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TECHNOLOGICAL SWARAJYA

RESEARCH FOR INDUSTRY

P. C. Mehta

ANNUAL COUNCIL MEETING OF ASWI

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Baldev Singh

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Founder President: LATE SHRI JAWAHARLAL NEHRU

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EDITORIAL

TECHNOLOGICAL SWARAJYA

"Operating a steel mill or a chemical plant set up by foreign assistance hardly made the country an advanced and industrialised nation, any more than using a car or flying an aeroplane purchased from abroad. It is only when India has acquired the ability to design, fabricate and erect its own plants without foreign assistance will it have become a truly advanced and industrialised country, and for this a much greater development of Science and Technology is still necessary. We want one who will design machines and improve them. There must be creativeness."

—Jawaharlal Nehru

THE recent warning by Shri M. C. Chagla, Union Minister of Education, that while the country has attained political independence, it has yet to attain technological independence—and that the country's industrial and planning policies are not taking it in that direction—has come not a day too soon. A situation is fast developing in which whereas a number of factories and industries would have come up—these would be completely dependent on foreign equipment, design, engineering and know-how. Under the collaborative agreements they will have to look to their foreign collaborators for all future research developments and improvement. Under the terms, 'third parties' will be kept out and hence the Indian scientific and technological research institutions will be excluded from any technical contact with these industries. There would be no possibility of associating indigenous research and technology with industrial development in any manner, since the foreign collaborators would not agree to this. In fact, the 'benefit' of research of the foreign partner would be continuously passed on to the indigenous firm who would thus be kept perpetually dependent, definitely a few steps behind, and out of competition with the parent concern abroad.

A more recent development is that the Indian entrepreneur under export incentive, promotion and other schemes undertakes to sell part of the production to countries in the Middle and South East Asia and Africa—the comparatively less developed of the developing nations. He thus plays the junior par ner and salesman to the collaboration in the newer markets. This would thus build up a chain—like the 'trained elephants' being used to 'capture' wild o es in the Khedda operation.

A picture is emerging wherein fresh foreign collaboration will have to be sought for every new unit to be set up and the market will be flooded with foreign brands selling through Indian collaboration. A comparatively simple item like mild steel welding electrodes, is being manufactured under licence from 13 foreign collaborating parties. If ever a new unit is to be set up it will necessitate bringing in the 14th collaboration. This position obtains in almost all the major and most of the minor industries. Let it be noted that the government departments responsible for planning and development do not appear to consider it a part of their responsibility to remedy this situation.

On the contrary, the Regional Research Laboratory, Jorhat, which took the initiative in developing the process and design know-how in the fields of cement and paper are being discouraged. It is argued that since licences for manufacture had been issued, no research or development was necessary. The foreign collaboration could provide all the data for the present and for the future and to develop indigenous process or design know-how would be a waste of the country's meagre resources. The indigenous TV project is reported to be in difficulties since foreign exchange for essential components was not made available. At the same time responsible Ministers are signing agreements to purchase TV receivers from Hungary, Yugoslavia, U.A.R. and other countries.

This is not the way to build independent India of Jawaharlal's dreams. It is significant that he visualised a further strengthening of indigenous science and technology. He clearly indicated that till the country develops its own design, engineering and manufacturing potential, it cannot be considered advanced and industrialised in the real sense. For this purpose some urgent measures ought to be taken and these should engage the attention of authorities at the highest level and more particularly of the Scientific Advisory Committee to the Cabinet:

1. A technical committee of the concerned scientific and technological and planning departments should assess the need of import of know-how and simultaneously work out measures for developing indigenous process, design and engineering know-how, so that the country becomes progressively self-dependent.
2. Wherever possible process know-how, design and engineering should be purchased on outright basis and provided on licence basis to interested parties by an appropriate government agency.
3. Scientific research and technological institutes should have access to technological information and should be associated with industry set up with foreign collaboration for further development and improvement.
4. Science & Technology in India should be given massive financial and organisational support to develop indigenous process and design know-how upto the manufacturing level stage. Risk capital should be provided to enable it to put up manufacturing units in collaboration with indigenous industries.

Political and economic independence are inseparable. In the present age, political freedom would be illusory unless it rests on a sound economic base. The latter can only be developed by building an industrial, agricultural and defence potential dependent on indigenous science and technology and know-how. Interflow of knowledge and technology between nations are important—but excessive dependence can involve a grave risk to the country's economy and defence. In our case, the position is almost of pathetic dependence on foreign know-how. Unless urgent measures are taken to provide resources in the direction of generating our own know-how and lessening the country's dependence, this great and ancient nation would be in the danger of being reduced to the position of salesman of foreign processes and products. "Technological Swarajya" is an inescapable necessity to sustain our economic and political independence.

RESEARCH FOR INDUSTRY

P. C. MEHTA
The Ahmedabad Textile Industry's Research Association

Clarification of Objectives

THE contribution of scientific research in India to the country's progress and welfare has received considerable attention recently and been often criticised in Parliament and the Press. The Council of Scientific and Industrial Research (CSIR), too has been conscious of the public criticism of Indian research and has periodically invited distinguished scientists and administrators to review, as a committee, our research organisation, policy and contribution in an overall national perspective. The last such committee has just submitted its report.

In any review of evaluation of our research effort, it would be worthwhile if we clearly define what we expect from it; in other words, what are the objectives of our research policy and organisation. Scientific research can be undertaken for and can accomplish a variety of purposes. For example, it can stimulate intellectual curiosity about the mysteries of nature and lead to an increase of our understanding of natural materials and phenomena.

Discipline

Also, by inculcating the discipline of logic in thinking and of objective analysis of data and by encouraging a depth of knowledge in specialised fields, research helps to train people in qualities which are important in industry or management.

Finally, research can also have, as its objective, technological and industrial development and, through it, the economic betterment of the country.

With so many different ways of looking at research and of assessing its contribution, it is no wonder that, at times, some of our scientists feel hurt at what they consider a lack of appreciation in the country of their devoted and sincere work. For, it is generally accepted that, since the setting up of the chain of our national research laboratories from 1947 onwards, Indian scientists have contributed substantially, through hundreds of learned papers in internationally reputed scientific journals, to the advancement of scientific knowledge and thinking. In the same way, these laboratories have steadily provided technical manpower to our newly growing industries.

Criteria

But the public does not use these criteria of intangible though important benefits to evaluate the "success" of our research. It uses the yardstick of the direct contribution of Indian research to economic betterment of the country. If this is the primary objective of the research effort in our national research establishments, it would be valuable to state it as a national research policy in clear and unambiguous terms so that each research organisation would have no misunderstanding about the yardstick that would be used to evaluate its work. Most people, including scientists, would agree that in a poor and developing country like ours,

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the aim of organised research should be economic betterment of the nation. This article assumes that this is so.

For the sake of convenience and clarity, it would then be useful to classify research as follows, according to its objectives.

(1) Basic pure research, which is primarily aimed at developing scientific thinking, and knowledge of research techniques in young scientists, contributing to knowledge **per se** and providing the country with a trained body of research workers in different fields. This would appear admirably to be the function of universities and of the various schools of advanced research set up recently through Government grants.

(2) Applied research, which has the objective of developing new technology or improving existing technology.

(3) Basic, objective research which provides a continuous supply of fundamental knowledge to applied research, so that the latter does not stagnate but keeps on growing to new and ever-widening horizons.

The last two should be the primary objectives of the various organisations set up exclusively for research and financed wholely or partly by the Government.

One must realise that the concepts, planning, conduct and evaluation of research are quite different for objective (1) as compared to (2) and (3). The choice of research projects for the latter must be clearly related to their economic and technological value and evaluation of their success must therefore be in terms of these pre-defined goals.

Novelty

Novelty of research result, by itself, is of little value unless it can be made use of towards the economic objective of the project. Indeed, often such projects may use knowledge already available in scientific literature and apply it for the improvement of a particular technology or industry.

In other words, originality of research **per se** is of secondary importance compared to the originality of applying knowledge, obtained either by one's self or by others, towards technological innovation.

Accepting that the ultimate aim of research is economic and industrial progress, there are important differences of opinion, often sharply divided, about the best method of organising research to achieve that objective. Many scientists are convinced that sufficient growth of the so-called fundamental basic pure research with absolute freedom to the individual scientist in the choice of his work is bound to show, in the long run, results of economic value.

They question how one can define what one is looking for even before the start of research when the very definition of research is to look into the unknown. In support of their point of view, they point to the number of major technological developments that have taken place during the last century from basic pure research which started only to satisfy the intellectual curiosity of a scientist, without any pre-conceived goals of utilisation.

Examples

The protagonists of applied research counter these arguments by pointing out that it was the applied research scientist who saw the economic value of such results of basic pure research and, starting off from the result, developed it into a commercial, technological product or process.

They cite several examples, some from our own research in India, when the technological value of a research result, was not appreciated and lost to the country because of the absence of scientists with the applied research outlook. They also quote numerous examples of equally important technological developments that have resulted from applied research, planned with clearly defined goals set with reference to specific economic needs.

If one looks at the research organisations of large industrial companies in the industrially advanced countries, one can see that research is planned and organised using essentially a business concept. In other words, the main job of the Research Director is to weigh the investment on a research project against the magnitude of its economic value and the probability that this value can be accomplished successfully.

In his overall planning, he may thus use a combination of direct application of existing knowledge together with applied and related basic research and may also encourage the rare outstanding scientist to pursue basic pure research according to the latter's own choice — all weighed carefully against the total unmistakably economic objectives of his research organisation.

Coming back to the Indian scene, let us see to what extent our research effort needs a reorientation to meet its objective more effectively and what problems exist in such a process. In the first place, it is important to remember that research is almost exclusively undertaken today in India by Governmental support, financed from the public exchequer. Even the incentive of some tax benefits on research expenditure has not promoted the growth of research by industry directly within its own units.

There are possibly several reasons for this lack of interest in research. Perhaps the most important one is that, under the highly protected conditions existing in India now, most industries are operating in a seller's market. They make profits and often substantial ones even if they continue their production policies without significant changes.

The main function of industrial research is to diversify production by discovering new products, to cut costs by improved processes or by increasing rate of production, and to improve quality. In the absence of internal competition due to the existence of a large unsatiated demand for virtually every commodity, and of external competition due to the artificial insulation of our industry through import restrictions, there is really no compelling need for our industry to use research for profitability. It may not be entirely a coincidence that the only industries in India which finance research, even to a small extent, are the major exporting industries, viz., cotton, jute and tea.

The incentive for earning more profits by applying research is also considerably dampened by the high incidence of corporate and individual taxation. Furthermore, in many commodities, excise or other forms of taxes are so high that reduction in cost of production may have only a marginal effect, if at all, on the sale price of that commodity.

Mr. J. R. D. Tata gave some interesting data in his annual report to the shareholders of TELCO last year. He said that between 1949 to 1964, the cost of production of a Tata-Mercedes truck had gone down by Rs. 355 due to improved production methods in spite of increasing labour, raw material and other costs. However, in the same period Government taxes had gone up by Rs. 6,780, and the cost of imported materials and components by Rs. 739, so that to the consumer the truck costs Rs. 37,619 today as against Rs. 30,455 in 1959.

In the absence of competition and under conditions where increase in profitability through technological improvements is substantially restricted by present taxation policies, the lack of interest in research by industry is perhaps not surprising. In the general atmosphere of apathy, the limited contribution of our research to the country's industrial development undoubtedly further retards the acceptance by industry of research as a financially worthwhile investment.

We can expect that these conditions will continue to exist because of our broader national problems and objectives. Therefore, support to research will have to continue as a responsibility of the Government. Though this raises some problems, this situation is not so unique in developing countries like India, as we seem to think.

