INTRODUCTION

After briefly going over the military history of mediaeval, ancient and colonial India and its defence production in those days, it is time to concentrate on free India. This Chapter covers the period from 1947 to 1962. Why up to 1962? Because, after suffering a humiliating defeat in Indo-China war of 1962, India was awakened to its real defence needs. Thereafter, an ambitious defence plan was formulated which put India ahead of all developing countries and earned a title of mini super power.

The ordnance establishment was not affected by partition, as all the functioning plants (sixteen ordnance and one clothing) were located within the political boundaries of the Indian Union. The government was well aware that the country's industrial base was narrow and its manpower deficient in many of the specialized skills required in modern armaments production. While striving to rectify these inadequacies as an integral part of economic development, official policy was: first, to ensure the indigenous production of basic items of military equipment that were likely to be required in sufficient quantity to make their production economically feasible; and second, to produce items which though in small demand, were essential. It was considered wiser to continue to purchase those military items that were extremely costly and in which new developments were taking place rapidly and unceasingly, such as fighter and bomber aircraft, gun-sights, and guided missiles. The spare peacetime capacity of the ordnance factories was to be used for the manufacture of
civil items, but it was intended to maintain close contact with civilian industry to permit future planning for defence production to proceed on a realistic basis.³

Immediately after independence in 1947, within their limited capacities, the factories produced goods for the Army that had formerly been imported from Britain. This was a difficult period for them technologically since production in the ordnance factories had been completely dependent on the supply of designs, expertise and some materials from abroad. Hence, replacement of foreign goods implied, as well, a replacement of critical missing components, especially manpower. After 1947 there where only 26 Indians of gazetted rank in the ordnance services compared to 79 Europeans. In response between 1948-49 and 1953-54, 75 Indians were sent to various locations in Europe and the US for training.⁴ After a short period when the ordnance factories had substituted all the defence goods they were capable of, they turned to civilian market to continue import substitution.

It should be noted that during this period of institutional decline of domestic weapons production, the armed forces were not suffering for lack of equipment. In the 1950s, the amounts of weapons imported, especially by the Air Force and Navy, increased tremendously.⁵ These weapons purchased were not a response to new threats to national security. By and large, they replaced worn out and obsolescent equipment dating from the war and filled the gaps in the arsenal of the services. Since, during the World War, Indian Armed Forces had been subordinate to the overall strategic plans of the Allied powers, this had led to a force profile that was only complete within the larger structure. Hence, some of the arms purchases of this period were simply to replace missing systems that had formerly been maintained by the British and the US. Not surprisingly, these missing systems were mostly technologically sophisticated weapons that could not be manufactured in India at this time, i.e. aeroplanes, tanks and naval surface ships.

Through the 1950’s, for those within the defence sector, the problem was perceived as follows. While a number of production units for the production of lethal equipment
did exist under the aegis of the state, they were inadequate and functionally fragmented. As an early Defence Secretary put it, these factories had been set up “to meet ad hoc requirements” and largely to serve the needs of the Army. In this period, however, defence production policy was centered around organisational change with the idea of making the system more efficient rather than increasing its size. As mentioned above, governmental concern with the ordnance factories led to the reorganisation of management and control via the formation of the Defence Production Board and its three supporting committees. While there were steps taken to increase the complexity of the output of the defence production sector, these steps hardly suggest a concerted and coherent state policy as was desired by some defence bureaucrats.

On the one hand, recognition of the need to construct units producing vital inputs for a defence production sector led to the formation of Bharat Electronics Limited (1954), a public sector corporation under the Ministry of Defence which was to design, develop and progressively manufacture electronic equipment such as transmitters, transceivers...and to undertake the manufacture of specialized and electronic components. The technical assistance for the project was provided by the Compagnie de Telegraphie sans Fils of France. Production of BEL increased in value from Rs 5 crores in 1947 to Rs 27.5 crores in 1953. Another important new facility was the Machine Tools Prototype factory at Ambenath.

On the other hand, an existing state owned corporation, Praga Tools Limited, was also included under the Ministry of Defence. The reason was literally because “someone thought it might make certain parts for carbines used by our defence forces.” This company had first been run by the state government of Andhra Pradesh, then taken over as a “sick” unit by the Union Ministry of Industries. Perhaps not surprisingly, the attempt at reviving an industrial unit under the protected conditions of Ministry of Defence was so successful that “in fact, it was able to declare a dividend for the first time in the history.” The success of the presumed overarching goal of efficient and modern defence production, however, goes unrecorded.
Also suggesting the haphazard state of defence production policy during this period was the attempt to build an indigenous supersonic aircraft at the state aircraft manufacturer, Hindustan Aeronautics Limited (HAL). While utilizing foreign design expertise, the scale and scope of this project was far beyond indigenous capabilities at this time and suffered as well the basic problem of the lack of a suitable power plant. At this time, quite independently of its aircraft business, HAL was also making rail coaches for the civil sector.

For the easy and understandable flow of information, this Chapter has been divided into the following parts :-

1. **Reorganisation of Production System.** During Nehru's leadership, a need was felt to integrate science with defence production. As a result, the whole defence production system was reorganized and DPSU giants like BEL, HAL etc. were established.

