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Swords into ploughshares: The quest for peace and human development

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I. Conversion, the economy and society

The problem of converting military industries and redeploying resources for socially useful purposes touches on two closely inter-related issues of cardinal importance: the quest for peace and disarmament, and the restructuring of society in line with human values and needs. The issues at stake are political, economic and social. Politically, they are tied to the imperative of disarmament as a crucial precondition for peaceful development. Economically, they address a vast complex of questions pertaining to the role of armaments and the arms industry in worsening today's economic crisis. Socially, they bear upon the rational (or irrational) use of human and material resources and the pursuit of the betterment of the human condition. As far as workers and employees are concerned, conversion has implications for job security, work satisfaction and self-realisation.

I should like first to consider the significance of conversion for national economies, laying special stress on the interest of working people and trade unions in the redeployment of resources. I shall next briefly discuss problems of converting the arms industry in Western Europe. Finally, I shall turn to the broader aspects of conversion as part of efforts for disarmament and for the transformation of international relations with a view to human development and a more just economic and political order.

1. Investment, growth and employment

It is a truism that armaments and the arms race–apart from their inherent political harmfulness as agents of international tension, violence and war–represent a socio-economic burden on society in general, since arms production is by its very nature a socially unproductive pursuit. Although it is usually included in the national product, it does not provide socially useful goods or services, neither has it any capacity to raise levels of consumption.

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On the contrary, in countries with a developed arms industry, it absorbs a large proportion of capital, raw materials and highly qualified human resources, all of which are vital to the civilian economy and the satisfaction of social needs. It is thus a drain on the economy, rather than an asset, competing with the civilian sector and interfering with its development. However, since it is crucially located at the power centre of society, the arms industry is a privileged part of the economy. It commands strong political support from governments and is well shielded by vested socio-political interests. As a rule, it enjoys priority treatment by the authorities, both in sustaining production and in the allocation of resources.[1] So it has a profound influence on the state of the market for goods and services.

An important feature of the arms industry is the fact that it is exceptionally capital-intensive. Armaments production relies on the most sophisticated technology, uses expensive equipment and works with lavish administrative overheads and profit margins. It absorbs the lion's share of the research and development budget.[2] When everything is taken into consideration, investment costs per workplace are far higher in the arms industry than in the civilian sector of the economy.

The armaments industry has a critical bearing on employment, inflation, growth and productivity.[3] Concentration of R and D in military production deprives the civilian economy of a vital impetus to development, and this in turn reduces productivity and growth. While military R and D provides the technological momentum for armaments production, the civilian sector of the economy experiences stagnation. The oft-cited "spin-off" effects to the civilian economy are insignificant in comparison with the magnitude of military R and D investments. The United States Council on Economic Priorities, in a study comparing the performances of 13 major industrialised countries over the past 20 years, found that countries in which the military sector represented a smaller average share of national economic output "generally experienced faster growth, greater investment, and higher productivity".[4] Japan and the Federal Republic of Germany are frequently mentioned as examples of this trend,[5] though in the latter country one may find some correlation between signs of recession in recent years and the growth of armaments production. It is certainly true that the higher the investment in armaments, the lower the growth rate and the efficiency of the civilian economy. This is perceptible in both East and West.[6]

The arms industry has a particularly detrimental effect on employment. First, jobs in arms production are the most expensive in the national economy. Second, by absorbing a huge part of the general investment budget–much larger than the GNP percentage of military expenditures –military production pre-empts a sound employment policy.[7] Third, by constantly introducing new technology and higher levels of automation, it generates redundancy. A study undertaken by the International Association of Machinists and Aerospace Workers on the employment situation of its members concludes: "As the military budget goes up, and procurement

contracts rise, machinists' jobs in military industry steadily decline. . . . Much of this job loss can be attributed to technological development. As military industries become increasingly capital-intensive, jobs decline."[8]

