producers, who had been crippled by protection.

From the domestic end of the telescope, however, it appears that because so much capital assistance is available to the military industrial firm, it is essentially independent of capital markets, investment banking, and the general financial structure. This unnatural situation fosters overcapitalization. Such an imbalance must and does change the relationship between a large segment of business and the government. The existence of this large island of subsidy in an ocean of market forces has far-reaching implications.

### **The Effects of Occupational Structure on Labor Practices**

The effects of military contracting on the industrial firm and its business environment include considerable changes in the way the firm is organized and in how it does the job. One of the most serious and pervasive changes concerns the engineering profession. Throughout modern times, engineers have seen their profession become increasingly fragmented as more and more specialties were developed. Such stories as the one about the meeting of two aerodynamicists, who upon finding out that they are in the same profession, ask each other, "What Mach number?" hail directly from the aerospace business. But at issue is not merely technological ultraspecialization. There are what one might call administratively oriented specialties like proposal writing and technical writing (parallel to Clemenceau's remark on military justice, these are to writing what military music is to music). A host of interpretive functions related to military specifications have grown up. Some of them remind one of Fred Allen's definition of the 'molehill man' among executives in broadcasting: He finds a molehill on his desk in the morning and has until the afternoon to make a mountain out of it. The result of such work is an astounding attenuation of technical content. In private conversation, the practitioners often show that they are aware of it and are not hesitant to voice their profound dissatisfaction and frustration at not being able to use what they learned as engineers in any meaningful way. The military industrial firm is thus a major cause of the amoeba-like growth in administrative overhead, which is itself one of the most worrisome symptoms of economic deterioration.[18]

A second profound dysfunction in engineering comes from splitting jobs into different functions that one would have expected to be part of a single professional task. A particular case is that of "value analysis" or "value engineering." This has become a separate engineering specialty, related to such newly created concepts as producibility and reliability assurance. Its basic precepts are "omit, combine, make cheaper." However, these considerations are exactly



what one would have supposed to be essential elements of product development. Such concepts formed a regular component of engineering training until the arms race began to get serious. That development, spurred on by the Sputnik shock, soon caused such subject matter to be excluded from engineering curricula in favor of more applied science. It then became necessary to second-guess the new crop of engineers, who were unfamiliar with these and other principles of commercial development. Yet precisely this kind of knowledge had been the true glory of American engineering. It was the way in which technical knowledge could be integrated with practical production know-how, product design, and marketing that enabled technically oriented American industries to be the very first in developing technically sophisticated products as mass-produced commercial items.

The change of emphasis in engineering education brought about a steady erosion of skill in commercially oriented research. The older engineers, whose skills have become more and more outdated but who might know more about commercial development, are being succeeded by young ones who know the new technology but cannot turn it into viable products. It is self-serving and quite inaccurate to depict the result as U.S. firms doing the research and foreign firms doing the production (Japanese research in particular is of the highest quality, although it does stress ultimate commercial purpose). However, the separation of research and production that originated within the military industrial firm has been the main model for the growing number of industries that now insist on having their research paid for separately, usually or preferably by government contract, rather than letting it be part of the risks and rewards of private enterprise.

About 25 percent of all American engineers work in such compartmentalized environments, as do 25 percent, 45 percent, and 80 percent of mechanical, electrical, and aeronautical engineers, and 20 percent each of mathematicians and computer scientists. Since these National Science Foundation statistics were gathered in 1978, moreover, those percentages have risen as the general industrial decline has accelerated and the technical and scientific content of military work has increased.[19]

Inefficiency and outsize costs are far from the only effects of the foregoing ultraspecialized and heavily administrative structure. Closely linked to DOD itself, this system of dividing labor has led to a pervasive, self-perpetuating, strongly entrenched bureaucracy. This situation is encapsulated in a German neologism for bureaucracy, *Filzokratie*. It is derived from *Filz*, literally meaning "felt" (the cloth), but connoting a social fabric in which the threads of corporate, governmental, and individual authority, responsibility, and self-interest have been woven together so tightly that they are inseparable. It has been defined as a kind of greedy collusion among people whose main objective is to perpetuate the system rather than to provide a worthwhile and efficiently created output.