2. **Army Programme.** The Army was the main force and therefore, some efforts were made to modernize it. During these times, it was decided to produce tanks indigenously, however, a grave mistake was made in 1959 to ignore private sector capabilities in automobile production of trucks, jeeps and earth moving equipment within the defence sector.8

3. **Air Force Programme.** During this period, an ambitious project of HF-24 Marut was taken up and ties with former USSR were strengthened.
4. **Naval Programme.** The existing assets of shipbuilding industry located at Mumbai and Kolkata were nationalised, however, not much progress was made in building of big ships.

5. **Government's Policy on Defence Production.** How the foreign policy of Non-Alignment of Nehru and Krishna Menon, the former Defence Minister, affected the defence production system have been covered in this part.

6. **Self-Sufficiency in Defence production.** The targets of self-sufficiency and their attainment have been critically examined in this part of the thesis.

**REORGANISATION OF DEFENCE PRODUCTION SYSTEM**

The government proceeded to prepare a scientific organization upon which to base its proposed modern ordnance establishment. A Science Research and Development Organization was established in 1948, and in 1952 a Defence Science Service was created to attract young scientists into undertaking defence-oriented research. The Institute of Armament Studies was established at Khidki (Pune) in 1952 to familiarize selected military officers with science and technology as applied to armaments and to promote the dissemination of basic defence information. A factory was set up at Ambarnath in 1954 to serve as the foundation of an armament plant aimed at enabling ordnance establishments to design and adapt existing types of equipment in small quantities. A reorganization was affected in January 1958 in which the technical development establishments of the three Defence Services and the Defence Science Organization were replaced by the Defence Research and Development Organization (DRDO). In 1959-60, the government constituted the Defence Minister’s (Research and Development) Committee to consider all policy matters affecting the DRDO and created a Research and Development Advisory Committee to replace the Defence Research Policy Board and the Defence Science Advisory Committee. In, 1959, the
government approved a defence research fellowship scheme, to give grants to universities and to persons undertaking defence oriented research.

Reorganisation of Defence Production Board

Krishna Menon's reforms were aimed at centralizing and rationalizing decision making about defence production. At the organisational level the Defence Production Board was revamped and renamed. The new Defence Minister's Production Committee expanded its membership and functions and concentrated administrative power in one body directly under full ministerial control. A number of existing committees and panels were dissolved or reconstituted making this Board the primary administrative organ for overseeing the entire defence complex.

The associated committees had clearly defined and separate functions:

1. Defence Production Advisory Committee. It was to interact with the private sector to examine possibilities of cooperation and to ensure non-duplication of productive capacity.

2. Defence Production and Supply Committee. It was committed to indigenisation of imported stores (import substitution) and making the stores allocation and distribution process more efficient.

3. Defence Research and Development Committee. It was to advance and coordinate defence-related research underway in the armed forces and scientific establishments.
Reorganisation of Ordnance Factories

Between 1947 and 1954, the existing ordnance factories were apparently balanced and brought up to a satisfactory state of efficiency, one or two were expanded, and several new factories were planned and approved by the Defence Committee of the Cabinet but were not proceeded with at the time 'for one reason or another. By 1953 the requirements of the armed forces obtained from local sources had been met and the government was considering the retrenchment of semiskilled workers. The aim continued to be 'to expand civil production in directions which will be helpful also to meet the requirements of the country in an emergency’, but the government had started a drive to use the surplus ordnance capacity to produce goods for other government departments and for civil industry, provoked partially by delays in civilian production in providing sufficiently advanced basic materials, components, and semi-manufactured parts.

A committee i.e. Ordnance Factories Reorganisation Committee was formed under Baldev Singh, the first Defence Minister of India. The report of the committee was submitted to the government in 1955 and, while not a secret document, has for some unexplained reason never been made public. According to informed sources, however, the report included recommendations for establishing a Defence Production Board, modernizing equipment, producing for the civilian market, and decreasing the number of semiskilled and unskilled workers. With the exception of equipment modernization, which was deferred largely for financial reasons, the committee’s proposals seem to have been subsequently implemented. About 5,000 workers were laid off by September 1956, and the production of civilian items was extended to include such things as coffee percolators, pressure cookers, and Meccano sets. It was announced in August 1955 that the Defence Production Board had been created to
assume management of all ordnance factories, co-ordinate research and development in the three armed services, and secure effective liaison with civil industry to meet defence requirements.

Modernisation Plans

The deteriorating border situation with Communist China, however, prompted the government in late 1959 to undertake an ambitious modernization and expansion programme in its ordnance establishment. Speaking at a New Delhi meeting of the Congress Parliamentary Party on 8 February 1960, Nehru explained that the government had sought to economize in the past few years by postponing the manufacture of certain items but because of the border situation with China, top priority was to be given to defence and the defence industries in the 1960-61 budget and in the Third Plan.¹³

About Rs 80 cores were sanctioned for the modernization and expansion of defence factories in the 1960-61 fiscal year in a plan to produce new items, renovate old plant and equipment, establish a new explosives factory at Bhandara, and develop a plant for steel and special alloys.¹⁴ These plans led one Indian daily to comment that ‘the year 1960 has all the portents of coming off as a significant landmark in the history of the Defence Industries.’¹⁵

How this modernization and expansion took place in next few years, has been discussed in subsequent paragraphs.
ARMY PROGRAMME

It has been seen in the previous Chapter, that the Army was the biggest component in Indian Armed Forces. There was no shortage of man-power in Army but, what needed was new equipment. The vehicle fleet was worn out, tanks were very few in numbers and mostly outdated. Integral to all this was the aspect of a weapon or equipment policy, which was absent till 1962 debacle; of course some progress was made on some fronts but, it was not enough.