Similar conclusions emerge from the recent United Nations study on the relationship between disarmament and development, which notes: "The job-creating differential between spending $1 billion on the military sector and the same amount on public service employment has been estimated to be roughly about 51,000 jobs in a major industrialised country like the United States."[9] And further: "On the key issue of employment, there is . . . persuasive evidence that virtually all possible alternatives to military expenditure and production will result in at least as many, and in most cases more, jobs being created."[10] Other studies corroborate these findings.[11]

These research results contradict the myth that armaments production serves to generate employment. The argument behind this myth is specious. It is true that arms production provides jobs; yet apart from the high political and economic opportunity costs related to the consequences of the arms race, the employment created by the arms industry is far lower than what could be achieved by comparable investments in the civilian branches of industry or in public services. The claim that cuts in the arms industry may cause unemployment is valid only as long as the authorities show no political will to plan for the redeployment of resources.[1]

2. The trade unions

In the light of the above, the interest of the trade unions in conversion should be evident. So broad are the issues involved that conversion, closely related to disarmament, economic recovery and the satisfaction of basic human needs, should become a common concern of governments, employers and employees.

Today's acute economic crisis, amplified and aggravated by the arms race, is most strongly felt by the working people. Armaments escalation and its growing drain on the economy tend to clash with the economic interests of workers and consumers, especially as regards employment and unemployment. But a number of other aspects of special interest to the working population are also involved: the quality of life, human values, moral and ethical issues and the very strain imposed by the balance of terror, which overshadows the deep-felt, visionary longings of working men and women everywhere for peace, welfare and a better future.

Conversion policies are in harmony with basic trade union ideals and efforts for social change. They converge with endeavours to mitigate the consequences of workforce reductions due to technological innovation or international economic competition, through redeployment of resources and finding new jobs for redundant workers.[12] They are also in line with the general trend towards humanisation of work, not only from the point of view of general well-being and the quality of the working environment, but also as

regards job satisfaction, self-realisation and the awareness of being engaged in socially useful production.[13] Finally, conversion policies can meet demands for worker participation in the redirection of resources, converging with the general move towards greater involvement of trade unions and works councils in the decision-making process with a view to safeguarding job security and improving the working conditions of employees.[14]

Of course, conversion is a complex issue. It poses dilemmas to the workforce engaged in military production. Faced with unemployment, arms industry workers may find it difficult to reconcile their opposition to the arms race on social grounds with the immediate economic interest of preserving their jobs. They accordingly adopt an ambivalent stance. In self-justification, they tend to acquiesce without demur in establishment rationalisations of the arms industry as being vital to national security, foreign trade and the balance of payments, or simply as a job-creating factor in the economy. Though in the long run conversion may be a better way of meeting the needs of workers, in the short term it often seems impracticable either because no plans have been made for its implementation or because of the resistance of the state administration and vested interests linked to the military economy. What is needed, perhaps, is greater elucidation of the issues involved. But first and foremost, some material reassurance is required; this can be provided by developing–parallel to fundamental long-term conversion planning to follow full-scale disarmament–anticipatory contingency planning focusing on the immediate needs of particular arms plants facing redundancies. The idea of conversion has to leave the realm of Utopia and become a hard-and-fast policy determining a given line of action.

Efforts to achieve this are still in the embryonic stage. The most prominent recent instance was the mid-1970s Alternative Corporate Plan of the British Lucas Aerospace workers, designed to redeploy resources in response to threatened job cutbacks and layoffs.[15] A combine shop stewards' committee was formed representing the entire staff from different plants of the company, including the engineering staff. After 18 months of work, the committee produced proposals for alternative socially useful products to replace military orders. The Alternative Plan included such products as heat pumps, wind generators, a hybrid road/rail vehicle, a series of robot devices, radar appliances for the blind, etc.[16] Other plants, like Vickers, have followed the Lucas example. Yet such redeployment plans have not been fully implemented, even though almost all the ideas in the original plans turned out to be technically feasible and some have been adopted by firms in other sectors. Resistance from the management side has proved too strong. Workers and managements have disagreed on criteria for assessing products. As pointed out by Mary Kaldor: "For the management, the criterion is profit. For the workers, the criterion is whether the product satisfies a social need and whether it provides employment at nobody else's expense."[17]