### **The Characteristics of Military Products**

The most obvious feature of military procurement is the exorbitant expense. The history of military products is replete with stretchouts, cost overruns, outright failures, and cancellations. We have outlined the tendency toward gold-plating and the neglect of the precepts of commercial development. This situation belies another old cliché, namely that military products have to work but considerations of cost are secondary, whereas in civilian products it is the other way around. But whatever truth there may once have been to this, it has become nonsense. Many of the weapons do not work but are so expensive that in the small quantities that are affordable their total military value is greatly diminished (if the concept of military value retains any meaning in the age of overkill). As to cost being secondary, that could be true only if it means that so far the public has been willing to put up with gigantic expenditures. As for commercial products, their price and cost are indeed subject to competitive pressures; however, many products are in fact of very good quality and last quite some time.

Still, the bottom of the barrel may not be far away. If the projections of deficits on the order of \$200 billion a year are realized, it will not be long before the national debt is doubled and debt service alone will be \$200 billion to \$250 billion a year. While modern societies will put up with a deplorably wide range of government-induced expenditures and accompanying miseries, such forbearance is not unlimited. Meanwhile, the overruns and functional problems in specific programs continue, as a series of typical recent news reports indicates. In May 1983, auditors from the Pentagon Inspector General's Office criticized the Naval Air Systems Command for the cost overrun of the FA-18 fighter program, accusing it of dealing with cost overruns for the plane's airframe by "postponing procurement of needed equipment, engineering changes and by shifting funds, equipment orders and costs between fiscal year

contracts." [20] The FA-18 aircraft was to replace the F-4 fighter and the A-6 and A-4 ground attack planes in the Navy and the Marine Corps and was to complement the F-14 fighters that provide air cover for carriers. The prime contractor for the FA-18 is the McDonnell Douglas Corporation.

Along with the exorbitant expense has come lowered -- even shoddy -- quality of workmanship. Typical problems were revealed at Grumman Corporation, which makes the A-6 and the F-14 planes. These aircraft have been extensively criticized for poor functioning and (as usual) for cost overruns. [21]

Perhaps the saddest report of this kind concerns the Hummer, a new Army vehicle designed to supplant the jeep. An order of 55,000 of these vehicles, at the rather handsome unit price of \$20,000, for a total of \$1.2 billion, was awarded in February 1983 to American Motors Corporation. [22] In tests later in the spring of 1983, the vehicles broke down, on average, every 370 miles rather than every 1,300, as specified (which itself is no great bargain). There were failures in the engine and transmission and there were problems with the mounts of the engine and the weapons; and the vehicles were unable to ford streams, as they were specifically supposed to do. In reply to criticism, Pentagon spokesmen again promised that things would go better in the future. But memories of an earlier, similar flop called the Gamma Goat make such assurances hardly credible. It is a great shock that this colossal failure should have occurred in the land that created the jeep -- a vehicle that has shown its mettle over decades, has been imitated far and wide, and is indispensable to transportation in much of the world. Technical debility could hardly have a more painful illustration.

Such results, occurring repeatedly, led Deputy Secretary of Defense W. Paul Thayer to tell a gathering of military contractors in June 1983 that they could cut 10 to 30 percent from their costs if they made weapons and equipment right the first time. In terms of a 1984 procurement budget of \$94.1 billion, this would mean saving \$9.4 billion to \$28.2 billion. [23] The prospect of so much waste is daunting indeed, in view of the projected steady rise in procurement as a proportion of total military spending. Others at the conference complained that the United States had failed to produce high-quality goods either for the armed forces or for the commercial market. One speaker noted that many industries had accepted as normal a 15-percent scrap rate for their products, compared with 1 percent in Japan for comparable products. The quality of some complicated electronic products was so poor, it was revealed, that the annual cost of maintenance was higher than the cost of the equipment itself. The reasons seem to be a combination of poor raw materials, inadequately trained workers, and -- most important of all -- indifferent managements. Similar strong criticism has since come from General John A. Wickham Jr., the newly appointed Army chief of staff. [24]

That kind of indictment should hardly come as a surprise. The U.S. automobile industry, when it was again trying to build up its market share (which had dropped to 75 percent), was finally forced to take quality control seriously again. At least the new message of its advertising was that quality was now the number one concern; but then, it should never have been anything else. Yet what can one expect when major sectors of the metal-working and machine industries can get away with selling inadequate products to the military sector, while the government -- meaning the public -- picks up the tab? Faced with competition from industrial countries that could not afford this kind of luxury, the U.S. manufacturing industry was further propelled toward decline. If present trends continue, collapse is inevitable.

In large firms with many divisions, of which only one or two are engaged in military work of the kind discussed in this article, managers seem to be aware of the problems. In corporate councils, such a division is often treated very much as a separate entity, and on a day-to-day basis its relationship with the Pentagon is often substantially closer than its relationship with its own head office. Those of us who have been concerned over the years with encouraging the conversion of military-oriented occupations into commercially useful ones have often been told that top managers of large firms view such transfers within their own organizations with great distaste; they would prefer to simply sell off the divisions rather than let them provide extra capacity for commercial activity.