Vehicle Production

After 1949 the Defence Ministry had placed substantial orders with Premier Automobiles and Hindustan Motors with hopes of ultimately obtaining military vehicles of 100 percent Indian manufacture. After eight years Premier was unable to achieve more than a 30 percent local manufacture of parts for their military vehicles. The firm manufacturing Studebaker trucks (largely through assembly) had supplied 4,000 units to the Army up to 1957, when they abandoned their manufacture, leaving the Army with a large number of trucks for which they were not assured of spares. Protracted negotiations with TELCO for 1,000 three-ton trucks foundered when the company refused to reduce its price. Finally, a decision was made in 1959 to ignore private sector capabilities in automobile production of trucks, jeeps, and earth moving equipment within the defence sector.

Finally, a scheme for the production of three-ton Shaktiman trucks, was signed with Maschinenfabrik Augsburg-Nurenberg AG (M.A.N.) of West Germany in September 1959. This was the direct result of government dissatisfaction with the performance of private Indian suppliers. After extensive tests conducted by the Army, the agreement was signed with M.A.N. The first Shaktiman truck rolled off the assembly line at the gun carriage factory at Jabalpur on 21 June 1959.
Bids were invited from manufacturers of tractors, with the proviso that such units were to be produced in ordnance plants. Komatsu of Japan was selected over Marshall, a Britain firm, and the scheme was sanctioned in March 1959.

In February 1960, the production of one-ton trucks was undertaken in collaboration with the Nissan Motor Company of Japan. Projects sanctioned during fiscal 1961 included a clothing factory at Avadi and the alloy and special steels plant. In an agreement made public on 16 December 1961, Nissan agreed to collaborate with the Defence Ministry in the assembly in India of small (800-pound) patrol jeeps, and the first of these 'Jongas' was pressed into service on 24 January 1962. On 1 February 1962 the foundation stones of a cable factory and base repair depot were laid at Chandigarh; the repair depot was to manufacture helicopters in addition to repairing and maintaining aircraft.

**Tank Production**

In mid-1954 the government reportedly considered an offer from Daimler-Benz of Stuttgart for a joint enterprise with the Tata Iron and Steel Company to produce light armoured vehicles and light tanks. Serious consideration of this proposal was kept in abeyance because of the reorganization of the OFs following the report by the Ordnance Factories Re-organization Committee headed by Baldev Singh.

Renewed interest was shown in the indigenous production of tanks. A team of defence experts headed by the Chief of the Army General Staff, Lt Gen L.P. Sen, visited Britain and West Germany, in January 1961 to assess possible types. The West German firm, a subsidiary of Daimler-Benz, was prepared to design a panzer tank suited to Indian conditions, but the offer by Vickers-Armstrong of Britain to modify the Chieftain medium tank to meet Indian specifications proved more attractive. An
important consideration in decision on equipment purchase from abroad, however, was noted by Nehru at a Delhi press conference in April 1956, when he admitted that "Indian forces had in the past been developed largely on the basis of British equipment and for practical reasons it was convenient, other things being equal, to continue on this basis." The resulting agreement, as revealed in a London announcement on 21 August 1961, involved the manufacture of 1,000 medium tanks (37 tons) at a heavy vehicles plant to be established for this purpose at Avadi, near Chennai. The first 40 units were shipped to India for assembly, and, ultimately, the manufacturing started at Avadi with the minimum of imported components. The plant has the capacity to manufacture 100 units per year.

**AIR FORCE PROGRAMME**

Even before independence, the nationalist political leadership indicated its hopes for national self-sufficiency in the manufacture of aircraft for the Indian Air Force and civil aviation within twenty years, that is, by about 1967. In 1946 the interim government invited a British technical mission to India to advise it concerning the establishment of an aircraft industry. The committee recommended the repair and overhaul plant of Hindustan Aircraft Limited (HAL) at Bangalore as the nucleus for the industry, and its advice was accepted by the government.

**Basic Trainers and Vampires**

While a modern design and development department was being established, HAL undertook the assembly of various aircraft required by the IAF. Fifty Percival Prentice basic trainers were assembled during the 1947-50 period and twelve were produced for the Indian Navy between 1951 and 1953. Some 150 de Havilland DH-8 Tiger Moth primary trainers were turned out up to 1951. A licensing agreement was concluded with de Havilland Aircraft of Canada in 1950, and assembly of Vampire F.B.9 fighter-bombers and T55 conversion trainers began in 1953 and 1956,
respectively. By the time production ceased, during the 1959-60, a total of 230 fighter bombers and 50 trainers had been produced.