Even in highly developed countries like the U.S., the Government finances, both in its own laboratories and in private industry, a substantial proportion (51 per cent in the U.S., 60 per cent in the U.K.) of the total research effort of the country. The significant difference is that in India not only is research financed almost totally by Government, but it is also entirely conducted by organisations which are semi-governmental such as CSIR, the Indian Council of Agricultural Research, and so on. This last factor has important consequences.

EVOLUTION OF A NATIONAL POLICY

It may be useful to classify industrial research into its three stages and then discuss the problems involved at each stage because of the particular organisational set-up for research that we have. The three important stages are: (i) Selection and planning of research projects, (ii) Execution of the research project, with periodical evaluation of results in a critical and realistic manner, and (iii) Communication of important results to industry.

Obviously this is the most important phase for successful industrial research. Research is gnerally a slow and expensive business, which yields results over a period of years. The choice of a wrong project with vague objectives can mean a waste of so much money, and, what is more important, so much talented manpower.

It would appear that research directed towards a better and more effective utilisation of our raw materials should be economically an important objective. This may be in terms of developing new products, substitution of imported products or adaptation of existing technology to use our raw materials. Some examples of the value of such research are already well-known. Research on bagasse and bamboo pulp for use in the paper industry, on the development of superior strains of Indian cottons to partially replace imported cottons and developing necessary modifications in existing metallurgical technology to utilise our low grade coals and iron ore are typical illustrations of such research which has given handsome financial returns.

Requirement

A necessary requirement for planning such research is adequate information about raw material availability in the country and of the estimated future demands of various commodities in the country. While the Government has considerably increased its efforts in the survey of our natural and industrial products, the information available is still not as detailed and extensive as one would wish.

A similar situation exists about import statistics also. The present, import classifications are based on customs duty requirements and have little relation to the need to develop indigenous substitutes. A more detailed and acurate classification would certainly help to relate availability of Indian raw materials which could possibly replace, with modifications if necessary, imported commodities.

The situation with respect to demand statistics is even less satisfactory. We have practically no market, research, either privately or publicily supported. All that we know are the very broad estimates made by the Planning Commission of requirements of different categories of basic and consumer commodities. This information, again, is not sufficiently detailed for effective planning of research. Information about our Plan targets and problem areas involved in fulfilling these targets should be widely disseminated amongst all our research scientists, at least those at the policy-making levels.

National Line

There appears to be a need for a National Research Policy, which would collate expected demand with available material resources and on that basis assign specific areas for research and development to the appropriate research organisations. Outstanding examples of such planning at a national level are the development, during the war years, of synthetic fibres, rubber and petroleum, due to either non-availability of the natural products as in Germany, or insufficiency of natural materials to meet the expected demand, in quantity or in kind, as in the Allied countries.

A question which is often asked is whether our expenditure of foreign exchange is importing technical know-how is justified when we already have so many research organisations. On a closer analysis, this question seems to be more important emotionally than economically.

Firstly, the total foreign exchange spent on imported know how is only Rs. 10 crores out of a total foreign exchange expenditure of about Rs. 400 crores per year.

Secondly, it is unlikely—and also unreasonable to expect—that an industrialist would risk a large investment in a new and untried process merely because our own research organisations have developed it when it is already a well-established technology in another country.

Lastly, it may be a consolation to such critics to know that even the industrially very advanced countries, with research expenditure several times as large as ours, continuously import technical know-how.

It may, therefore, be expedient for a rapid development of the country's Industry to import necessary know-how than to spend our meagre research funds on developing alternative processes for those which are already well tried out and successfully established elsewhere.

Having done this, the important thing would be not to have this one-sided dependence for ever, but to relate our own research towards expansion and improvements in the imported technology so that a time may come when we can export as well as import know-how.

Any planning of an overall research policy of this kind must be done jointly with industry's representatives. Effective participation by industry right from the stage of formulation of policy would have several important advantages. The plans, in the first place, are likely to be more realistically related to industry's needs, present and future, as the latter sees them.

Also, the feeling of participation at the policy-making level is likely to encourage industry to take more interest in research, help it to appreciate the problems involved in planning of research and finally make acceptance of research results by industry an easier task.

Participation

Participation of the type envisaged here has to be carefully sought. It is not necessarily enough merely to have a few prominent industrialists on committees. Very often, such people may not be able to spare enough time to make effective and studied contribution to the problem. It may be necessary to explain the problem and emphasise its magnitude through briefing notes suitable for study at such senior management level. Sufficient time should be given to them for advance preparation before attending meetings.

Participation from industry in policy-making need not be restricted to membership of committees. Scientist or technologist member(s) of the committee could also individually meet other senior management representatives of different industries to get a fair picture of what industry sees as its direction and problems of future development.

Another difficulty which is likely to arise, at least in some industries is the inability of even industry's representatives to foresee the trend of future developments and needs of their Industry, which is vital for research planning. This inability may be partly due to the absence of adequate market research data and also to an unfamiliarity with research planning.

The scientist may be able to help by defining a list of development problems that he considers worthwhile and place these before industry's representatives for a discussion and assignment of priorities. In spite of the many difficulties involved and the possibility that the contribution of industry to thinking and planning its own future may initially be limited, it is essential to make industry an important partner in formulating the national research policy.

The concept of research planning as envisaged here may cause fears and reservations, especially in the research organisations, that they would have to surrender the control and direction of their organisations to an external body. Just as planning at a national level is accepted as a necessity for a rapid and balanced industrial development of the country, so would it seem worth-while to plan the allocation of research funds and facilities on the basis of a national plan. To that extent, individual research organisations do surrender their control over their programme of research. In utilisation research, the users must have a say in determining the relative importance of different development needs as they see them.

Broad Fields

However, these fears need not be exaggerated. In the first place, such a National Research Plan can only define broad fields of development and research, most of which are bound to be within the interests and specialisations of individual research organisations.

Secondly, such a reorientation of our research effort can, and should, take place only gradually so that, say, in three to five years, 25 to 40 per cent of the resources of each research organisation may be allotted for the National Research Plan. That should give enough time to allay undue fears and to work out suitable relations, which would meet the desired objectives without stifling the scientist's initiative.

Arising out of the very concept of planned research, there are other problems, too, related to the research scientist. It is, generally accepted that he should have sufficient freedom to choose his work, if one wishes to nurture his creativity. Such individual freedom would seem to be incompatible with planned research.

This conflict is not impossible to resolve, provided the research plans define broad areas and goals and do not dictate how the scientist must pursue these objectives. It is well known that this was done extensively during the Second World War, when hundreds of scientists worked in teams towards set goals.

In undertaking objective oriented research in a big way, some of our scientists may also have to remould their attitudes and values. Often one comes across the belief that industrial research must be empirical and lack precision and sophistication.

On the other hand, fundamental research seems to be given a higher status merely because it is called fundamental, and is supposed to be more "scientific" and requiring greater intellectual and experimental abilities.

Vast Scope

Neither of these beliefs is necessarily true. One can have first-rate industrial research just as one can have fourth-rate fundamental research. If our definition of industrial research covers applied as well as basic objective research, it should offer plenty of scope to satisfy the creative urge in research scientists with either a theoretical or an applied bent of mind.

From the broad directives of the National Research Policy, each research organisation would naturally have to define and plan detailed research projects to fulfil the objectives laid down for it in the Policy. In many projects of this type, the Project group concept of organisation is more rewarding than the Divisional concept, commonly found in our research organisations.

Industrial problems are rarely restricted to one field of scientific discipline such as physics, chemistry or mathematics. Almost invariably, they require a combination of various kinds of specialised knowledge and skills. Therefore, it is better, right from the beginning to look at the problems in its multi-disciplined totality and plan for a project staff which can contribute all the required skills to the research.

Such project plans include estimates of time and expenditure and state the objective, economic or academic, of the project. An appropriate priority is assigned to the Project on this basis. Against this background, the progress in each project has to be critically reviewed periodically, say once or twice a year.

Purpose

The purpose of this review is mainly to advise and guide the Project leader in terms of the broad direction of the project and of the necessity for shifts in emphasis that may be required from time to time, and to decide if the laboratory results are sufficiently promising to warrant pilot plant trials.

Such reviews may also recommend axing of a project, in part or full, if the approach planned originally has proved to be unfruitful. This weeding out of unpromising lines of work should be done without feelings getting ruffled. The discontinuance of a project or a part of it is no reflection on the ability with which a Project leader has guided and conducted the research and should therefore not involve questions of personal feelings.

Throughout the progress of a project, from planning onwards, the concept of a Project Re-viewing Committees can be very useful. The Committee can consist of industry's representatives, both scientist-technologist and policy-makers, and research scientists from within or outside the organisation.

To be effective, such committees should be small, and members must be carefully chosen on the basis of their first-hand knowledge of the field and the contribution they can make to the conception of the project.

It may be difficult perhaps to find enough such persons in the beginning. However, if one did not restrict oneself to senior and better known persons, the problem may not be very acute.

There is also the danger that meetings of such committees may be reduced to merely information giving by the Project leader without his getting substantial contribution, in return, from the Committee.

In spite of these possible limitations, which one hopes would be temporary, such committees would still fulfil two very worthwhile objectives—namely, participation of industry in research all the way and a continuous two-way education of the industrial manager/technologist and the research scientist in one another's ways of looking at problems. Technologists and managers of industry often complain that the scientist in the laboratory is unaware of their problems and, at times, is even unwilling to consider them as important.

For effective working, the administrative procedures pertaining to men and equipment in our research organisations need a fresh outlook. Procedures which may be suitable for maintenance of law and order in the district and other responsibilities in the Government of a country can certainly not be applied to problems of industry or research.

It is unthinkable that the Director of a research laboratory, entrusted with the responsibility of organising the work of hundreds of scientists and an annual budget of millions of rupees should not have the authority to appoint, promote or dismiss staff even at junior levels.

The constant and probably exaggerated fear of nepotism and the consequent substitution of the chief executive's and direct supervisor's judgement by a half-hour interview before a distant, non-specialist committee lends only to a situation in which good, quick decisions about personnel are difficult to put in practice and in which no one is accountable for any bad decisions that may have been taken.

It would be far better to have a budgetary and performance control than to mercilessly fetter the organisation's internal executive authority. Excepting at the very senior levels, for which the Director may have an external staff committee, the selection, promotion and other personnel matters concerning his staff should be within his authority.

Vital Phase

The ability and performance of a research worker can be evaluated just as well as that of a worker in any other profession. As in the case of men, unimaginative and inflexible application of rules to supplies of materials and equipment for research can also lead to a feeling of frustration and exasperation in the research staff. CSIR has been aware of these problems and major administrative reforms are being introduced to eliminate many of these.

This is the final and vital phase in the successful utilisation of industrial research. By temperament and training, most scientists are averse to the idea of publicity of their work, except to convey their work to their colleagues through publications in scientific journals. Valuable as this is, it is not effective for the purpose of utilisation of research.

Effective communaiction implies that the information is conveyed to the users through media which can reach them and in a language which they can readily understand. Communication of the same research may have to be done in several forms depending on whether it is addressed to management, technologist or fellow-scientist.

This is, however, easier said than done. There are many problems in organising effective communication of scientific research. In the first place, the scientist who carried out the research may not be the best person to write his work in the language of the user. Some journalistic ability is needed to translate scientific language into words of common usage, without losing or disturbing its significance. But we do not have many journalists with a scientific background or scientists with a journalistic aptitude to do this type of work.

Closer Liaison

If a scientist has only to report about other people's research without doing any research himself, he is likely to be frustrated soon, unless he has a special liking and aptitude for such work. To communicate effectively, at various levels, research on diverse subjects and critically compare it with existing technology needs not only journalistic ability but a width and depth of knowledge similar to a Prof. Ritchie Calder. Where are such people in India ?

To increase the impact of the written word as well as to reach large and scattered audiences, better use needs to be made of mass communication methods and audio-visual aids.

Rarely, if ever, have our broadcasting and information services talked to the public through the radio or documentary film, about our research effort and its accomplishments, howsoever limited they may be.