All the same, the Lucas experience served as a valuable lesson to the trade unions, leaving a deep imprint on their activity. It helped to inspire new

thinking and broaden trade union interests beyond wages and working conditions to include general employment issues and production profiles of particular plants. In the light of this experience, the expertise of workers and trade unions in production and management matters has come to command greater respect.[18]

As the United Nations Group of Governmental Experts on the Relationship between Disarmament and Development concludes: "There is an overwhelming consensus, based on solid experience, that the resources employed for military purposes can . . . be adequately 'refashioned' to work effectively toward meeting civilian needs."[19]

II. The case of Western Europe

Problems of converting the arms industry had long been hotly debated in the United States. The new ideas reached Western Europe in the 1970s, as witness the example quoted above. In comparison with that of the United States, the Western European armaments industry is more vulnerable in that it is more exposed to fluctuations caused by international competition for markets, by technological rivalry or by waves of détente. At the same time, Western European arms manufacturers must strive particularly hard for economies of scale to recover the high costs of military R and D and make production profitable, and must fight for export markets to enable their governments to offset foreign trade deficits and ensure oil supplies. For all these reasons, periodical crises involving employment redundancies are increasingly common. The workforce in the United Kingdom defence sector, for instance, decreased from 963,000 in 1963 to 715,000 in 1978.[20]

Keen competition on the international weapons market has developed, especially between East and West, and even between the NATO countries themselves. In 1979-81 the shares in world exports of major weapons were as follows: USSR 36.5 per cent, United States 33.6 per cent, France 9.7 per cent, Italy 4.3 per cent, United Kingdom 3.6 per cent, and Federal Republic of Germany 3.0 per cent.[21] Thus the four major Western European arms exporters accounted for 20.6 per cent of world trade in major weapons. But there have been significant shifts over the past two decades. The United States increased its share of exports of major weapons to Third World countries from 29 per cent in 1962-66 to 37 per cent in 1977-81, while the United Kingdom's share fell back from 12 to 4 per cent.[21]

Symptomatic of this competition in weapons exports is the recent rift between the United States and its Western European allies concerning mutual arms purchases. In recent years the imbalance in the United States-Western European arms trade was already 10 to 1 in the former's favour. It was therefore with bitterness that the Western European NATO countries received the December 1982 United States Congress decision to halt arms imports from Europe altogether. This was especially resented in the Federal Republic of Germany, eager to win NATO markets for its weapons

production.[23] This episode is but one of several examples showing how volatile the Western European arms industry is.

Estimates vary concerning the number of employees in arms production in Western Europe, both because of the scarcity of available statistical data and because of uncertainty regarding the numbers indirectly employed by subcontractors, in services, etc. A reasonably accurate assessment of the total workforce engaged in arms production in the four Western European countries mentioned above, and of the employment generated by arms exports, gives the following figures for 1977:[24]

Country	Total (arms industry)	Arms exports
France	436 000	151 000
Germany (Fed. Rep. of)	283 000	39 000
Italy	161 000	76 000
United Kingdom	630 000	168 000

About 20 per cent of the world's workforce employed in the arms industry appears to be located in Western Europe.

The arms industry in Western Europe is characterised, inter alia, by the following features:

First, high capital- and skill-intensiveness. We have already seen that the same amount of investment creates far fewer jobs in the armaments industry than it does in the civilian sector. As regards skill-intensiveness in France, for instance, the share of engineers in the total industrial labour force in 1973 was 1.4 per cent, but as high as 7.9 per cent in the military aircraft and shipbuilding industries. For technicians, the corresponding ratio was 4.2 as against 19.8 per cent, and for skilled workers 25.6 as against 42.1 per cent. By contrast, the proportion of unskilled workers was 19.3 per cent in the total industrial workforce, but only 13.4 per cent in the arms industry.[25]