**Gnat / Avro-748 / Alouette III**

Negotiations were undertaken in 1955 with Folland Aircraft and Bristol Siddeley Aero-Engines of Britain for a license to produce the Folland Gnat lightweight fighter and its powerplant, the Orpheus 701 turbojet. The licenses were acquired in September 1956, new factory buildings for the project were completed in 1959, and production of the airframe commenced in 1961 from imported components. The first Orpheus 701 came off the production line on 21 November 1960, and type approval was granted by the Defence Ministry nine months later. After concluding a license agreement with Hawker Siddeley in Delhi on 7 July 1959, the Indian government initiated a project to manufacture a military version of the Avro-748 short- and medium-range transport at the Aircraft Maintenance Depot established for this purpose at Kanpur. A license for Indian production of the Rolls Royce Dart RD₃₇ turboprop, the proposed power plant for the Avro series, was secured in an agreement signed in London on 30 December 1959. In the spring of 1962, the Indian government obtained the right to produce Sud-Aviation's SE-3160 Alouette III general-purpose helicopter.

**HT-2 / Pushpak / Krishak**

Simultaneously with the assembly and production of foreign aircraft under license, HAL developed its own design section under its government-appointed chief designer, Dr. V. M. Ghatage. In September 1948 the government decided that HAL should proceed with the development of three aircraft types, designated the HT-2 primary trainer, the HT-10 three-seat advanced trainer, and the HT-11 advanced trainer. The first prototype of the HT-2 all-metal two-seat trainer flew on 13 August 1951, and a total 160 units were subsequently produced for the IAF, Indian Navy, and
civil aviation training centers until lack of orders caused the production line to be virtually closed down in early 1962. For some reason the HT-10 and HT-11 trainers were never developed, nor was the proposed Navy amphibian, which was to have been similar in design and power to the Short Sealand; a number of short Sealands were purchased instead. HAL developed the two-seat Pushpak monoplane for flying clubs and private owners, and the more powerful four-seat Krishak for artillery observation and spotting. The first demonstration of a light communication aircraft, the Kanpur, took place on 4 February 1961.

**Jet Trainer Aircraft (HJT-16)**

During the Second Five-Year Plan (1956-61) HAL undertook to design and manufacture a jet trainer, and advanced jet fighter, and aero-engines. The trainer was intended as a single replacement for the HT-2, Harvard, and Vampire, while the fighter was to be produced in two series to meet the Air Force's requirements for a transonic ground attack fighter-bomber and a Mach 2 interceptor.

Official approval for the development of the HJT-16 two-seat basic-intermediate jet trainer was given in December 1959—the first jet design to be undertaken in India without the help of non-Indian consultants. Detailed design work began in April 1961, when Dr. V. M. Ghatage, HAL's chief designer, assembled a group of fifteen designers, who were increased to thirty-five personnel the following year. Development also commenced on the HJE-2500 turbojet engine for the trainer, on a six cylinder piston engine for the Krishak, and on the PE90H four-cylinder piston engine for the Pushpak—the first production model of the latter engine was started up by Defence Minister Menon on 11 March 1959.
Development of the HF-24 fighter began in 1956 under the direction of Dr. Kurt Tank, former technical director of the famous Focke-Wulf organization and designer of the Kondor maritime bomber and F. W.190 fighter. The team was initially comprised of eighteen German engineers, three Indian senior design engineers, and about twenty-two other Indian engineers with design experience. Initial plans were to use two Orpheus 703 turbojets for the transonic MK1 version and a single Orpheus 12 turbojet for the supersonic MK2. The Orpheus 12 engine was being developed by Bristol for the NATO competition, and its completion by Bristol was conditional on its acceptance by NATO countries.

Within 22 months of the start of the project, glider trials were begun to test the full-scale wings and fuselage of the HF-24 design, which had previously been model-tested in wind tunnels and had been tested for low-speed behaviour in the tunnel of the Indian Institute of Sciences at Bangalore. Assembly of the first prototype began in April 1960 and was completed in eleven months, after which ground trials were held. The aircraft took its maiden flight on 24 June 1961, powered by two Orpheus 703 turbojets.

Indian technicians had reportedly built some twenty-five Orpheus 12’s virtually by hand when it became clear that NATO no longer had any interest in the engine. Bristol Siddeley was thereby faced with a further expenditure of about $10 million to complete development of an engine for which India alone offered a market, and a limited one at that. Although under no obligation, contractual or otherwise, to India to complete development of the model, Bristol Siddeley was prepared to expend up to $1 million further on development but advanced the perfectly reasonable suggestion that the Indian government either accept further financial liability or request a subsidy from the British government. For reasons that can only be ascribed to pique, New Delhi refused to assume the costs of further development. And, according to a well-informed aviation magazine, An effort by Britain to compromise by offering India a
loan for the general purpose of aviation development and not specifying the Orpheus project as beneficiary was rejected by India’s Defence Minister, Krishna Menon.India reportedly showed no interest in an offer by the French firm, Snecma, of the Atar 9 turbojet (which powers the Mirage III and IV) but turned to the Soviet Union for a suitable power plant.