**A Calamitous Convergence** This discussion of military industrial firms has stressed the many basically undesirable ways in which they operate. It has considered the implications for the organization and the future of engineering (and its related scientific specialties) as a force for industrial progress in the United States. The military industrial firms are not villains beyond redemption. Their problems and difficulties, however, are more or less inevitable as long as the Pentagon dominates capital and technical resources as it has in the past. Unfortunately, the Pentagon will increase its domination if President Reagan's plans are carried out and as long as it enjoys a blank check from the U.S. Treasury.

Largely for these reasons, the military industrial firm also bears an uncomfortably close resemblance to a Soviet Russian enterprise, in which the place of the Pentagon is taken by the ministry that has close control.[25] One difference is that Soviet society, with severe physical shortages but widely available engineering education, hoards machinery and other capital assets rather than specialized technical talent. Nevertheless, both societies have the worst situations possible. In the Soviet Union, engineers are often technically underemployed, just as they are in the United States. In the American firms, prohibiting government-owned equipment from being used for commercial purposes amounts to hoarding capital equipment.

In the United States, a further problem is the creation of two kinds of industrial management. The line of demarcation between military and commercial work becomes ever sharper, and the managerial skills ultimately become totally different. At the same time, the convergence of government operation and the extensive and growing military-oriented sector of industry becomes ever more pronounced. Essentially, a crucial sector of American business is being detached from private enterprise. Whatever the political ideologies of individuals in military industrial jobs, however strongly they may object to governmental involvement in other parts of society, their understanding of the problems of the rough-and-tumble of the marketplace will of necessity be undermined on account of the jobs they hold. Much is expected of the private sector in solving the current economic problems. But if it is to succeed, then a distinction must be made within it. Part of private industry still takes risks, makes its own decisions, and organizes work to serve rationally definable markets; but the corporate beneficiaries of Pentagon Keynesianism operate beyond the criteria of efficiency and cost-effectiveness.

The undue influence of the military-industrial complex that President Eisenhower warned against does not merely take the form of powerful lobbying on behalf of a sector of the business community and its government patrons. For one thing, the complex is now a military-industrial-academic-and-union complex. For some universities, the payoff is a munificent source of research support at a cost of keeping the results secret. Trade unions not only trade off ideological support for the arms race by certain union leaders but also accept considerable government direction of business, as long as it brings jobs -- never mind other consequences. However, substantial opposition is growing in universities and among and within unions, as it is also within the business community. Many groups have suffered from the economic dislocation and have begun to allocate the responsibility for the conditions.

In short, a major decision center has been created in American national life that is largely immune to the conventional countervailing forces of the marketplace, politics, and (to some extent) even congressional control. The latter non-relationship particularly appears to make neither the armed forces nor Congress happy. In a significant farewell statement as Army chief of staff, General Edward C. Meyer (General Wickham's predecessor) said that the Reagan administration and Congress lack basic agreement on missions for the armed forces and related political objectives and that Congress is therefore "out of control," focusing on individual weapons programs (with their pork-barrel implications) rather than overall budget and policy.[26] His words were underscored by persistent reports in the American and European press that the armed forces of the Soviet Union are also a decision group unto themselves, beyond the control of even the Communist Party.

That kind of power is heady in any society. One does not have to espouse any conspiracy theories to become alarmed about it. Such a parasitic growth must be fed (at an ever-increasing rate) by the nation's substance. In the United States, that growth has sapped the country's social and economic strength.

The worst of it is that the current military overexpenditures reduce national security rather than enhancing it. The current prospects of huge deficits, investment-discouraging interest levels, and high unemployment are bound to affect the United States adversely. It is clear from the foregoing analysis that a combination of overblown organization, bad work habits, waste, and technical incompetence bears a heavy share of the responsibility for what is going on. That layer of Filz deserves to be attacked first, of course.

But beyond that, a number of proposed reformulations of U.S. foreign policy have been put forward. Some proposals are designed to provide an effective defense while limiting the ability of the United States to project its armed forces around the world (which, as of the fall of 1983, involved riding off in all directions at once).[27] These reformulations would justify a freeze of military spending, to begin with, as part of a general budget strategy proposed by Senator Ernest Hollings (D-S.C.) and others. To sustain the arms race now, with its illusion of Pentagon prosperity, requires

perpetuating and exacerbating international tensions, stifling peaceful initiatives, and constantly invoking nuclear annihilation. It is not surprising that under the Reagan Administration, these developments have coincided with unprecedented moves towards government secrecy, as more and more takes place beyond the realm where it is accountable under the Constitution.