Second, heavy dependence on arms exports, which is justified politically on both economic and national security grounds. As one Western European political leader remarked: "The [national] armed forces would not have such modern equipment if [our] arms industry had to content itself with the domestic market."[26] Since this holds good for other countries as well, the natural corollary to such a dynamic arms export policy is its contribution to conflict and wars in the Third World. Most of the wars which have taken place there since the Second World War–estimated at over 130–have been fought with weapons supplied by the industrialised countries, including those of Western Europe.[27] The share of national arms production exported by Western European countries is about 50 per cent in the case of Italy, 30-35 per cent for France, 25 per cent for the United Kingdom and 20 per cent for the Federal Republic of Germany.[28]

Third, marked direct or indirect control by the State–the lion's share of the arms industry is actually state-owned[29]–and concentration in a few highly specialised branches of industry such as aerospace, electronics, machine-building, shipbuilding and metalworking. It is also dominated by larger companies: the 463 largest industrial groups in Western Europe with a turnover of more than DM 100 million in 1977 included 55 per cent of arms-producing companies in France, 50 per cent in the Federal Republic of Germany and 40 per cent in both the United Kingdom and Italy.[30] The concentration is, however, more pronounced than these figures suggest, since the bulk of arms production is in even fewer hands: the ten largest companies in each of the above four Western European countries command 37-39 per cent of the total arms production turnover.[31]

Finally, most companies in the arms industry have a diversified production mix: in 1977, out of the 18 largest arms producers in France only four, with a combined workforce of fewer than 60,000, worked exclusively on armaments; the corresponding figures for the United Kingdom were four out of the 25 largest arms producers, accounting for fewer than 40,000 employees; for the Federal Republic of Germany four (out of 30) with a workforce of about 4,000; and for Italy two (out of ten) with over 4,000 employees.[29]

The above situation has various implications for the problem of conversion. On the one hand, the fact that the State controls arms production and that the military-industrial complex exerts considerable influence on the economy may stiffen resistance against the redeployment of resources. On the other hand, given a progressive reduction of tensions and an end to the arms race, this same factor of central control and public ownership may facilitate conversion, especially as regards adapting facilities and equipment to civilian production and retraining some of the specialised labour force for civilian jobs.

We must bear in mind, however, that the prospects for conversion are of a long-term nature, stretching over an extended period of stepwise disarmament. Of immediate concern are plants threatened by employment redundancies, which would be natural first candidates for conversion. Such an approach would not neglect legitimate national defence requirements. Seen as part of an effort to restructure society and international relations within the context of disarmament, it might go hand-in-hand with an explicit shift in strategic concepts and thinking, from confrontation to low-profile defensive deterrence.[32] This would be less material-intensive and less costly. In such circumstances, much of the arms industry would become superfluous.

As an integral part of disarmament measures, conversion should have a salutary effect on Europe, both politically and economically. Given sufficient advance planning and political will, it should also be attainable without excessive difficulties. The rebuilding of Europe after the Second World War can serve as an example of what can be achieved by a concerted planned effort. True, circumstances differ today, since there is no war devastation to

repair and no deprivation in urgent need of remedy. All the same, the relatively orderly reconversion of the economy after the Second World War provides telling evidence of the feasibility of redeploying resources. In the United Kingdom alone about 7 million people were demobilised within 16 months and reabsorbed in productive work. What has been done on such a large scale before should certainly be possible in relation to the more modest numbers of employees involved in the arms industry today.

III. The wider perspective

Problems of conversion must be seen in the wider perspective of global transformation from a war economy and a conflict-ridden world towards enduring international peace, security, welfare and human development. Within this context, given its potential for redirecting development in the wake of disarmament, conversion could be a powerful force for relieving tension. Disarmament and development, both equally crucial to genuine peace, have been at the centre of international attention since the Second World War. Numerous plans have been conceived and a number of partial agreements concluded to further disarmament and promote development. Yet we have failed in both. The arms race continues unabated, the world is in the midst of a profound economic crisis, and the disparities between the industrialised and the developing countries are steadily growing.