Several Klimov VK-7 turbojets, which develop a thrust comparable to the Orpheus 12, were obtained and subjected to evaluation tests at Bangalore. The centrifugal-flow VK-7 could not, however, be fitted to the existing HF-24 airframe without major design changes, so that India shifted its attention to the Russian RD9-F axial-flow engine; six of this type were imported in late 1961 and bench-tested. The use of this power plant was also dependent on a modification of either the engine or airframe, but, for reasons of prestige and the problems of time and finance involved in a redesign of the airframe, the Indian government was strongly disinclined to undertake such a measure except as a last resort. In an apparent about-face, however, Moscow finally agreed to modify the engine to fit the existing HF-24 airframe and an agreement was concluded in the Russian capital in July 1962 for the licensed manufacture of the Mach 1.4 engine in India. The Soviet authorities agreed to supply a few models by the end of 1963, and production was initially envisaged in 1963 but was subsequently deferred. Indian inquiries about the feasibility of acquiring a Soviet power plant for the HF-24 indirectly led to interest in the MIG-21, Russia reportedly proposing that it will provide the whole airframe and engine of a supersonic fighter.

**NAVAL PROGRAMME**

The indigenous construction of naval craft and warships was evidently given a lower priority than aircraft & tanks and little serious consideration was publicly evidenced in such projects until 1955, when an order was placed locally for a survey vessel and consideration was given to Indian construction of a mooring vessel, seaward patrol craft, and some inshore minesweepers.
In April 1960 the government purchased the entire assets of Garden Reach Workshops Limited (Kolkata) and Mazagon Dock Limited (Mumbai), planning to build small naval vessels like minesweepers and, later, destroyers. Orders were subsequently placed with these yards for various yard craft and six seaward patrol craft. Firm orders for two inshore minesweepers were placed with Mazagon Dock in 1960-61, and it was reported as 'likely' that an order for a destroyer would soon be placed with the same yard. Negotiations were also undertaken with Britain for technical and financial assistance in the proposed construction of three 'leander' class frigates at Mazagon Dock, and discussions were still in progress at the time of the border war with China.

**GOVERNMENT POLICY ON DEFENCE PRODUCTION**

It will be relevant here to talk about the political situation in India during this period, because, the decisions of the existing government affected the defence production system directly. Nehru's influence was overwhelming in all decisions, be it defence related or economic. As a result, Nehru influenced India's foreign and defence policy to a great extent between 1947 to 1964.

In the early post-independence period, the production of arms declined in importance as a priority of state activity. Various commissions were set up to examine defence science (the Blackett Report), streamline the industry (Baldev Singh Committee), and develop atomic energy (1948); but on the whole, state investment in domestic production of defence equipment was low.

The prevailing view was that while having an indigenous defence industry was important for an independent India, its social cost was not justified. There were more important development issues at stake that, in turn, meant strictly economic
development. This was the time of debates about the respective virtues of balanced and unbalanced growth, planned versus unplanned economies, mixed versus free market systems and other variations in economic strategy; but in any case the lack of modern, industrial capital was perceived to be the central issue of underdevelopment.\textsuperscript{37}

While hoping security concerns could be kept at bay by a combination of diplomacy and weapons imports, although the need for defence was clear, scarce domestic capital would be used for economic development. With regard to the latter, Indian policy makers became aware that it was always easier to get credit for weapons purchases even when loans for civilian development were not always available. In their minds, arms were still an instrument of security: this external dependence was abhorrent but less important because of the privileging of other means, i.e. diplomatic instruments, over conventional military security measures.\textsuperscript{38} The centrality of this tradeoff in state security policy cannot be separated from the views of the first Indian Prime Minister, Jawaharlal Nehru.

This is not the place to go into Nehru's formative influences: many biographies and critical works do this in great depth, controversy and clarity. Whatever these influences were, Nehru's beliefs in the 1950s seem quite clear in one respect. There was an absolute opposition between purely defence-related issues and civilian development but not between overall national security and development. This ideology of national security, which may be now coming back into vogue,\textsuperscript{39} sees the security of the state as ultimately dependent on the industrial capabilities or strength of the economy: the crucial variable, hence, is economic development, rather than the amount of weapons or arms possessed by the armed forces since these can always be produced by an industrially diversified and developed state. However, in the short run, while the vital industrial base of the country was being strengthened, diplomacy was critical in keeping the country secure. These views are so fully expressed in a speech during the presentation of the defence budget to the Lok Sabha in 1956:–

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“What is the equation of defence? In what lies the strength of a people for defence? Well, one thinks immediately about defence forces, army, navy, air force. Perfectly right, They are the spear points of defence... How do they exist? What are they based on? The more technical you get, as armies, navies and air forces are getting, the base is the industrial and technological development of the country... Therefore, apart from the (armed forces) you want an industrial and technological development of this country. Because if the country's economy is not sound, the country, in fact, is not a relatively prosperous country, so far as its economy and people are concerned, it is a weak country.

I have often said that the real answer to the atomic bomb lies in other spheres. I mention this because in the final analysis what counts is not your soldier or your military weapon, but the spirit of the unity of the people; the will of the people to survive in spite of every difficulty and every menace... so the equation of defence is your defence forces plus your industrial and technological background... thirdly the economy of the country and fourthly the spirit of the people.”