These media deserve particular consideration when the object is either to arouse public awareness or to reach a large user audience all over the country as in the case of agricultural and veterinary research. A closer liaison between the two Ministries concerned should produce quick and effective results.

NOTES AND COMMENTS

The "Amrita Bazar Patrika" of January 10, 1965 while reporting the Bhatnagar awards to be presented to distinguished scientists on January 14, 1965 by the Union Education Minister, Shri M.C. Chagla, gives the headline "Bhatnagar awards for Bengali scientists". One wonders whether Amrita Bazar Partrika would like only to highlight the fact that among the recipients of awards, two were from Bengal and not deal with Bhatnagar awards as indicated in the achievements of the scientists in the country as such. This type of regional approach appears to be completely out of date with the spirit of science and one can only hope that in the days to come the Amrita Bazar Patrika would bring to bear a wider and more universal approach to science and its problems which would be in keeping with the true spirit of science. In the meantime one would not but conclude that the opinions expressed by Amrita Bazar Patrika would always reflect a narrow viewpoint cramped by provincial considerations.

* * *

Krishnamachari's Begging Bowl to Western World

Commerce & Industry comments on the forthcoming trip of Mr. Krishnamachari to Western World:

"Finance Minister, T. T. Krishnamachari, is now scheduled to go round the Western capitals in search of aid for the Fourth Plan.

"Currently in New Delhi, our Ambassador to Washington, B.K. Nehru who is struggling against possible induction into the Planning Commission is reported to have told the highest of the high in Government not to take for granted foreign aid as an essential element, to the degree envisaged, for the Fourth Plan.

"It is tragic that Vijayalakshmi Pandit, our Ambassador in Washington at the time of President Truman and his Point Four Programme, and B.K. Nehru — both who were the principal agents for the country under Jawaharlal Nehru— have today, that is after Jawaharlal's death, felt called upon to advise us not to depend on foreign aid.

"Traditionally, a Brahmin has a right to beg with the incantation 'bhavati bikshan dehi' (Mother, give me alms), but the modern Brahmin our Finance Minister happens to be, in advance of going on his quest for the holy grail of foreign aid, he can only shout to Parliament that he can only show the aid-giving donkey the carrot of inducement, but that he cannot compel him to eat it !

"This apart, what is the roster of our foreign debt obligations ? The following, in round figures, is the record to date:

(1) Our emortization and repayment obligations between 1960-61 to 1964-65 are of the order of Rs. 470 crores, rising progressively every year from Rs. 50 crores to Rs. 140 crores last year. It is estimated, under the Fourth Plan, about Rs. 1,200 crores will be the total load for amortization and repayment. So far, under the Third Plan, we could not meet our obligations but obtained postponement, or tried to pay by taking further loan.

"(2) Upto the moment, more than Rs. 5,000 crores have been borrowed from the outside world, and the Fourth Plan period would almost double this amount.

"(3) American loans provide for full repayment in some cases after 40 years, whereas the U.K. loans are for 25 years, while the Soviet loans are limited to 12 years in other words, even beyond the second generation from now, there will be transference of present burden of improvidence on to the shoulders of future generations.

"Our non-developmental expenditure, which was about Rs. 500 crores in 1950-51, has in 1963-64 shot up to more than Rs. 1,600 crores in a year. What a dismal picture of our national bankruptcy in terms of the need for proper utilisation of monies and of giving an audit of performance, which is reasonably satisfactory ?

"It is time that our friends in both the blocs are made to realise that, apart from these obligations in loan or aid giving, there is also the almost inexhaustible source of supply, still awaiting proper accounting, of grants and gifts which are already in the region of Rs. 700 crores.

"No one in this country would like to cut his nose to spite his own face. But somebody must stand up and declare without equivocation that the people do not wish to subsidise and endorse governmental improvidence, maladministration, misfeasance and worse.

"This in what we have been attempting to do all these years, and also are doing today".

(*Commerce & Industry*, 1965, April 14, p.3)

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India's Economy at Cross Roads

Professor V. I. Pavlov, a Soviet expert on Indian economy, said that India's economic development had reached the "historical cross roads" posing various problems.

Mr. Pavlov is currently touring India as a guest of the Government of India to make a first-hand study of some of the country's vital economic problems.

Speaking to pressmen, the Soviet professor said that if the present trend of monopoly tendencies became victorious, it would be extremely harmful for India's all-round development.

But such a course of development did not appear to him to be inevitable. On the contrary, the alternative course of economic development which would check the growth of monopoly seemed to him brighter.

"This could be achieved," he said, "not by the distribution of poverty, but by the proper distribution among all strata of society, the fruits of high productivity and the distribution of national income either in cash form or in the form of equipment according to optimum effectiveness."

Underlining the fact that the gap between the productivity of the large scale manufacturing industry and the small-scale industry had increased in the past one and half decade and according to Indian scientists which might be more widened in future, Prof. Pavlov suggested that modern improved equipment and tools of production should be made available in larger quantities to small-scale industry for narrowing the gap. He felt that rapid development of small-scale industry could be achieved through industrial co-operatives.

(*Economic Times*: 1965, April 14, p. 1 v).

* * *

Know-How for Steel Plants

Mr. N. Sanjiva Reddy, Union Minister for Steel and Mines, said at Bilaspur recently that during the Fifth Plan period the country would be able to supply 80% of equipment and 90% of technical know-how required in the construction of India's steel plants.

Inaugurating the Rs. five lakh industrial estate, Mr. Reddy said in the case of the Bhilai steel plant 90% of equipment had been imported while during the construction of the fourth public sector steel plant at Bokaro, the percentage would be 60.

Mr. Reddy said that alumina plant being set up at Korba, with Hungarian aid would be producing in the first stage—within four years' period—alumina and would take up the production of aluminium in the second stage.

Later addressing the concluding session of the three-day session of the Madhya Pradesh cooperative conference, Mr. Reddy suggested that major industries should be launched in the cooperative sector as the country's resources could not be allowed to be in the hands of capitalists.

He added he was not against capitalists setting up industries but what was essential was the people's participation in the economic advancement of the country. This was possible through the extension of the co-operative movement to the industrial sector.

(*Financial Express*, 1965, April 19, p. 5 viii)

* * *

Greater Use of Technologists Demanded: Change in Pattern of Administration Urged

Though India has gained political freedom 17 years ago, technologists believed that there was still "no technical freedom" for them to serve the country.

This and similar observation by Col. S.K.S. Mudaliar, President of the Institution of Surveyors, prompted, Mr. M. C. Chagla, Union Education Minister, to say that the Government could perhaps get a little more progressive and avail itself of the services of specialists."

At the annual convention of the Institution which Mr. Chagla inaugurated Col. Mudaliar lashed out at "layman administrators" who were alright for the pre-independence days but were today hindering progress by standing between technical men and Ministers.

Claiming the support of the "Institution of Engineers and all professional men" for his views, Col. Mudaliar said: "We consider that the present secretarial administration results in the violation of human dignity"—dignity of the elected member and Minister, of the "layman administrator" and of the professional man.

The system led to delays and hindered the speedy execution of projects dealing with defence, security and development. "The professional man, even at the highest level, is not in a position to formulate and execute the project speedily and economically, due to the restrictions placed upon his initiative".

Though the country had achieved political freedom 17 years ago, "we the technologists believe that there is no technical freedom, to serve the nation effectively. We appeal to those who hold high offices of this great country in the name of justice and in the name of generations to come to give the proper place to professional men and thereby accelerate the pace of development and progress", Col. Mudaliar said.

(*Statesman*, 1965, April 10, p.1 vii).

FRANKLY SPEAKING

'LESSONS OF THE KICHLU EPISODE'

The Kichlu affair has had its run of the press and the parliament — culminating in the publication of his secret and confidential correspondence with the CSIR authorities.

By the time these lines are in print, dust would have settled on this controversy and a calm appraisal of the underlying issues should now be possible. Whatever the merits of the controversy, one would agree with Smt. Renu Chakravarty, M.P., that it has left a bad taste. It is our hope that under the stewardship of the new Director, Prof. A. R. Varma, a young and able physicist, the laboratory would build up an *esprit de corps* and win for itself laurels of achievement in academic and industrial research. Some good would have come out of this controversy if right conclusions were drawn to serve as a guide for future.

Development of Leadership in Research Institutes

Dr. K. S. Krishnan, F.R.S. was the first Director of NPL and continued in that august position till his death in June, 1961. In his later years he had suffered a serious heart attack and was in poor health. Immediately after his death, came the deluge. Charges of equipment lying idle, crates of disposals-stores lying unopened, too much theoretical and poor scientific work were made against the institute—much to the embarrassment of the NPL scientists.

The question arises as to whether any effort was made during Krishnan's time to build up research leadership in the laboratory? In the absence of a strong second line of research leadership, the laboratory drifted from one difficulty to another. What are our research institutes doing to encourage younger scientists to develop in them the qualities which are a combination of scientific ability and institutional responsibility? Is the devolution of authority and responsibility practised at lower levels or does it stop with enhanced powers to the heads of the institutes?

Selection to the Posts of Head of Institutes

Unless one accepts the theory put forward by some journals that it was a case of extra-scientific pressures, one wonders as to the basis for the selection to this high post of Dr. Kichlu. The fact that he had hardly made any worthwhile research contribution during the last decade and his difficult temperament (it is significant that in the published correspondence his Delhi University colleagues have left his letter unanswered) could not have been unknown to the eminent scientists who voted his selection. Subsequent events have proved the choice to be unfortunate.

The research organisations should definitely discard the policy appointing old and retired scientists to head their institutions. Scientific, administrative, organisational and multifarious other problems particularly when the research institutes are called upon to play a dynamic role in the country's development, would tax hard the energies even of younger men. It would hardly be fair to the institutions or the scientists therein to give them leadership wanting in vitality and dynamism.

Basic Policies and Institutional Discipline

Dr. Kichlu's appointment was made as Director of the Applied Wing of NPL (and not the entire NPL) in pursuance of Prof. Blackett's recommendations that the NPL should function as applied research centre and centre for advanced research in fundamental physics. Whatever the merit of this arrangement, in taking up his appointment Dr. Kichlu accepted the basic principles of the Blackett Report. If he had any reservations, it would have been more honest not to accept his appointment as Director of the applied wing of the laboratory.

However, the learned Professor lost no time in extending his occupation to the research centre for advanced physics, and manoeuvering himself into the position of Director, NPL. A question arises as to why the CSIR authorities did not intervene effectively when the Director was acting in violation of the accepted policies.

If these policies were incorrect, the authority to change them (as has been done in pursuance of the Mudaliar Committee's recommendations) vested with the Governing Body. Where would institutional discipline be if the heads of the institutions took the bit in their teeth and ran away with ideas contrary to basic policies for the organisations.

Merit Promotion

One of the issues of the controversy related to the merit promotion of a younger scientist. The recommendations for merit promotion originate from the Director. This procedure limits considerations of merit to the discretion of the Director. If the Director is not favourably disposed to a scientist with merit, there is no method by which the name of the scientist could be put up to the Merit Assessment Committee.

The rules should be changed whereby the scientist himself or any other scientist even outside the laboratory may be able to send his name to the Merit Assessment Committee. Since the promotions are to be made on the basis of merit alone, there should be no objection to leave the decision to the best judgment of the Merit Assessment Committee.

Signature Campaigns in Laboratories

The Professor has reported that 47 out of 55 scientific officers signed a petition to the Prime Minister in his favour. He quotes it as an indication of his popularity and the confidence of the scientists in him. It is also reported that at a meeting of the staff association called for the purpose, a resolution supporting Dr. Kichlu fell through for want of a seconder.

Was Prof. Kichlu a popular leader or did his supporters stage a signature campaign to please him — would be a difficult question to answer! The whole affair smacks of manoeuvring reminiscent of ministerialist and dissident activities in some of the States. And why can't the scientific workers who signed for him either support him properly or have the courage to decline their signature to the campaigners'? Why leave him high and dry in the staff meeting? Such conduct is unworthy of a community of socially conscious scientific workers.