If any lesson can be drawn from the above, it must be that armaments production and development are inherently incompatible. Development is irreconcilable with the annual expenditure on armaments of material resources at present roughly equivalent to the gross national income of the poorer half of the world's population.[33] No upswing in the global economy is possible without channelling at least part of the resources wasted on armaments to productive ends. Disarmament is essential to the social, economic and political restructuring of international society. In other words, it is a precondition for genuine development. To make disarmament work to the advantage of development must become the concern of mankind as a whole if economic decay and cataclysmic conflict are to be averted and a new, more just international economic and political order established.

Conversion should therefore not be viewed as a measure to shore up the war economy at critical junctures of falling employment or productivity. Although immediate intervention to alleviate crisis symptoms is essential, we must never lose sight of the general social, political and economic context.

How radical are the changes required for economic recovery and the restructuring of society and international relations? Conservative reformist approaches would counsel caution, with a preference for a step-by-step strategy that would not disturb existing socio-political balances and systems. Others may think differently, reasoning that little can be achieved without such fundamental changes as general and complete disarmament under effective international control–proclaimed as the ultimate objective by the

United Nations–and a style of development which, "besides the need for sustained economic growth, would involve the opportunity and responsibility for full participation in the economic and social processes and a universal share in its benefits as a result of profound economic and social changes in society".[34]

The need for structural reform is confirmed by studies based on the comparison of scenarios computed using a detailed input-output model of the world economy. Even with reduced rates of growth of military spending throughout the world accompanied by increased transfers of economic aid from rich to poor regions, the poorest regions would not make dramatic advances in their standards of living by the year 2000 in the absence of structural changes in their economies.[35]

Whatever the divergence of views on the scope of transformation needed, we must remain aware of the barriers to change. The centre of gravity again lies in the domain of disarmament. Without distinct advances in disarmament and a freeing of resources, conversion must necesssarily remain a chimerical goal.

Barriers to disarmament are largely inherent in the current dynamics of the arms race. This is not the place to go into the subject in detail. However, a general indication of the nature of some of the obstacles to disarmament may help to illustrate the magnitude of the problem.

Mention has already been made of the socio-political forces behind the armaments drive. These are generally identified with what former United States President Eisenhower termed, in his farewell address, the "military-industrial complex".[36] Four segments can be distinguished in this "web of special interests": the armed forces–in Eisenhower's words "rarely satisfied with the amounts allocated to them";[37] the armaments industry–always pressing "for even larger munitions expenditures";[38] the state executive bureaucracy, which relies on armaments as an instrument of policy and diplomacy;[39] and, last, but by no means least, the huge technological establishment involved in military R and D. On a global scale this encompasses half a million of the best-qualified scientists and engineers. It is this segment in particular which has developed vested interests against conversion. Public policy, in Eisenhower's words, is in danger of becoming "the captive of a scientific-technological élite".[36]

But apart from the "almost overpowering influence, . . . economic, political, even spiritual"[39] of the military-industrial-bureaucratic-technological complex in the councils of State and government, the arms race is powered by a technological momentum of its own, inherent in the operation of military R and D. Of special importance are the long gestation periods–ten to 15 years–required to invent, test and produce new weapon systems. This factor invests the armaments race with permanency irrespective of outside political processes and negotiations. Then comes the follow-on imperative–the inevitable urge to develop a defensive system to counteract each new offensive weapon, and vice versa. Finally there comes the

competitive thrust, stimulated by the secrecy surrounding armaments production, which leads to constant over-reaction in the arms race, i.e. responses out of proportion to real challenges. A Frankenstein-like spectre of destruction is being set in motion.[40]

If we do not come to grips with this phenomenon, bring the arms race under social and political control and initiate genuine disarmament measures, large-scale conversion may prove unattainable. Increased awareness of the barriers to disarmament and conversion, and of the dangers involved in allowing the arms race to run its course, should invest efforts at disarmament and conversion with determination and persistence. The stake is our future–indeed, with the nuclear cloud over our heads, the very survival of the human race.