In practice, the interpretation of these views led to the development of a stark dichotomy between civilian and defence production. In the perception of state managers and political elite, the ordnance factories, especially, were seen as a net drain on the economy. Appearing overstaffed and unproductive, they take funds away from directly productive activity. Hence, with little else to justify their existence, the obvious decision was to turn ordnance factory output towards the civilian market to keep the factories active and labour employed. The motivation, unlike most investment in the non-defence public sector which was for infrastructure development, was ultimately to ensure their own survival. Positive balance sheets and visible products helped reduce the overall criticism as well as appeared to further the industrial policy of import-substituting industrialization.

A new vitalism emerged in the Defence Ministry in late 1950s due to the newly appointed Minister of Defence, V. K. Krishna Menon. Krishna Menon’s contribution
to the formation of the security complex was the first well formulated and committed operationalization of the rhetorical goal of self-sufficiency in defence production. His gamble was to try and achieve increased indigenous defence production and affirm the social value of added spending on the armed forces, visibly and with full responsibility for failure. The following comments by a high ranking and retired bureaucrat and air force chief, respectively, are typical of Menon’s impact.” With the arrival of Mr. Krishna Menon in the scene, there was an immediate change (in the way the Ministry was run)41 and “ but for Krishna Menon I doubt whether anything would have been done to increase the supply of Indian-made arms and equipment to our services.” 42

But the gamble did not pay off. As one observer put it, “there can be no doubt about it, that for the first time since Independence, the defence apparatus of the nation was receiving the attention and direction it needed, from the new Minister of Defence; the fatal weakness in the situation lay in the fact that there was simply not enough political support and backing behind the Defence Minister”.43

This lack of broad based support for Menon’s policies seemed to be motivated, above all, by a dislike of the person and his style, so much so that his closeness to Nehru could not save him. After the fateful war with China in 1962, the responsibility for the failure of the Army fell on his shoulders and he was forced to resign.

SELF-SUFFICIENCY IN DEFENCE PRODUCTION

It is apparent that politics emerged as a primary determinant in defence production during the period that coincided with Krishna Menon’s tenure (1957-62) at the Defence Ministry. The vigour with which he approached the issue of defence production, and the constant stress he placed upon the supposed progress being made, suggests that he perceived that only thus could political capital be made from a portfolio that was, from the viewpoint of domestics politics, hardly a stepping-stone
to higher political office. The Avro project affords an example of his approach as, according to one political commentator, Menon wanted the first Indian-assembled Avro to fly even before it was thought fit for the first prototype to do so in Britain. The result was that project officials set out to manufacture a full production model to certification standards instead of proceeding by the route of a pre-production development prototype. Work began in January 1960 but sanctions for the buildings were not given until 30 months later, with the result that equipment arrived but could not be installed and, as late as January 1964, production and construction were going on simultaneously in some hangars.

There would also appear to be sufficient evidence to support the widely held view that Menon deliberately sought to create a private industrial empire within his ministerial control. Although the production of various items for civil trade was undertaken by the Defence Ministry before Menon's tenure, the items involved at this early stage...road rollers, rail carriages, and so on...appear to have complemented existing civil government and private facilities. After Menon's appointment, however, production was undertaken of such items as film projectors, briefcases, mailbags, microscopes, and coffee machines. The production of such items in ordnance could scarcely be considered warranted by the absence of such capacities in the private sector, and the expense involved in the limited production of such items could not possibly have been competitive with the large capacities of the private sector if proper cost accounting and depreciation methods were followed. The argument that such production by ordnance was required to preserve spare capacity against the contingency of war would also appear to have been overworked; the private sector could employ the same argument even more effectively. Ordnance would have undoubtedly been more effective in its essential task - the development and production of military items - if it had not delivered its attention to petty items of civil trade in competition with established private facilities.

The production schemes for one and three-ton trucks allegedly resulted from unsatisfactory deliveries and prices from private suppliers. Defending these projects during the debate on 9 April 1960, Menon claimed that two of the three manufactures
of trucks in India had delivered 'almost nothing' of the orders placed with them by the Defence Ministry while the third, although making more regular deliveries, had increased his price 'very considerably'. Menon claimed that the types of trucks under production in ordnance were better in performance and price than those supplied by the private sector. It would have been cheaper, however, to have resolved the issue through penalty-clause contracts with the private manufactures than to have established such facilities independently in ordnance. As the annual requirements of the Army at the time amounted only to about 2,000 trucks, it seems highly doubtful that an ordnance scheme of, say, 2,000 vehicles per year could be operated as efficiently or as economically as private production lines serving a market of 40,000 civilian vehicles per year. This is particularly so when one takes into account the profit motive underlying the efforts of private manufacturers - an incentive not likely to be so compelling in a miniature 'ordnance empire' where the input-output efficiency scale method of computation was much more difficult to ascertain and where production schemes were undertaken on various items in the 'national interest' even if they were not economical.