'Science and Culture'

One would have expected some interest from this Journal which claims on its Board of Editors and collaborators a number of eminent physicists to have given some opinion on the merit or otherwise of the Report of Prof. Blackett on NPL. On this the Journal has maintained complete silence.

However, angered by the acceptance of Prof. Kichlu's resignation, the Journal has come out with the statement that the CSIR could do without its Chief Executive and affairs could be carried out by a Secretary. We would say perhaps *Science & Culture* can do without its Editors.

A word to the Professor

It would have served the cause of NPL better if it had been kept out of press and parliament and left to carry on its work in peace and quiet. There is a time to be on the stage and a time to bow oneself out. When the latter stage comes, it is better that the last appearance leaves an impression of grace and dignity. We wish the Professor many happy years of useful work and hope that he would be able to find constructive avenues for his residual energies.

ALL INDIA MANUFACTURERS' ORGANISATION

Silver Jubilee (May 1, 1965)

The Silver Jubilee Conference of the All India Manufacturers' Organisation was held on May 1, 1965 in New Delhi, which was attended by the Honourable Prime Minister Shri Lal Bahadur Shastri.

The Chairman of the Conference, Mr. Hansraj Gupta, pointed out the importance of increasing *per capita* production both in agriculture and in industry, and also the desirability that increased *per capita* production should be made available to consumers at reasonable prices. Mr. Gupta also remarked that increase in money income in the form of wage or salary should be kept in line with the growth of productivity in order to hold down prices.

Apart from wages, another important factor bearing on prices, was incidence of indirect taxes to which Mr. Gupta drew attention. He remarked in this connection that a study should be made of what should be the proportion of incidence of indirect taxes on cost price of essential commodities. During the last five years, tax revenue has been increased five-fold while the national income has gone up by only about 30 per cent. Mr. Gupta hence emphasized that at least in future increase in tax revenue should be related to growth in national income.

Next, Mr. Gupta dealt with problems of raising resources for the corporate section. He advocated that a liberal policy should be followed in the provision of development rebate. He suggested that the cut imposed on development in the case of certain industries from 20 per cent to 15 per cent should be removed. As generation of internal funds was required to a greater extent for larger ploughing back of profits in future, adequate relief in the incidence of corporate taxation should receive sympathetic attention of the Government in future, thus Mr. Gupta pleaded.

Mr. Lal Bahadur Shastri, who was inaugurating the annual conference, agreed that certain suggestions by Mr. Gupta deserved consideration by the Finance Minister. The Prime Minister, however, wondered if there could be any changes in the budget proposals of the Finance Minister, which were now in the final stage of approval by Parliament. He, however, expressed the hope that the suggestions will be looked into by the Finance Minister.

On the topic of procedural controls, Mr. Shastri agreed with the Chairman of AIMO that these were causing avoidable difficulties. He favoured the fixing of a time limit for the processing and issue of licences to entrepreneurs. The Government—observed the Prime Minister—would also consider if there was need for uniformity of policies pursued by the various Central, State and local purchasing authorities.

Mr. Shastri also referred to complaints against complications created by octroi duties, and remarked that that was an "outmoded levy".

Mr. Shastri remarked —on the subject of allowance of expenditure on advertisement—that the proposed rules by companies needed careful consideration. He assured that the interests concerned would be consulted before a final decision was taken.

The Prime Minister also appealed to businessmen to invest in joint ventures in Nepal to promote and strengthen the economic development of that country which is friendly to us. He wanted the trade between the two countries to expand.

Commenting on the country's economics, Mr. Shastri—while noting that the industrial production is picking up after a lean period — expressed the expectation that it would become self-generating after 10 or 15 years.

Finally, the Prime Minister pointed out—in the context of the country's present crisis in regard to foreign exchange —that the industrial production should be export-oriented and that the quality of the products should be very good to stand competition. The competitive prices could be achieved, Mr. Shastri maintained, if the industrial management were good. In the end, he stressed that there should be better co-ordination between the producer, the distributor and the consumer because this factor is important as far as the pricing policy is concerned.

Annual Council Meeting of Association of Scientific Workers of India

Minutes of the 18th Annual Meeting of the Council of the Association of Scientific Workers of India held at New Delhi on 14-15th March, 1965.

1. The following were present:

1.1 Members of the Central Executive Committee:

Dr. N. P. Gupta,	*President*
Dr. H. A. B. Parpia,	*Vice-President*
Dr. S. K. Roy,	*General Secy. (Orgn.)*
Shri K. Ray,	*General Secy. (Publication)*
Dr. V. S. Nair,	*General Secy. (Public Relations)*
Shri J. M. Dutta,	*Treasurer (Actg.)*
Dr. (Mrs.) S. Z. Ali,	*Member;*
Dr. Y. V. Kathavate,	*Secy., IARI Branch*
Shri K. Kashyapa,	*Secy., CSIR Branch*
Shri S. K. Asthana,	*Secy., Roorkee Branch*
Shri R. N. Nigam,	*Secy., Dehra Dun Branch*
Shri G. V. Subramanya,	*Secy., Jamshedpur Branch;*
Dr. H. Dakshinamurthy,	*Secy., Hyderabad Branch;*
Dr. J. Misra,	*Secy., Lucknow Branch*
Dr. K. M. S. Sastry,	*Secy., Jammu Branch*
Dr. T. N. Chojer,	*Secy., UPPWD Res. Instt. Branch*
Shri K. M. Dastur,	*Representing Secy., Mysore Branch*
Dr. A. H. Ghosh,	*Representing Secy., Dhanbad Branch*
Dr. G. T. Gadre,	*Representing Secy., Bhavnagar Branch*
Shri S. V. Kulkarni,	*Representing Secy., Kirkee Branch*

1.2. Delegates:

Dr. M. G. Ramadoss Menon,	*IARI*
Dr. Jagadish Seth,	*IARI*
Miss S. Ramamani,	*IARI*
Dr. B. K. Nayar,	*CSIR*
Shri S. P. Gujral,	*CSIR*
Shri G. Ramaseshan,	*CSIR*
Shri B. N. Chatterjee,	*Dhanbad*
Shri S. K. Puri,	*Dehra Dun*
Shri Y. Kumar,	*Dehra Dun*
Shrimati C. M. Sowbhagya,	*Mysore*
Shri G. Prasannappa,	*Mysore*
Shri C. S. Virakatmath,	*Mysore*
Shri R. Y. Vasudeva,	*Mysore*
Shri A. M. Nanjundaswamy	*Mysore*
Shri A. R. Ranaganath Naidu,	*Mysore*
Shri V. S. Aggarwal,	*Roorkee*
Shri S. K. Banerjee,	*Jamshedpur*
Shri A K. Lahiri,	*Jamshedpur*
Shri S. Srinivasan,	*Jamshedpur*
Shri C. R. Tiwari,	*Jamshedpur*
Shri B. N. Dutta,	*Jamshedpur*
Shri B. K. Saxena,	*Jamshedpur*
Shri S. Bhattacharji,	*Lucknow*
Shri N. M. Khanna,	*Lucknow*
Shri S. N. Bakshi,	*Lucknow*
Shri A. N. Kapur,	*Jammu*
Shri J. N. Suri,	*Jammu*
Shri R. K. Razdan	*Jammu*
Shri Y. P. Talwar,	*Jammu*
Shrimati Ila Vora,	*Jammu*
Dr. B. J. Roy Ghatak,	*Jammu*
Shri P. K. Dutta,	*Jammu*

1.3. By invitation:

Shri Y. R. Chadha,	*CSIR*
Shri A. K. Bose,	*CSIR*

2. The following business were transacted:

2.1. The delegates stood and observed silence for one minute in the memory of the late Shri Jawaharlal Nehru, Founder-President of the ASWI.

2.2. Minutes of the 17th meeting of the Council

The minutes of the 17th Annual Meeting of the Council held on 17-18th March, 1964, which had been circulated earlier were read and confirmed.

2.3. Matters arising out of the Minutes

The Council felt that action taken on the Resolutions adopted by the Council should be communicated to the Branches. It was noted that this was done through periodic reports in *Vijnan Karmee*. However, a separate communication may be issued specially on receipt of a reply from the concerned authorities. Efforts for recognition of ASWI may be intensified.

3.1. President's Opening Remarks

The President drew attention to the important tasks ahead. He deplored the recent cut in allocation of funds for scientific research and mentioned how this was affecting adversely the scientific effort. About working condition of the scientific and technical personnel, he felt that the unnecessary multiplicity of grades was in many instances the cause of dissatisfaction and this should be removed. Laboratory technicians and other Scientific Workers in the lower ranks should be afforded the opportunity to improve their qualifications. He urged the delegates to take special note of the language controversy and evolve a suitable policy so that the issue does not stand in the way of country's progress in science and technology. On behalf of the Association, he supports the demand of the teachers and doctors for better service conditions.

3.2. Report of the General Secretary, (Organisation)

The Actg. General Secretary (Organisation) presented the Annual Report of the Association.

3.3. Report of the General Secretary, (Publication)

The General Secretary (Publication) presented the Annual Report of the Publications.

3.4. Report of the General Secretary (Public Relations)

The General Secretary (Public Relations) presented the Annual Report on Public Relations.

3.5. Report of the Treasurer for the year 1963-64 and Auditors Report ; Budget for year 1965-66 and appointment of Auditors for 1964-65

The Acting Treasurer presented the audited statement of accounts for the year ending 31st March 1964 and also the report of the Auditors in this period. He also presented the budget estimates of ASWI for the year 1965-66.

All these reports had been circulated earlier to the delegates. To facilitate consideration it was decided to discuss all the reports together.

4.1. Discussion and Adoption of the Reports

It was suggested that the CEC should make special efforts to increase the membership. Membership drive within the existing branches and establishment of new units and branches should be undertaken. Branches at places like Calcutta, Bombay, Poona should be revived. Members of a branch may contact scientific workers in the neighbouring areas with a view to establishing of new units and branches. It was felt that reestablishment of Regional Offices of the Association, would be helpful in this respect. The Association, and more so the branches should organise symposia, seminars etc. to discuss various problems facing the scientific workers and try to ensure participation of the non-members. Public meetings on various topics may also be organised by the ASWI. Meetings of CEC and Council may be held at different places. The Association may undertake a study of the migration of scientists from research to administrative jobs and the reasons thereof. The meeting also felt that the various resolutions adopted by the Council should be vigorously followed up with the concerned authorities and branches should be kept informed of the outcome.

The delay in publication of *Vijnan Karmee* was pointed out and it was suggested that if regularity for a monthly issue could not be assured, the *Vijnan Karmee* may be brought out as a bimonthly or quarterly. The Council was, however assured that the journal will come out regularly every month. A suggestion that *Vijnan Karmee* may publish research papers was not considered acceptable. Efforts should be made to raise more funds for *Vijnan Karmee* so that the journal may become self-supporting. The Branches agreed to send their reports regularly for publication in *Vijnan Karmee*. It was felt that a correspondent for *Vijnan Karmee* may be appointed in each Branch. The question of mailing *Vijnan Karmee* to individual member was considered and it was decided that this should be started as soon as possible.

The Treasurer's Report and the Auditor's Report were considered. It was suggested that the receipt from Branches may be shown separately Branchwise in the statement of Accounts. Branches were urged to collect subscription from members at the beginning of every year and send the Centre's share of subscription at an early date. Small items in the balance sheet like cash in Palai Central Bank and balance of stock of papers may be written off.

The Council viewed with concern the deficit in the Budget Estimates for the year 1965-66.

The reports of

(*i*) General Secretary (Organisation)
(*ii*) General Secretary (Publications)
(*iii*) General Secretary (Public Relations)
(*iv*) Treasurer along with the auditors report and audited statement of accounts and the Budget and estimates for the year 1965-66 were then duly adopted.