IV. Challenge and opportunity

To halt and reverse the arms race–the drift towards nuclear catastrophe–is today the greatest challenge facing humanity. For some people it may seem like reaching for the unattainable. Yet in view of the unpredictable consequences of armaments escalation, resignation is no alternative. We must face the challenge with creative policies for change. Inherent in any predicament are both peril and opportunity. Disarmament offers immense opportunities not only for averting war but also for redeployment of resources and the betterment of the human condition. "We can state with some confidence", the United Nations study on the relationship between disarmament and development emphasises, "that the stock of useful knowledge and technology in the year 2000 will be immeasurably enlarged if we succeed in diverting to civilian ends a considerable fraction of the funds and manpower now programmed to work in the military field."[41]

In this context, educational efforts to make the arms race and the operation of the arms industry more clearly understood are particularly important. The first step towards change is to develop an understanding of our predicament, of the policies and structures that plunge us still deeper into the quagmire. Out of this understanding, both commitment and alternative policies for change can grow.

Problems of conversion are an intrinsic part of disarmament. They have their specific aspects which can be rationally discussed in economic and developmental terms. They can also be conceptualised on moral and value-based grounds.

Conversion is not a purely technical issue with solutions that lie exclusively in econometrics and organisational measures. Far more decisive is the socio-political context: human versus military needs; socially useful production versus barren waste; science and technology for human development versus their misuse for destructive purposes; and participatory and democratic working conditions versus hierarchical and authoritarian production structures. Like disarmament, and as its corollary, conversion is an

existential and spiritual historical necessity for the advancement of the human race. It is the way of the future, and as such needs careful preparation and planning. Inherent in the nature of modern technology is constant adaptation to change, and conversion is but one aspect of this vitally important transformation. However, planning for conversion has to go beyond technicalities, economic feasibility and alternative production. Reaching out for new human relations must be part and parcel of the plan.

Seen from this perspective, conversion research and planning would need to encompass two main areas: economic and technological aspects, and social theory and value-based philosophical aspects.

The first area of research and planning would rely on analysis of past experiences such as demobilisation and reconstruction following the Second World War; on actual cost-benefit calculations; on research into the utilisation of equipment, redeployment of military R and D and necessary retraining of the workforce; on identifying economic and social destinations for the use of resources now devoted to armaments; on alternative socially useful products; and on concrete projections–local, regional and national –for the redeployment of resources.[42]

The second field of conversion studies would require in-depth consideration of cultural and socio-political structural implications on the one hand and of preferable futures on the other.[43] The military implications involve such matters as security concepts, alternative defence, the role and organisation of the armaments industry, arms control and disarmament strategies, and schemes for the abolition of war. Parallel to this, in the realm of development, conversion studies go hand in hand with the search for alternative development models, with the emphasis on basic human needs versus consumerism and inequitable growth, and with development strategies geared to peace. In the socio-cultural sphere, conversion research would encompass value-compatibility studies, ethical approaches, and questions of autonomy, self-realisation, life-styles and social responsibility.

Conversion planning is part of our schemes for the future. It has not yet received the attention it deserves in public debate. Scholars, research institutes, trade unions, political parties and governments should be encouraged to take up the issue as a vital part of disarmament efforts and the quest for equitable human relations. As the United Nations study on the relationship between disarmament and development recommends:

> Preparation for conversion should be among the first steps on the road to disarmament. . . . Governments [should] create the necessary prerequisites, including preparations, and where appropriate, planning, to facilitate the conversion of resources freed by disarmament measures to civilian purposes, especially to meet urgent economic and social needs, in particular, in the developing countries. One might envisage, inter alia, the creation of a core of people within each country with a significant military establishment with knowledge and expertise on conversion issues; the development of contingency conversion plans by plants engaged in specialised military production; the broad involvement of all affected parties in conversion planning, including management, trade unions and national defence research institutes.[44]

Above all, conversion and redeployment of resources must not be perceived as a disagreeable necessity but as a challenging opportunity for beneficial change.

Notes

[1] S. Melman: *Barriers to conversion from military to civilian industry–in market, planned and developing economies*, Report prepared for the United Nations Group of Governmental Experts on the Relationship between Disarmament and Development (New York, 1980; mimeographed).