Menon's well-known bias against the private sector was not absent from defence production policy and, it can be argued, it did not facilitate the formulation and execution of policy calculated to achieve maximum results for the human, financial, and material resources expended. Insofar as policy was reflected by the HF-24 and MiG-21 projects, efforts were seemingly directed towards the projection of an image of industrial power and technical skill which in fact did not exist - and which contributed very little, if at all, towards alleviating India's pressing social and economic problems. The contradiction between a supersonic aircraft from an ordnance factory and emergency grain shipments from the West (over and above the massive grain shipments which the United States had provided in 1950s under Public Law 480) needs no elucidation.

However, Krishna Menon stressed the need for self-reliance. More than material development during his tenure, and apart from his organizational changes, what was given form and would sharply modify the beliefs of the civilian defence bureaucracy...
from this point onwards was the imperative of self-reliance. What this translated to in practice was not always clear: in the 1950s, self-reliance was taken solely to mean import substitution. This policy was not helped by an uneasy cohabitation with a private sector that wanted to ensure the state did not compete with the civilian economy and the armed forces that wanted the latest equipment from abroad, preferably the US or Britain. Finally, Defence Ministry units still had to appear efficient and in the larger public interest. Krishna Menon’s defence of his budget in the Lok Sabha (1961) suggests all these factors: “Thanks to the decision by the government to go more and more into indigenous production whereby it is possible for us to improve on what other people have made and what is more, to be able to make things for ourselves...When I come to the figures of foreign exchange (savings), in 1957-58...stores from abroad were Rs.93.57 crores but in 1961-62 it came down to Rs. 44.84 crores...Bharat Electronic came in quite rightly for a considerable amount of criticism. Two aspects of this question have been raised. One is, why should this be a defence factory? Well, it was started seven years ago as a defence factory because the defence people were expected to be the largest users of electronic instruments and what is more there are certain products under secret list with the Defence Ministry which have to be manufactured there. But Bharat Electronics works also for the Railway Ministry, the Home Ministry, the Transport Ministry and everybody else.”

ANALYSIS

To quickly summarize, in the immediate post-independence period, a limited amount of defence production in India was carried out in the OFs inherited from colonial rule. Efforts at indigenization took the form of upgrading machinery and equipment to provide domestic substitutes for imports and to expand the production of low value items like small arms, ammunition, clothing and so on. Import substitution took the form of replacing some forms of external dependence. Especially with regard to personnel, by the end of the decade, the OFs were also producing, on license, wheeled vehicles like trucks and earth movers.
India had made substantial progress in developing local sources of defence equipment, particularly after 1959, on a foundation that was built in a no less spectacular fashion between 1947 and 1958. HAL’s Aero-Engine Division had achieved the distinction of being the first organization in non-Communist Asia to manufacture a gas turbine aero-engine. The HJT-16 was the first jet aircraft designed by an Afro-Asian country without help from either of the two power blocs. The HF-24 project gave India the ‘distinction’ of being one of only four or five countries to proceed with the development of a supersonic fighter aircraft.

India was still far from achieving self-sufficiency in defence production, however, and officially inspired claims to the contrary were grossly misleading. India remained dependent upon external sources of supply for designs, vital armaments components, all sophisticated equipment, and many of the basic chemicals and intermediate required for the manufacture of ammunition and explosives. The production schemes for Komatsu tractors, Shaktiman and Nissan trucks, and Nissan patrol jeeps were considerably behind schedule and heavily dependent upon foreign components.48

The aircraft industry was geared largely to the assembly of imported components. Neither special-quality steel nor aluminium both vital to aircraft production was manufactured in India, and all instrumentation, undercarriage, braking systems, communications, and electronic equipment had to be imported. HAL was unable to undertake the repair and overhaul of jet engines until 1960 or to overhaul and inspect a Canberra bomber until 1961. The HF-24 fighter project had progressed in a halting fashion; the first prototype of the Mk 1 was flight-tested with great fanfare in June 1961 but did not attain a supersonic speed in level flight; the second prototype was flight-tested in October 1962. The Avro scheme was on the verge of chaos. The test flight of the first unit on 26 November 1961 was hailed by government and project authorities with the claim that three or four units would be produced each month in 1962. Furthermore, most of HAL’s factory equipment was of pre-1945 origin and the Aircraft Maintenance Depot’s tools and jigs were fabricated from stores left behind by
the United States Army Force in 1945, with some additions from the Punjab and Hindustan Machine Tools plants.

India’s defence production organization was also afflicted with a series of other ills which inhabited efficiency and the establishment of soundly based defence industries consistent with the country’s resources and immediate needs. India remained badly deficient in technicians and very short of first-rate design engineers and scientific workers despite the considerable efforts of the Defence Science Organization. The modernization of the ordnance establishment undertaken in 1960 was making only slow progress, and efficient operations were being seriously compromised by the absence of proper cost accounting and depreciation allowances which concealed the heavy costs being absorbed for moderate gains. Low pay scales and slow promotions were reflected in the flight of sorely needed personnel to the greater attractions afforded by civil and private industry. A country that remained dependent on gifts of America grain to meet persistent food shortages and on massive foreign aid to underpin its economic development was committed to two supersonic plane projects at a time when nations with greatly superior financial, technological, and industrial resources were limiting the types of fighter aircraft in service.