It was also resolved that M/s. K. C. Gupta & Co., be appointed as Auditors of the Association for the year 1964-65 on a suitable remuneration to be negotiated with them.

5. The Secretaries of the Branches present read out the reports on the activity of their respective branches during the year 1964. The branches appeared to have functioned actively during the year and had worked not only for the advancement of the interests of scientific workers and enhancement in their social status but also for the popularisation of science and proper application of science and technology for industrialisation of the country. Various national and international issues received the attention of many of the Branches. At the same time local problems were not neglected.

6. Resolutions

A number of resolutions had been received from Branches. These had been circulated to the delegates before the meeting. The President pointed out that some of the resolutions were on the same topic and to facilitate discussion these could be considered together.

The resolutions received could be broadly classified as follows:

1. Service conditions.
2. Organisational matters.
3. National issues.
4. Promotion of Science in the country.
5. International issues like atomic weapons, international collaboration in the field of science and technology etc.

The Council agreed to take up the resolutions under the above heads for discussion. The Council appointed Sub-committees to consider the resolution under each separate group and formulate a single resolution for each topic. The Resolutions revived by the Sub-committees were placed before the Council.

(*i*) Resolution on the restoration of scale of Pay of Rs. 325-25-575 for SSA/STA in CSIR

adopted unanimously.

(*ii*) Resolution on review of cases of SSA/STA's in CSIR who have completed 5 years service for promotion to higher scale.

adopted unanimously.

(*iii*) Resolution on forwarding of applications for outside jobs

The resolution was discussed and amended and put to vote. The amended resolution was adopted by a majority.

(*iv*) Resolution on adoption *in toto* of Dass Commission recommendation on Dearness Allowance.

adopted unanimously.

(*v*) Resolution on granting of gratuity to those who opted for CPF on a rate at par with those in pension scheme.

to be examined by CEC.

(*vi*) Resolution seeking a modification of the Rules governing Leave Travel Concession to provide facility to travel anywhere once in every 2 years.

adopted unanimously.

(*vii*) Resolution on study leave to scientific workers under liberalised conditions.

adopted unanimously.

(*viii*) Resolution on liberalisation of air-travel facilities to scientific workers for journey in the interest of scientific work.

adopted unanimously.

(*ix*) Resolution on adoption of uniform pay-scale for scientific workers employed under different departments and organisations.

adopted unanimously.

(*x*) Resolution asking for framing of model rules for recruitment, promotion and working conditions of scientists in CSIR to ensure uniformity of practice in different laboratories.

adopted on principle; Shri G. V. Subramahanya was requested to draft model rules for further consideration.

(*xi*) Resolution on recognition of ASWI.

adopted unanimously. The CEC was directed to pursue the matter vigorously.

(*xii*) Resolution on representation of ASWI members in the Governing Bodies or Executive Councils of Research Institutions.

This resolution provoked a heated discussion. An amendment was proposed seeking representation of scientists working in the Institutions and not necessarily of members of ASWI. The amendment fell through by a small margin of votes. The resolution without the amendment was passed by a majority vote.

(*xiii*) Resolution demanding education as a concurrent subject. This was discussed and the Council advised a cautious approach to this subject. The Council autho ised the CEC to st dv the subject and take suitable action.

(*xiv*) Resolution on appointment of a Bureau of CEC at the Central Office to act on behalf of CEC.
adopted unanimously.

(*xv*) Resolution on creation of an office of General Secretary (International Relations).
adopted unanimously.

(*xvi*) Resolution on cut in the funds for scientific research.
adopted unanimously.

(*xvii*) Resolution urging Scientific Workers to exercise caution in expending the available resources and to exercise economy wherever possible.
adopted unanimously.

(*xviii*) Resolution deploring the lack of response to representations made by Scientific Workers through proper channels.
adopted unanimously.

(*xix*) Resolution commending the measures taken by the Dir ctor General, Scientific and Industrial Research in promoting the cause of science and technology and improving the working conditions and economic status of scientific workers, particularly of those in CSIR.
adopted unanimously.

(*xx*) Resolution on Language issue.
The Council agreed to authorise the CEC to study the issue very thoroughly and formulate a policy on the language issue.

(*xxi*) Resolution expressing great concern of the scientific workers, India on the continued manufacture and proliferation of nuclear weapons and supporting the decision of Government of India of not manufacturing the atom bomb.
adopted unanimously.

(*xxii*) Resolution on collaboration with developing countries for application of science and technology.
adopted unanimously.

(*xxiii*) Resolution expressing the fraternal support to teachers and CHS doctors in their demand for improvement in service conditions.
adopted un nimously.

The Council considered the resolutions referred to CEC in the Annual General Meeting held in March 1964 and felt that many of them were covered in the resolutions considered in the present meeting. The Council authorised the CEC to examine the remaining resolutions and take necessary action.

7. The Report on the Symposium—"Science and the Nation in the 3rd Five Year Plan" held in July 1964.

The report had been circulated to the delegates previously. The proceedings of the symposium were being printed and the first volume is likely to come out very soon. The Council requested the CEC to pursue with the relevant authorties the question of implementation of the main recommendations.

The report was adopted.

8 The Report on World Federation of Scientific Workers and International Symposium under the auspices of WFSW to be held in Budapest in September 1965.

The report had been circulated earlier. The President had attended the meeting of the Bureau of WFSW in June 1964, as also the meeting of the Preparatory Committee in January, 1965. It was decided that ASWI shall participate in the Symposium.

9. Report on the Symposium on "Collaboration between countries of Asia and Africa for Promotion and Utilisation of Science and Technology to be held in Delhi in December 1965.

The President described how the idea of the Symposium came into being and what has been done to organise it. It was noted that ASWI have offered to be the host to the delegates. The Council appro ed of the proposal of holding the Symposium in Delhi and ASWI acting as host to the delegates.

A Preparatory Committee comprising representatives of 10 countries was formed to organise the symposium—the first meeting of the Preparatory Committee was scheduled to be held in Cairo towards the end of April 1965.

The report was recorded.

10. Amendments to the constitution

The Council considered the amendments to the constitution proposed by the Sub-Committee appointed for the purpose in the last Annual Meeting. The first amendment sought to modify the provisions in notes (*i*) and (*ii*) in Clause 18 by raising the enrolment fee to Rs. 5/- from Re. 1/- and annual subscription to Rs. 10/- from Rs. 5/-.

The Council did not approve the amendment.

The Second amendment sought to modify clause 19 relating to the ceiling related to qualifying salary of 1/3 of the Office bearers by raising the limit from Rs. 500/- to Rs. 700/-.

It was decided that the amendment with a summary of the discussion may be referred to Branches for further consideration.

11. Request of NPL Staff Association for affiliation to ASWI.

The Council considered the proposal and decided that the NPL Staff Association may be affiliated to ASWI. The Council authorised the CEC to take necessary steps.

12. Election of the members of the Bureau of CEC.

The Council appointed the following to form the Bureau of the Central Executive Committee for the present.

(1) Dr. N. P. Gupta, *President.*
(2) Dr. S. K. Roy, *Gen. Secy. Organisation*
(3) Shri Baldev Singh, *Gen. Secy. Publications.*
(4) Dr. V. S. Nair, *Gen. Secy. Public Relations.*
(5) Shri A. Rahman, *Gen. Secy. International Relations.*
(6) Shri S. Dutta, *Joint Secretary.*
(7) Shri J. M. Dutta, *Treasurer.*
(8) Dr. Y. V. Kathavate, *Representative of Branches.*
(9) Dr. S. Bhattacharjee, *Representative of Branches.*

13. The delegates from Lucknow, Jamshedpur and Mysore, invited the ASWI to hold the next meeting of the Council in their respective cities. The Council decided that the Bureau may consult the three branches in due course and decide the venue of the next meeting.

14. Election of Office Bearers of the Central Executive Committee for the year 1965-66.

The General Secretary reported that the Branches were invited to submit their nomination to fill the forthcoming vacancies in the Central Executive Committee. The nominations received for different offices were considered by the Council and the following were unanimously elected the Office

Bearers and Members of the Central Executive Committee for the year 1965-66.

President: Dr. N. P. Gupta.
Vice-President: Dr. H. A. B. Parpia,
Shri Jagjit Singh, Dr. M. S. Iyengar.

Gen. Secy. Orgn.: Dr. S. K. Roy.

Gen. Secy. Publications: Shri Baldev Singh.

Gen. Secy. Public Relations: Dr. V. S. Nair.

Gen. Secy. Intl. Relations: Shri A. Rahman.

Joint Secretary: Shri S. Dutta.

Treasurer: Shri J. M. Dutta.

Members: Dr. S. Husain Zaheer, Prof. G. S. Ramadoss Menon, Mr. A. K. Lahiri, Dr. Narendera Singh, Dr. S. Bhattacharji, Dr. Mrs. Sultana Z. Ali, Dr. Manohar Lal, All Secretaries of the Branches.

Resolved further that the new Office Bearers will take charge of their respective offices as early as possible after the meeting of the Council.

Resolved further that according to clause 85 of the Constitution of the ASWI, Dr. S. K. Roy as the Hon. General Secretary and Shri J. M. Dutta as the Hon. Treasurer will operate under their joint signatures the Bank account of the Association of Scientific Workers of India with the Punjab National Bank Ltd., Parliament Street, New Delhi. Cheques etc. issued by the Association will be signed by both and Cheques, drafts etc. payable in favour of the Association will be endorsed by either of them.

Annual Report of the General Secretary (Organisation)

The annual Report of the General Secretary (Organisation) adopted in the last meeting of the Council held in March, 1964 noted with satisfaction the efforts made in reviving some of the old Branches and establishing new Branches. No other new Branch or Unit have come into being since then, excepting that we have been able to enroll some members in the National Physical Laboratory New Delhi. The position of membership on 31.12.64 as intimated by the Branches is given below.

It is regretted that it has not been possible to renew contacts during the year with many of the Branches that existed quite a few years ago. Serious attention should be paid to this during the present year so that these Branches, at least those in Aligarh, Calcutta, Bombay, Pimpri are revived. We have however, received a request from N.P.L. Staff Association for affiliation with ASWI and we shall discuss this request later.

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* They have not supplied their membership list.

Central Executive Committee Meeting

During the year 1964, the Central Executive met only once on 31th July, 1964 in Delhi soon after the Symposium on "Science and the Nation during the 3rd Five Year Plan."

General Meeting

The ASWI held a meeting on 6th June, 1965 in IARI to condole the death of late Prime Minister Jawaharlal Nehru, Founder President of ASWI. It also organised and participated in a meeting of scientists in Delhi convened jointly by various scientific organisations in Delhi to condole the death of the late Prime Minister held in N.P.L. Auditorium and presided over by the Education Minister, Shri M.C. Chagla.

The ASWI also held a meeting on 10th December, 1964 at IARI, New Delhi to condole the death of late Prof. J.B.S. Haldane, the World renowned biologist.

Affiliation

The ASWI has continued its affiliation with the World Federation of Scientific Workers. The President of ASWI and Dr. S. Husain Zaheer attended the meeting of the Executive of the WFSW, held in Bucharest in June, 1964.

The ASWI is also continuing its affiliation with the Indian Parliamentary and Scientific Committee and have been attending nearly all the meetings and conferences convened by the Committee.

The ASWI remains an Associate member of the Indian National Commission for cocperation with the UNESCO and the representative of ASWI participated in the deliberation of the Commission.

Economic and Professional status of Scientific Workers

Members must be keen on knowing the result of the effort put in to improve the economic and the professional status of the scientists in the country. In a memorandum from Lucknow Branch, it was stated that the hierarchy amongst the scientists should be abolished through the unification of pay scales, discrimination between scientists of different so-called categories, be removed, and fair chances of promotion for all scientists be ensured. It was also suggested therein that instead of the Assistants and the Officers the men of science should be categorised as Fellows and Scientists; the period of probation for the Fellows not exceeding three years.