[2] Stockholm International Peace Research Institute: *World armaments and disarmament*, SIPRI Yearbook 1981 (Stockholm, London, Taylor and Francis, 1981), p. 7.

[3] *Economic and social consequences of the arms race and of military expenditures*, Updated report of the Secretary-General (New York, United Nations, 1978), chapters on "The arms race in terms of resources" and "The arms race and economic and social development". See also R. Huisken: "Armaments and development", in H. Tuomi and R. Väyrynen: *Militarization and arms production* (London, Croom Helm, 1983); and R. L. Sivard: *World military and social expenditures 1981* (Leesburg, Virginia, World Priorities, 1981), p. 17.

[4] R. de Grasse Jr. and D. Gold: "Military spending's damage to the economy", in *New York Times*, 29 Dec. 1981, p. A15.

[5] During the period 1960-80 military expenditures amounted to approximately 7 per cent of GNP in the United States, nearly 4 per cent in the Federal Republic of Germany and nearly 1 per cent in Japan; the corresponding annual rate of increase in manufacturing productivity was nearly 3 per cent in the United States, about 5 per cent in the Federal Republic of Germany and over 9 per cent in Japan. See R. L. Sivard: *World military and social expenditures 1982* (Leesburg, Virginia, World Priorities, 1982), p. 23.

[6] L. J. Dumas: "Disarmament and economy in advanced industrialized countries–The US and the USSR", in *Bulletin of Peace Proposals* (Oslo), Vol. 12, No. 1, 1981, pp. 1-10.

[7] S. Melman: "Inflation and unemployment as products of war economy", ibid., Vol. 9, No. 4, 1978; and R. L. Sivard: *World military and social expenditures 1980* (Leesburg, Virginia, World Priorities, 1980), pp. 14-16.

[8] International Metalworkers' Federation: *Metalworkers' unions and the armament industry*, An enquiry of the impact of armament production on employment (Geneva, 1979), p. 13.

[9] United Nations: *The relationship between disarmament and development*, Study Series 5 (New York, 1982), para. 215.

[10] ibid., para. 289.

[11] The numbers of jobs directly or indirectly created by the investment of $1,000 million in various sectors of the United States economy, as given in Bureau of Labor Statistics: *The structure of the US economy in 1980 and 1985* (Washington, n.d.), p. 110, are as follows: military production: 76,000; machinery production: 86,000; administration: 87,000; transport: 92,000; construction: 100,000; health: 139,000; education: 187,000.

[12] E. Yemin (ed.): *Workforce reductions in undertakings*. Policies and measures for the protection of redundant workers in seven industrialised market economy countries (Geneva, ILO, 1982).

[13] ILO: New forms of work organisation (Geneva, 1979), Vols. 1 and 2.

[14] See idem: *Workers' participation in decisions within undertakings* (Geneva, 1981).

[15] On the Lucas Aerospace initiative and similar action in Great Britain, see M. Kaldor: "Workers' initiatives for conversion: Reflections on British experiences", in P. Wallensteen: *Experiences in disarmament*, Department of Peace and Conflict Research, Report No. 19 (Uppsala University, 1978); also "Alternatives to military production and to unemployment", in *Development Dialogue* (Uppsala), No. 1, 1977, pp. 31-33.

[16] More details in D. Elliot: "The Lucas Aerospace Alternative Corporate Plan", in D. Smith (ed.): *Military spending and arms cuts*, Economic and industrial implications, alternative work for military industries (London, Richardson Institute for Conflict and Peace Research, 1977); see also I. Sachs, M. Rogalski and C. Yakubovich: *Réflexions sur les stratégies de reconversion des industries d'armement* (Paris, Ecole des études en sciences sociales, 1980), Ch. III: "L'expérience Lucas Aerospace".

[17] M. Kaldor: *The role of technology in industrial development*, Report prepared for the United Nations Group of Governmental Experts on the Relationship between Disarmament and Development (Brighton, 1980; mimeographed), p. 79.