Planning for defence production must always be related to existing and potential capabilities, to a careful evaluation of likely military requirements, and their projection over a period of time. The available evidence suggests that New Delhi generally ignored these truisms in the latter half of the 1947-62 period. Maximum self-sufficiency in military needs was desirable to enable the country to pursue its foreign policy objectives free of the limitations imposed by the virtual arms embargoes applied by external powers, as during the Kashmir conflict. Desired armaments could not always be acquired when needed or at a price deemed reasonable. Acutely conscious of India’s size, convinced of its importance and great potential, and sensitive to the country’s economic dependence upon the goodwill of the more prosperous and committed countries of both the Soviet and Western blocs, India’s political leadership developed what amounted to an obsession to achieve
maximum self-sufficiency in defence equipment and thereby provide substance to her policy of nonalignment.

The considered approach to broadening indigenous defence production during the first decade of Indian independence gave way, about 1955, to ambitious schemes which were not warranted either by India's immediate military requirements or by the capacities of local technology and industry. The HF-24 project and the decision to initiate a MIG-21 scheme were quite premature and invoked the actual or proposed diversion of scarce funds and technical skills to projects that have been described as 'nothing short of a huge fraud on the gullible public.' Professed official beliefs notwithstanding, there is really little difference between dependence upon external weapons systems and dependence upon external sources for blueprints and vital parts, as both require the co-operation of a foreign company and at least tacit approval of the particular foreign government. From the standpoint of time, external purchase from a substantial production programme permits faster acquisition of items undergoing progressive and revolutionary development. Such external purchase is far less expensive than the establishment of a limited local production line at great cost for a very limited domestic market. The popular argument that indigenous production permits appreciable savings of scarce foreign exchange is hardly relevant here, in view of the massive foreign aid India was receiving from the very countries from which she obtained military stores and equipment.

On the eve of Indo China War (1962), India's defence industries were occupied with diverse and ambitious production schemes:

1. The aircraft industry, comprised of HAL and the Aircraft Manufacturing Depot, had underway or in the planning stage the production of Pushpak and Krishak light monoplanes, the Kanpur Logistics Air Support type, Gnat transonic fighters - bombers and supersonic fighters, MIG-21 supersonic fighters, HTJ-16 advanced jet trainer, Avro-748 transport, Alouette III helicopters, and Orpheus 701 and 703, Dart RD27, and PE90H aero-engines.
2. The state-owned Magazon Docks and Garden Reach shipyards were engaged in the construction of yard craft and patrol vessels and contemplated the building of minesweepers and destroyers in the near future.

3. The ordnance establishment comprised 22 factories—seven general engineering, five metallurgical, five clothing and leather, two chemical, two chemical-cum-engineering, and one cable—which produced small arms and ammunition, artillery, sea mines, depth charges, bombs, one-ton and three-ton general service vehicles, 800 pound patrol jeeps, tractors and a variety of civil items including pressure cookers, Meccano sets, and their hair clippers. The research organization consisted of 25 research laboratories and technical establishments, two training centres, and three field research stations, and its efforts were directed toward the development of a mountain gun, the Ishapore rifle, and universal gun and mortar sights.

However, what was needed for a concerted effort in self-reliance first, to begin, and second, to expand in definition, was a military disaster. That real disaster came in 1962, when India was humiliated in Indo-China border war. Therefore, it will be correct to say that “Real” domestic weapons production was set into motion only after the 1962 war with China, and even more so, after the 1965 war with Pakistan, when the United Kingdom and the United States placed an embargo on defence equipment to the sub-continent.
REFERENCES

1. For the details of the ordnance plants, see Chapter 2.

2. The Industrial Policy Resolution of the Indian Government issued in 1948 and revised at the start of the Second Plan in April 1956, designates munitions, aircraft, and shipbuilding as 'industries whose future development would be exclusive responsibility of the state'.


9. It had formerly been chaired by the Minister of Defence Organisation, a Junior Cabinet Position.


12. Ibid., p. 128.


15. Hindu, 26 January 1960


18. Op. Cit., No. 11, p. 128. This was reported by the Bonn correspondent in *The Times*, 21 June 1954.


23. Ibid.,

24. Ibid.,

25. In early 1961, a study was also in progress regarding development of a naval version of the HF-24 as a replacement for the Sea Hawk, Ministry of Defence, Report, 1960-61, p. 13.

26. He was Head of Aeronautics Department at IIT, Bangalore also.


29. Ibid., p.134. According to the report, development of the engine was started with US Mutual Aid Funds, which were terminated by America when India purchased Soviet transports and helicopters.


34. Op. cit., No.11, p. 135 (This was stated by the then Deputy Defence Minister Satish Chandra in Lok Sabha on 1st March 1955.


38. Ibid., p.7.

39. For more details, see, the paper presented on Development Dynamics: Security and Political Consideration, an international conference held at the Bangladesh International Institute for Strategic Studies, Dhaka, 12-14 December 1989.


42. P.C.Lal, *My Years with IAF*, Lancers Publishers, Delhi, 1985, p. 25


46. See Menon's statement as reported in Hindu, 11 April 1960.


49. Madhu Limaye, National Apathy, Seminar, July 1962, p. 34.