Our efforts have borne fruit and the Council of Scientific and Industrial Research has taken a lead in this field. The discrimination amongst the scientists has been removed and preliminary steps to abolish hierarchy have already been taken. At present in this organization there are only three categories of scientific personnel: (i) Assistants, (ii) Scientists and (iii) Directors. From the decisions already taken by the CSIR, it is obvious that fair chances of promotions have been provided for both the assistants and scientists.

A circular dated June 15, 1964 issued by the CSIR, relating to the upgrading of scientific and technical assistants, notifies that the cases of upgrading of Senior Scientific/ Technical Assistants who have completed 5 years in their present position may be reviewed.

We also hear that the merit of the scientists working in the CSIR will be assessed for the purpose of promotion after every five years of the appointment or after the completion of one year's service at the maximum of the existing scale.

We hope that these principles be implemented without any further loss of time in the CSIR, and it is our hope that other scientific organizations will follow suit.

Symposium on "Science and the Nation During the 3rd Five Year Plan"

The ASWI organised a Symposium on "Science and he Nation in the 3rd Five Year Plan" to discuss various problems in the fields of development and how the Science and Technology is contributing towards solution of the problems. The Symposium was held in New Delhi from July 27 to 30, 1964. About 250 delegates from India representing various Ministries, Public and Private Sector Undertakings, Research Institutes, Universities etc. participated in the Symposium and about 40 delegates from countries in Africa and Asia also participated as observers. The Symposium was inaugurated by Dr. S. Radhakrishnan, President of India and received a message wishing all success from Shri Lal Bahadur Shastri, Prime Minister of India. A detailed report on the Symposium along with the principal recommendation are being submitted separately.

The ASWI received a grant of Rs. 2.65 lakhs from the CSIR for organising the Symposium and records its grateful thanks to D.G. S.I.R. not only for the grant but also for his constant advice, help and encouragement in organising the Symposium. The CSIR also helped the ASWI in providing a room in its Secretariat building to house the Symposium office and our grateful thanks are also due to Secretary, CSIR for this kindness.

The brief report on the Symposium cannot end without a mention of the valuable services rendered by some of the members of our Branches who took personal trouble to come over to Delhi and stay here for a considerable period to assist the local organisers with their untiring services and also the help and assistance rendered by volunteers from CSIR and IARI. Our grateful thanks are also due to the members of the Steering Committee and the Reception Committee and specially the Coordinators and Recorders of the various sections for their untiring efforts without which it would not have been possible to achieve the success in organising the Symposium. Thanks are also due to Lala Bharat Ram, Federation of Indian Chambers of Commerce and Industries, the Education Minister of India, Vice-Presidnet of India, The Minister of State for External Affairs, India and the Arab League for the generous receptions to the delegates.

Our thanks are also due to Prof. S.K. Mukherjee, Dr. C. R. Krishnamurthy, Shri A. Rahman, Shri A.K. Bose and Dr. N.P. Gupta for undertaking the tours of countries in Asia and Africa at their great physical inconvenience for extending personally invitations to the Scientists in these countries.

A meeting of the representatives of the overseas delegates was held in Delhi after the Symposium was over and suggested that another Symposium on "Problems of Collaboration of Science in developing countries" may be held in Delhi in Dec., 1965 and appointed a ten member Preparatory Committee with representation from ten countries. The ASWI have offered to be the host for the Symposium.

The Vijnan Karmee

Vijnan Karmee, organ of ASWI was published more regularly in 1964 and a report by Gen. Secretary (Publication) is being presented separately. I would here like to express my indebtedness to the Secretaries of all Branches for their kind co-operation in distribution of the journals to the members.

General

The ASWI in last two years have been brought back into a position of security and strength and contacts with Scientific Workers in various Ministries, Public and Private Sector Undertakings, Research Institutes have been widened. The recently held Symposium has gone a long way in establishing this contact and removing much of the prejudices that existed in the minds of Scientific Workers outside the organisation. It has helped the ASWI to receive the recognition as the representative organisation of Scientific Workers component to contribute to the building up of Science and Technology in the country and to give a sense of direction and purpose. Our contacts with Scientists and Technologists in countries in Asia and Africa have also increased.

All these, at the same time, have imposed tremendous responsibilities on all of us and we cannot live up of these responsibilities unless we work hard, all together, to build a very strong and active ASWI in India. Probably our preoccupation with organising he Symposium during the year did not enable us to pay the necessary attention to the question of strengthening our organisation further. Necessary steps to amend any shortcomings in .h.s respect should be taken during the year. I am confident that we shall be able to do that and in doing so we will have the cooperation of all our Branches, Units and Members. I am sure the new Central Executive Committee to be elected in this Council will do all that it can to fulfil this desire.

Before concluding this brief report I would like to make a special mention of the selfless, untiring efforts of our Gen. Secretary (Organisation) Dr. M.S. Iyengar but for whose enthusiasm and hard work the ASWI could not have achieved whatever it has in the past two years. It is unfortunate that he had to leave Delhi at a time when ASWI needed him most and asked to be relieved of his office as General Secretary (Organisation). While wishing him all success in his new assignment I express on behalf of all our sincere and grateful appreciation of his contribution in making ASWI an worthy organisation and hope that we could always count on his services.

Finally, I would like to express my sincere thanks to all my colleagues and friends in Centre and Branches for their help and cooperation.

Dr. S. K. Roy

Report of the General Secretary (Publication)

I have great pleasure in reporting that twelve issues of the Vijnan Karmee were brought out from January to December, 1964.

The number of copies printed for each issue is as follows:

Issue of Vijnan Karmee in 1964		*No. of copies printed*
January	... ...	1500
February	... ...	1500
March	... ...	2000
April	... ...	2000
May	... ...	2500
June	... ...	3000
July	... ...	2500
August	... ...	2500
September	... ...	2500
October	... ...	2000
November	... ...	2000
December	... ...	2000

Advertisement rate card was printed with enhanced rates of advertisement. The rates have been increased due to the improvement in get-up of the journal, quality of matter and increased circulation. The total revenue for the year from the advertisement will be around Rs. 2000/-. The cost of printing of 12 issues has come to about Rs. 20,000/-.

Reprints or preprints of 15 papers presented at the symposium 'Science and the Nation' held at New Delhi in July 27-30, 1964, were also brought out in 500 copies each for the purposes of distribution amongst the participating members of the Symposium.

A brochure entitled 'Bird's Eye View of Indian Science' was also prepared and printed for distribution at the symposium.

I would like to make an appeal to the members of the Council to make efforts to procure advertisement and articles for the *Vijnan Karmee*. Response from the various units and branches of the ASWI had not been very encouraging in respect of Branch Reports for publication in the *Vijnan Karmee*.

I am grateful to Dr. M. S. Iyengar, Secy. (Orgn.) for making available some of the Symposium papers for publication in the *Vijnan Karmee*. I am also grateful to Sarvshri S. P. Gujral, K. Ram and M. R. Dhall for their ungrudging assistance in the task of production of the *Vijnan Karmee*.

Our grateful thanks are also due to Shri Y. R. Chadha, Shri K. Kashyapa and Mrs. K. Ramachandran who took great pains in the editing and publication of large number of papers received for the Symposium on 'Science and the Nation'. A book of about 250 pages containing selected papers was published.

(K. RAY)

Gen. Secy. (Publication)

NEW DELHI:

Report of the General Secretary (Public Relations)

The year under report was marked by intense public relations activity consisting mainly of contact with scientists in different parts of India as well as in friendly countries of Asia and Africa, arranging publicity for the activities of the Association through press and radio, and looking after the hospitality, reception and stay of guest scientists from Asia and Africa who attended the symposium on Science and Nation in July, 1964.

A press conference was arranged in May 1964 in which the President of the Association explained to the newsmen the activities of the Association and the scope and aims of the Symposium on Science And Nation. Over 16 press releases were put out regarding the symposium and other activities of the Association. A 10 minute talk on "Science And Nation" was arranged to be broadcast by All India Radio; the material for the talk was provided by the Association. Interviews were arranged for all guest scientists to the symposium with All India Radio for its broadcasts. Interviews for some of them with newsmen, from important dailies were also arranged. Background material for the symposium was supplied to the press, based on which editorials, features and comments were published by important dailies. A News Letter concerning the symposium was prepared and sent to all branches of ASWI, participants in the symposium, and scientists in the Universities and research organisations in the country. The daily proceedings of the symposium was covered for the press and radio by putting out press releases. News Reel coverage for the Inaugural function of the symposium was also arranged through the Films Division of the Ministry of Information & Broadcasting. Our efforts resulted in receiving a great deal of publicity for the Association and the Symposium through the press and All India Radio.

Income and Expenditure Account for the year ended 31st March, 1964

Expenditure	Rs.	P.	Income	Rs.	P.	Rs.	P.
To Salaries ...	227	00	By Subscriptions:				
,, Stationery and Printing ...	42	62	(*i*) from Members	10	00		
,, Travelling Allowance & Con veyance	1,488	26	(*ii*) Centre's share from Branches	1,206	45	1,216	45
,, Postage & Telegrams ...	237	51	,, *Vijnan Karmee* Publication Grant-in-aid from Government of India ...			4,000	00
,, V.K. Publications & Distributions and other Expenses	3,207	60	,, Advertisement Revenue ...			740	00
,, Bank Charges ...	29	10	,, Sales of Journals ...			38	00
,, Miscellaneous Expenses ...	171	49	,, Affiliation Fee ...			40	75
,, Audit Fee ...	200	00	,, Miscellaneous Receipts (Sales of old portfolio)			10	00
,, Depreciation ...	37	45					
,, Excess of Income over Expenditure transferred to General Fund Account ...	21	23					
Total	6,045	20	Total			6,045	20

Sd./S.K. Roy
Actg. Gen. Secy.

Sd./J.M. Dutta
Actg. Treasurer

Sd./N.P. Gupta
President

Sd./K.C. Gupta for K.C. Gupta & Co.
Chartered Accountants & Auditors, New Delhi.

Report of the Symposium on "Science and the Nation during the Third Plan"

1. The Association had on its agenda for the past five to six years the holding of a symposium on "Science and the Nation" but lack of finances had been standing in the way. It was only in early 1964 when the Director General, CSIR was approached that the Council made available to the Association the necessary grant for the purpose. Immiedately afterwards, machinery of the ASWI was put into gear for organizing the Symposium. Two working Committee, viz. (*i*) Organizing Committee, comprising scientists from several scientific institutions in Delhi, and officials and active members of the Association, and (*ii*) Steering Committee headed by Dr. N. P. Gupta and consisting of Dr. S. Husain Zaheer, Shri Jagjit Singh, Dr. Sadgopal, Dr. S. K. Roy, and Dr. M. S. Iyengar, were constituted to assist in the preparations for the Symposium.

1.1 The original idea was to organize a small national symposium. But as the preparations went apace, the scope of the symposium was enlarged and scientists from the friendly countries of Asia and Africa were invited to participate as observers. Three representatives of the Association, namely Shri A. Rahman, Dr. C. R. Krishnamurthi and Dr. S. K. Mukherjee, were sent to the Middle East, African and South-East Asian countries to establish contacts with the scientists in these areas and ensure their participation in the Symposium. Likewise, Shri A. K. Bose was sent to Kathmandu and Dr. N. P. Gupta to Moscow and Bucharest for the same purpose.

2. The main objective of the Symposium was to evaluate the extent to which indigenous scientific and technological efforts have been utilised in the development programmes of the current plan and indicate lines on which scientific research could be integrated with various sectors of the nation building activities. The aim was to bring together the scientists and the policy makers to appraise the national goals to which science should contribute on the basis of which planning of scientific research and financial allocation could be made.

2.1 At the international level, the purpose was to review the position of science in the developing countries of Asia and Africa and to establish contacts with the scientists in these areas.