[18] The resurgence of interest in conversion has led to the establishment in the United Kingdom of the Centre for Alternative and Industrial Technology Systems (CAITS) at the North East London Polytechnic; and in the Federal Republic of Germany IG Metall, Europe's largest union, has formed a special working party on armaments, technology and employment consisting of works council members from the most important armament companies.

[19] United Nations: *The relationship between disarmament and development*, op. cit., para. 301.

[20] D. Pelly: "Arms conversion and disarmament", in *Chronicle* (London, Dag Hammarskjöld Foundation), June 1982, p. 33.

[21] *World armaments and disarmament*, SIPRI Yearbook 1982 (Stockholm, London, Taylor and Francis, 1982), p. 176.

[22] ibid., p. 177.

[23] See "Ein Job für uns", in *Der Spiegel* (Hamburg), 24 Jan. 1983, pp. 107-109.

[24] M. Brzoska: "Economic problems of arms production in Western Europe–Diagnoses and alternatives", in Tuomi and Väyrynen, op. cit., p. 68.

[25] Sachs, Rogalski and Yakubovich, op. cit., p. 61.

[26] Quoted in J. Klein: "Arms sales, development, disarmament", in *Bulletin of Peace Proposals*, Vol. 14, No. 2, 1983.

[27] I. Kende: "Kriege nach 1945–eine empirische Untersuchung", in *Militärpolitik Dokumentation* (Frankfurt am Main), Heft 27, 6. Jahrgang 1982.

[28] M. Brzoska: "Third World arms control: Problems of verification", in *Bulletin of Peace Proposals*, Vol. 14, No. 2, 1983.

[29] Tuomi and Väyrynen, op. cit., pp. 300-306.

[30] Brzoska: "Economic problems . . .", op. cit., p. 70.

[31] ibid., p. 75.

[32] See B. V. A. Röling: "Feasibility of inoffensive deterrence", in *Bulletin of Peace Proposals*, Vol. 9, No. 4, 1978.

[33] According to *World development report* (Washington, World Bank, 1980), table 1, the "low-income countries", with a population of 1,293.9 million, had in 1978 an average per capita GNP of $200; in addition, China, with a population of 952.2 million, had an average GNP of $230. Thus the combined GNPs for a population of 2,186.1 million–over half of the world population in 1978–amounted to just under $478,000 million. At the same time world military expenditures were $439,953 million at 1978 prices and exchange rates (*World armaments and disarmament*, SIPRI Yearbook 1980 (Stockholm, London, Taylor and Francis, 1980), table 1A, p. 19). While the average GNP per capita may have risen in the meantime, so have military expenditures.

[34] United Nations: *The relationship between disarmament and development*, op. cit., para. 399.

[35] See F. Duchin: *How much development can disarmament buy?* (New York University, 1982).

[36] See *Department of State Bulletin* (Washington), 6 Feb. 1961.

[37] D. D. Eisenhower: *Waging peace, 1956-1961* (New York, Doubleday & Co., 1965), p. 615.

[38] See B. M. Blechman, S. Kaplan et al.: *Force without war.* U.S. armed forces as a political instrument (Washington, Brookings Institution, 1978); and S. Kaplan et al.: *Diplomacy of power.* Soviet armed forces as a political instrument (Washington, Brookings Institution, 1981).

[39] Eisenhower, op. cit., pp. 615-616.

[40] See M. Thee: "Military research and development: Impact on society", in Kåre Berg and Knut Erik Tranøy (eds.): *Research ethics* (New York, Allan R. Liss, Inc., 1983).

[41] United Nations: *The relationship between disarmament and development*, op. cit., para. 152.

[42] See N. P. Gleditsch, O. Bjerkholt, A. Cappelen and K. Moum: "The economic effects of conversion: A case study of Norway", in Tuomi and Väyrynen, op. cit., pp. 225-258.

[43] See Jan Øberg: "Is the conversion idea to be converted?", ibid., pp. 289-299.

[44] United Nations: *The relationship between disarmament and development*, op. cit., recommendation 5, p. 168.