What happens to our freedoms in this distancing of government acts from the governed? What prospects remain for a well-functioning, diverse, and expansive economy of the kind that served us so well in the past? Samuel Butler's poem *Hudibras* offers us a sensible warning about the consequence of tunnel vision in the arts of government:

For if we should fight for the Cause By rules of military Lawes, And onely doe what they call just, The Cause would quickly fall to dust.

## FOOTNOTES

[1] There are two principal analyses of the military industrial firm: J. F. Gorgol and I. Kleinfeld, *The Military Industrial Firm* (New York: Praeger, 1972); and S. Melman, *Pentagon Capitalism* (New York: McGraw-Hill, 1970). For an early discussion of the effects on industry, see J. E. Ullmann, "Conversion and the Import Problem: A Confluence of Opportunities," *IEEE Spectrum*, April 1970, p. 55ff.

[2] M. J. Peck and F. M. Scherer, *The Weapons Acquisition Process* (Boston: Harvard Graduate School of Business Administration, 1962), especially chap. 4.

[3] President Dwight D. Eisenhower, in a farewell radio and television address to the American people on January 17, 1961: "In the councils of government we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex."

[4] Memorandum of General Eisenhower dated April 27, 1946, cited by Melman in *Pentagon Capitalism*, p. 231ff.

[5] A. A. Rogow, *James Forrestal* (New York: Macmillan, 1963), especially chap. 7.

[6] M. Weidenbaum, cited by Melman in *Pentagon Capitalism* pp. 12-13; see also M. Weidenbaum, *The Economics of Peacetime Defense* (New York: Praeger, 1974), especially chap. 6. [7] Melman, *Pentagon Capitalism*, chap. 1.

[8] U.S. Department of Defense, *Armed Services Procurement Regulations (ASPR)*, vol. 32, *Code of Federal Regulations (CFR)* (Washington, D.C.: Government Printing Office, 1982).

[9] U.S. Department of Defense, *Defense Procurement Handbook* (Washington, D.C.: Government Printing Office, 1982).

[10] See for instance K. Sakoh, "Industrial Policy: The Super Myth of Japan's Super Success," *Backgrounder*, The Heritage Foundation, July 13, 1983.

[11] U.S. Department of Defense, *Armed Services Procurement Regulations*, vol. 32, sub-vol. 1, pp. 1:80-1:84.

[12] John S. McNamara, in hearings before the Armed Services Committee of the House of Representatives on the U.S. Department of Defense, commenting on Secretary's Posture Statement (Washington: Government Printing Office, 1964).

[13] S. Melman, "Looting the Means of Production," *The New York Times*, July 26, 1981.

[14] Executive Office of the President, *1983 Economic Report of the President* (Washington, D.C.: Government Printing Office, 1983), p. 180.

[15] Defense Science Board, 1980 estimate cited in A. T. Marlin, ". . . Would Drag Down the Economy," *The Washington Star*, January 21, 1981.

- [16] Cited in "Stopping the Incredible Rise in Weapons Costs," Business Week, February 19, 1972.
- [17] C. Mohr, "Drop in U.S. Arms Spurs Debate on Military Policy," The New York Times, October 24, 1982.
- [18] J. E. Ullmann, "White-Collar Productivity and the Growth of Administrative Overhead," National Productivity Review, Summer 1982, p. 290ff.
- [19] U.S. National Science Foundation, Characteristics of Experienced Scientists and Engineers (Washington, D.C.: Government Printing Office, 1978), table B-13.
- [20] "Navy is Critical on Cost of Plane," The New York Times, May 2, 1983.
- [21] J. Barron, "Grumman's Navy Quandary," The New York Times, June 1, 1983. [22] "Army's Replacement for Jeep Failing Pentagon Battle Test," The New York Times, May 5, 1983.
- [23] R. Halloran, "Pentagon Aide Says Shoddy Work Adds 10 to 30% to Military Costs," The New York Times, June 2, 1983.
- [24] R. Halloran, "Chief of Army Assails Industry on Arms Flaws," The New York Times, August 9, 1983.
- [25] For a detailed exposition of the comparison, see Gorgol and Kleinfeld, pp. 119-27.
- [26] R. Halloran, "Farewell Call to Nation on Armed Forces Policy," The New York Times, June 17, 1983.
- [27] See for instance Boston Study Group, The Price of Defense (New York: Times Books 1979).