2.2 The third objective was to build up the Association and increase its membership through the campaign for the Symposium so that the Association could have an effective voice in formulation of national science policies and ensure how science can best be used for the common weal.

3. The Symposium was held during July 27-30, 1964 and was inaugurated by Dr. S. Radhakrishnan, the President of India. It was attended by over 250 Indian delegates representing 20 major public sector undertakings, most of the national laboratories under the CSIR, several research institutes under the various Ministries, Planning Commission, Atomic Energy Commission, Indian Council of Agricultural Research, Indian Council of Medical Research, 15 Universities, a number of private sector industries and 25 branches of the ASWI. In addition about 40 observers from Afghanistan, Algeria, Ceylon, Congo, Ethiopia, Ghana, Indonesia, Iraq, Iran, Kenya, Lebanon, Malay-

sia, Mongolia, Morocco, Nepal, Nigeria, Philippines, Sudan, Syria, Thailand, Tunisia, United Arab Republic, and the USSR, and representatives from the World Federation of Scientific Workers and its Prague Regional Centre were present and participated in the deliberations of the Symposium.

3.1 Papers numbering about 150 were received for discussion under the following 8 sessions:

(1) Irrigation & Power, (2) Petroleum & Chemicals, (3) Steel, Mines and Heavy Industries, (4) Food and Agriculture, (5) Transport and Communication, (6) Health, Building and Town Planning, (7) Planning, Finance and organization of research and related administrative problems; Training of Scientists; and Science and the Government and (8) Science and International Relations. In the concluding Session, the recommendations of the different sessions numbering about 65 were discussed and adopted.

3.2 An important feature of the organizational aspects of the Symposium was that the salient features of the papers were summarized and presented in a coordinated form by the Coordinator for each session or sub-session the authors did not read their papers in full but only a brief version. This was done to allow more time for discussions. The abstracts of all the papers that were received upto 10 days before the inaugural date were printed in a book form and distributed in advance; those received late were as far as possible mimeographed and distributed in the respective sessions.

4. The Symposium proved a great success and was unique in many ways. It was for the first time that the Association had organized a Symposium of this magnitude. As a result of it the ASWI received wide publicity through circular letters, press and radio, and through participants in the various sessions.

4.1 It was perhaps the first occasion when such large number of scientists engaged in different spheres of nation building activities, public administrators, planners and industrialists were present at a common platform to bring to focus the achievements and shortfalls in the application of scientific knowledge in the development programmes of the country. The presence of the Central Ministries concerned with different sessions made the deliberations more fruitful.

4.2 Again it was for the first time, that the scientists from several Afro-Asian countries were represented in a Symposium of this type organized in the country. Country statements on research organizations were presented by representatives from 14 countries which provided valuable data concerning the commitment of science in those countries. At the end of the Symposium, the guest scientists from abroad were taken on a tour of important research laboratories and industrial projects in the country. They met again with the ASWI delegation in New Delhi on Aug. 11, 1964 and unanimously decided to hold a Symposium on "Collaboration between the countries of Africa and Asia, for the promotion and utilization of science and technology" in New Delhi towards the end of 1965. A Preparatory Committee representing 10 countries with leader of the Indian delegation, Dr. S. Husain Zaheer as the Convener, was constituted for the purpose.

5. Although the Symposium brought the ASWI into such limelight, the opportunity could not be fully utilized in pushing up the membership of the Association. It was due to the fact that the Association had only a limited number of active workers who worked day and night and were fully occupied

with the technical arrangements of the Symposium.

5.1 It was also criticised that there were too many papers covering many diverse fields of science leaving inadequate time for discussions. But perhaps it could not be avoided in a Symposium of this type all embracing in its scope.

5.2 One of the task that now emerges bebefore the ASWI is to arrange in future smaller conferences and symposia in specialized fields. This could be better arranged at the Branch level. The branches might each select an appropriate topic for holding a symposium which, besides its scientific usefulness, would help in activising the branches.

5.3 It was recommended at the concluding Session that the ASWI should set up a Follow-up or continuing Committee to go into the various recommendations made at the Symposium and make specific proposals for their implementation. It is regretted that no committee for this purpose was formed. A Committee comprising the Coordinators for the various sessions and some representatives of the Association might be constituted to concretise the recommendations and take appropriate steps for their implementation by the concerned ministries and the Government Departments.

5.4 The proceedings of the Symposium are being published in two volumes, of approximately 350 pages each. The first volume is expected to be out very soon; the second volume will take another three to four months.

Report on World Federation of Scientific Workers (WFSW)

The WFSW was formed in July, 1946, as an international body linking organisations of scientific workers in different countries. Among its aims, the WFSW includes use of science for human welfare and for promoting peace, international exchange and co-operation and improvement in the status of scientific workers. Affiliated organisations of WFSW exist in more than 25 countries and corresponding members in nearly 70 countries of the world. The WFSW organises symposia, publishes the quarterly Scientific World in 7 languages and brings out their publications to further its activities. Its main activities have been to mobilise opinion of scientists for world peace and for the advancement of science and technology in developing countries. It has affiliate status C with UNESCO.

With its headquarters in Paris, the WFSW has three regional offices—for Central Europe, South East Asia and Far Eastern countries. The ASWI is affiliated to the WFSW and in recent period has actively associated itself with activities of the World Federation. We from the ASWI have attended 3 meetings of the WFSW:

In 1963, the Bureau of the WFSW met for 2 days. The agenda included approval of Moscow Test Ban treaty, claim for independent functioning of the Peking Centre of the WFSW and fixing the venue and dates of the future symposium and other meetings.

The resolution on approval of Moscow Test Ban treaty was referred to the E.C. No definite rules existed for guidance of regional centres. This was also postponed. A proposal for holding the symposium and assembly meeting in India was not accepted.

In 1964 the E.C. of the WFSW met in Bucharest. The important items on the agenda included a discussion on the nature of the Peking Symposium, venue of the next WFSW symposium and policy matters relating to the activities of the WFSW. A sharp conflict was noticeable in the views expressed on all these matters. The majority view point was supported by British, French, Danish, East European, Soviet and Indian representatives. The minority view was held by Chinese and North Korean and Japanese. Once again the proposal to shift the Budapest symposium to Delhi was not ascceptable to the E.C. The offer by the Indian delegate was, therefore, withdrawn. But as in the previous meeting, the Bucharest meeting of the E.C. agreed to support the regional symposium in Delhi.

In January, 1965 the meeting of the Preparatory Committee of the Budapest Symposium was attended by us. The final programme was narrowed down and rearranged. The form of the symposium was discussed. Quotas for participation was accepted. Dr. Zaheer's name was included in the list of main speakers at the plenary session. The proposal to include Indian representatives on WFSW delegations to African countries was accepted.

The Indian Regional Centre of the WSFW has been inactive. In the absence of precise rules in the constitution of the WFSW regarding functioning of these regional centres, it was considered best not to initiate any activity on its behalf. This matter will come up for discussion at the next meeting of the General Assembly in September, 1965 at Budapest.

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VIJNAN KARMEE

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Fellow scientific workers:

May we introduce ourselves as the incoming Editor for your Journal. We should like to thank you for your past cooperation and look forward to your continued and more enthusiastic support in making the Journal a representative of the views of scientists and a forum for discussion of their problems.

May we offer a token *cash contribution* in recognition of your effort. Should you decide to undertake the labour of writing an article for the Journal we will be happy to pay at the rate of Rs. 25 per page upto a maximum of Rs. 100 per article. You may like to write at greater length and we will be glad to publish it but the payment will be limited to Rs. 100. We are too poor to afford more. Of course, we will part with our meagre cash only if we decide to publish your contribution. Much as we would like to accept all that you write, it is likely that the subject matter may not be of interest to our readers. Since somebody has to exercise discretion in this regard, we have decided to keep this privilege to ourselves. You may call it autocratic but so it is.

In case you may choose to give your views in the form of a letter, you are welcome. Your letters will be paid at Rs. 15/- per page upto a maximum of Rs. 25/- per letter. We naturally expect that what you write will be of interest not only to us (and indeed yourself) but also to our other readers. We will be grateful to receive your letter but do not be too sure that it would get into print unless the contents are of interest and service to the scientists. Here again very reluctantly, your Editor will have to be the judge.

We agree that the amount we are offering is too trivial but we still ask for your indulgence and cooperation. Scientists are not rich people nor is their Journal.

Baldev Singh

Economic crisis and the role of science and technology

The present economic crisis and the extremely difficult foreign exchange situation are neither unexpected nor as sudden as they appear to be. The financial circles have been aware of the rapid and progressive depletion of the country's foreign exchange reserves, and that the resources were not being generated at the pace at which they were being expended. The situation has allowed to drift from the difficult to the impossible till the industries, trade and scientific circles woke up to a total cut of import for a period of two months and a greatly slashed list in the Red Book after July. This type of rude shocks may be understandable where a country's economy is subject to pulls and pushes from various interests not State directed. However, in India where the major political parties are committed to Socialist Planning and the State controls the check points, such a sorry position can only be the result of mis-management of the economic and financial resources.

Be that as it may, the crisis is in the people and inflationary trend of prices is whowing a steep ascent. Under pressure from the organised trade union and middle class circles some compensation by way of increased dearness and house rent allowances have been provided but this may lead to prices and salaries chasing each other. There are talks of cutting down the financial outlay proposed for the Fourth Five Year Plan from Rs. 22,500 to 18,000 or even 16,000 crores. There is a proposal of converting the Five Year Plan into a Seven Year Plan and devoting an entire year to agriculture while staggering investment in industries. In the meantime production in some of the private and public sector industries has in some cases come to a stop and in others slowed due to non-availability of imported essential components, spares, and raw materials. Export promotion schemes have been adeversely affected. In the economic and industrial circles there is a hue and cry all round. The nation is on the verge of bankruptcy.

One may as well face the bitter fact that no amount of financial controls or economic juggling is going to provide an immediate answer to the situation. Substitutes for imported raw materials, indigenous know-how, copying of foreign designs, modifications in trade and patent laws are talked about. These are all desirable things and should have been the essence of a national policy and planning. Industry which has been habituated and encouraged to depend upon imported materials and foreign collaborations cannot be expected to switch over to substitutes and indigenous know-how overnight. Even now in some responsible circles, the solution to the crisis is sought in terms of economic manipulation, increased aid from abroad, long-term loans and credits and increased purchases from rupee payment countries.

In refreshing contrast to this are the pronouncements of the Prime Minister and the Chairman of the National Productivity Council, Dr. P.S. Lokanathan, made in the meeting of the National Productivity Council held on July 17, 1965

In his opening remarks, the Prime Minister said: that "one of the most disturbing features of the present situation is that although much progress has been made and industry has developed during the last 10 years, we have become more dependent at the end of this period than we were 10 years ago.

Our scientists should help and if our National Laboratories will produce indigenous know-how and substitutes for imported materials, Indian industries will take advantage of this. We should determine what items we could make in the country and we would gradually stop import. On export we should determine that at least some of our industrial products should be reserved for export—railway wagons could be exported; we could export part of our steel; the edible oils could earn 10-15 crores of rupees because they are liked abroad and perhaps we could even make an effort to export our ships." He drew attention to the fact that although production was rising, the prices were increasing and goods were becoming costly. steel prices haye gone up and in public sector the prices of commodities are more.

Dr. Lokanathan said "This brings me to the problem that we face at the moment: a critical shortage of foreign exchange. Minor or major, foreign exchange crises have always been with us in this period of development. It seems to me that the basic cause is our failure to invest in the development of our own capacities. We continue to depend by and large on borrowed technologies. The time has come when we should rely increasingly on our own research in science and technology."

These statements show an increasing realisation at least in some circle that the long range solution to the crisis lies in greater support to and application of science, and technology to the industrial and economic problems of the country. A reference has been made elsewhere in the Journal to the Memorandum submitted by the Federation of Indian Chambers of Commerce & Industry to the Government wherein they have listed a number of items and have pointed out that imports of capital and non-essential goods are continuing even when these are being produced in the country. Foreign collaborations and out-moded technology continues to be imported even when corresponding indigenous know-how is available or capable of development. The concerned authorities are either not aware of the gravity of the crisis or lack courage to introduce drastic measures and *declare a National Policy* to meet the crisis.

The loopholes which permit the foreign exchange appears to leak out, the round about ways in which the traders and industrialists are able to bypass foreign exchange restrictions, the manner in which officialdom and ministers go on happy jaunts abroad in search of wisdom and experience is an indication that those responsible, for the destinies of the country are only making a bid to hold water in the sieve. It is pertinent question why we continue to import Hollywood films and cheap fashion magazines and literature against foreign exchange. Why no national effort is made to identify the areas of importance on which the resources should be concentrated to give the maximum returns.

There is a crying need for a National Policy to gear science and technology to build up indigenous knowhow, substitute for imported and scarce materials and deliberate planned efforts to give the industry and economy a national infra-structure.

The Government and the Planning Commission should indicate to the scientists and their organisations the lines on which the country could increasingly depend on its own resources to its own needs. We have been talking of the 'take off' stage but are heading for a downward plunge unless a National Policy is evolved which gives the first place to the utilisation of science and technology and generating enough Indian know-how to sustain industrial production and economy. A systematic formulation and execution of National Policy is the only long range solution to prevent recurring crises in the country's economy and accompanying miseries to the people.

ART AND SCIENCE —A SINGLE REALM*

Dr. Mulk Raj Anand said that he had selected this topic because of the still unsettled controversy about the 'Two Cultures'. Curiously enough the developments in India during the first half of the 20th century were contrary to this thesis. Leading intellectuals like Aurobindo had propagated the theory of the integration of the human personality. Jawaharlal Nehru, for example, was an eclectic, and Rabindranath Tagore, after dabbling in mysticism for many years, became towards the end of his life a 'scientific humanist' like Tolstoy.

Speaking of his own development, Dr. Anand said that he became interested in Ibqal's poetry at the age of nineteen and this, in turn had aroused his interest in philosophy. However, it was a struggle for a man with strong literary leanings to break away from a philosophy of mysticism. Mysticism and metaphor go together; for some of the idealisations and speculative flights of mystic philosophers can be expressed only metaphorically. That was how it came about that the first draft of his doctoral thesis — about 70 pages written up after several years of study in England—was unceremoniously torn up by his Professor, with the cryptic comment that the thesis may have been alright as literature, but was not philosophy. This shock treatment made him shed tears, but also brought him face to face with himself.

If Indian intellectuals could come face to face with themselves, they would realise that they had to face two challenges — the first as Indians and the second as Citizens of the World. Mankind was facing the most crucial situation in its density. The problems raised by the invention of nuclear bombs had been adequately described and discussed. Men like Frederic Juliot-Curie and Linus Pauling had risked their jobs and reputations to bring mankind to its senses.

Turning to the internal situation in India he stated Jawaharlal Nehru's view that there would be no India if we did not have a hundred years of peace. After becoming free politically, we had learnt that it was not easy to become economically free also. There were 35,000,000 unemployed persons in the country including 12,000,000 graduates. Political freedom could not possibly mean very much to them.

Clearly, the economic situation was bad enough, but the situation among intellectuals was desperate. While the majority of European intellectuals viewed science with despair, Indian intellectuals viewed it with ignorance. Many of them had become lazy and had found security in the ideas of the past. Many scientists, too, had suffered from this malady, with the result that some of them did not even know what science was. Science requires that we look to our gift horses in the mouth, that is to say, continuously reexamine traditional concepts in the light of newer knowledge. But how many scientists do that ? This abject surrender of the majority of intellectuals had made us unable to live with dignity. A foreign critic had

* Report of an address by Dr. Mulk Raj Anand to ASWI, Mysore Branch on 23rd June 1965

remarked sardonically: 'Indians talk a good deal but are not addicted to doing very much. They are living on borrowed food, borrowed money, and borrowed hopes'.

Through his novels and stories Dr. Anand had tried to inculcate a revolutionary romanticism into our young people. He wanted them to take such action as would help humanity to reach its ultimate destiny. The first goals would be to provide sufficient food and clothing for all. This gigantic task would require the widespread application of scientific knowledge. Next it was necessary to ensure equality of opportunity for all; this, too, was a scientific concept. A serious effort at self-examination must be made if we are to reconstruct our social order. Only then would it be possible to synthesize from the common sources of the 'Two Cultures' a new 'Third Culture', based on social democracy. Only then could we produce a younger generation imbued with curiosity and a desire for beauty.

DEATH STRIKES AT DHORI

SAD DAYS, unfortunately, are not rare in the regions where men go down deep into the bowels of the earth for the treasures that lie there. Even so, May 28 was, indeed, a tragic date in the calendar of many families whose bread-winners had toiled at Dhori Colliery in the Hazaribagh District in Bihar State. On that day of death and disaster an explosion claimed some 250 lives and devastated an area of 2.5 square miles. The Government of India was commendably prompt in announcing its decision to set up a court of inquiry into the causes of the tragedy, but, at the time of writing, although nearly a fortnight has elapsed, neither the character of the inquiry nor its composition appears to have been settled. Meanwhile, there has been a demand from many quarters for a judicial inquiry. Although this demand has been backed, in some instances, by a suggestion that an act of sabotage might have been responsible for the disaster, this is not by any means the sole ground on which a judicial inquiry is being asked for. It has also been argued that, even if there is no provocation to suspect sabotage, a judicial inquiry might still be desirable if only to set the public mind at rest on the score of a full and fair investigation having been conducted into the observance of mining regulations generally and the provision and working of safety facilities in particular.

In view of the magnitude of the loss in human lives occasioned by the Dhori explosion, it seems desirable that the Government should order a judicial inquiry. There is precedent for this course and it may be recalled that, back in February 1958, when an accident in the Chinakuri Colliery had resulted in no less than 176 deaths, the Government had ordered a judicial inquiry. The finding of this inquiry was that the disaster had been caused by technical factors and not by lapses attributable to human agencies, and it is, no doubt, true that the chairman of the court of inquiry, Mr. S.N. Guha, had expressed the view that once the court became aware that the problems of the inquiry were fundamentally of a technical and scientific nature, it began to feel that "the judicial process is probably not the most effective way of getting at a scientific truth which may often elude even the most patient search outside a laboratory or a research institute." It is possible that this observation could be employed as an argument against a judicial inquiry into the disaster at Dhori. But, since it cannot by any means be taken for granted at this stage that only technical problems or factors are involved in the Dhori disaster also, the safest course for the Government would be to set up a court of inquiry presided over by a judge, adequately assisted by assessors of sufficient technical competence.

Any major accident involving much loss of life is bound to set off ripples of uneasiness in the public mind. It is often seen that, in the wake of a serious accident on the railways, in the air, on the seas, or in the mines, the normal state of public complacency is disturbed and a powerful reaction is provoked

* Reprinted by permission from Eastern Economist Vol. 44, No. 25, June 18, 1965.

often to a disproportionate degree of anxiety or apprehension. It is, therefore, always useful to make an attempt to view serious accidents of the type of the explosion at Dhori in their proper perspective. With this purpose in view, an attempt is being made here to discuss trends in coal-mine accidents in this country over a period and compare them with experiences elsewhere.

Details are given in Table I regarding loss of life in coal-mine accidents in this country between 1951 and 1963. It will be seen that the number of deaths due to accidents, with the exception of one year, has been on the decline and that between 1959 and 1963, the number of fatal casualties in accidents was consistently less than 300 every year while between 1951 and 1958, the casualties had always been above 300 (1956 and 1957 being exceptions). In 1958, the figure of 420 casualities was because of the Chinakuri (176 deaths) and Bhowrah (23 deaths) accidents. The casualties in each year have been related to coal raised as well as persons employed. The incidence of deaths per million tonnes of coal raised, had declined steadily, dropping from 0.91 in 1951 to 0.59 in 1963. Similarly, deaths for every thousand persons employed dropped from 9.12 in 1951 to 4.00 in 1963. These ratios, unfortunately, will be higher for the current year, thanks to the Dhori accident.

It is, however, a fact that accidents do take place even in mines which are well-equipped and where the safety measures are rigorously enforced. Even in the most advanced countries where there is no dearth of technical equipment and mining industries are prosperous as well as progressive in the matter of taking safety measures, serious accidents are not by any means unknown. Close on the heels of the Dhori accident was reported an equally grave disaster in a coal-mine in southern Japan and, later, on June 7, 55 miners were killed in an explosion in a coal-mine in Kakanj (central Yugoslavia).

TABLE I

Casualties in coal-mines in India

Year	*Persons killed in accidents*	*Death rate per 1,000 persons employed*	*Death rate per million tonnes of coal raised*
1951	319	0.91	9.12
1952	353	1.01	9.8
1953	330	0.97	9.2
1954	329	0.96	8.9
1955	309	0.89	8.1
1956	259	0.73	6.49
1957	182	0.49	4.14
1958	420	1.10	9.14
1959	212	0.50	4.45
1960	233	0.59	4.47
1961	268	0.65	4.81
1962	265	0.61	4.80
1963	267	0.59	4.00

Table II shows the number of fatal accidents at coal-mines in India and selected countries between 1935 and 1960. One fact which emerges clearly from a study of this data is that the number of deaths in accidents in coal-mines in these countries has declined during the last three decades. The casualties due to accident in the U.K. have been reduced to less than half during this period, while output of coal has been around 200 million tonnes all these years. In 1935 the number of deaths in the U.K. due to accidents was as high as 849 while in 1960 it had dropped to 317, which is noteworthy because the seams now being worked are deeper, a factor which tends to increase the hazards. The same trend is witnessed in the case of other countries, including India and the U.S.A.

TABLE II

Number of persons killed* at hard coal mines in the Principal Producing Countries (1935 to 1960)

						West Germany			*United States of America*	
Year	*India*	*UK*	*Belgium*	*Nether-lands*	*France*	*Ruhr*	*Aachen*	*West Germany*	*Anthracite*	*Bituminous*
1935	...	849	125	23	187	340	27	372	274	968
1936	...	784	146	15	163	374	41	421	244	1,098
1937	...	851	135	15	152	481	26	511	215	1,198
1938	...	851	131	18	143	493	33	534	225	880
1947	...	612	128	34	279	531	19	562	173	985
1948	...	466	140	17	299	580	34	629	137	862
1949	...	454	133	15	224	522	28	558	91	494
1950	...	487	167	18	268	614	19	645	93	550
1951	319	486	139	26	203	591	42	649	101	684
1952	353	417	177	19	219	591	49	652	99	449
1953	330	381	202	26	180	599	33	641	64	397
1954	329	366	147	21	179	547	29	590	62	334
1955	309	419	96	24	151	579	35	623	60	360
1956	259	329	374	19	153	451	35	494	56	392
1957	182	396	101	9	187	445	27	485	51	426
1958	420	327	88	27	191	456	35	498	32	324
1959	212	348	75	21	172	381	43	437	47	245
1960	233	317	72	11	115	309	32	350	35	291

* There are small variations with regard to the basis on which accidents involving subsequent deaths are counted as fatal accidents in the various countries.

Source: *Official Reports of the various countries.*

In comparing deaths in accidents in coal mines in different countries, they could be related to the volume of coal produced or the number of workers involved. In Table III figures of production of coal have been related to casualties in accidents in the case of the U.K., the U.S.A., the Netherlands, Belgium, France, West Germany and India. Because of the fluctuations in the number of deaths in accidents, five year averages have been taken both in regard to casualties and production. It is seen that the number of casualties for a million tonnes of coal produced was the least in the U.S.A. at 0.9 The corresponding figure for India was 5.7. Belgium had as high a death-rate as India; for every million tonnes of coal produced, five to six persons were usually killed in accidents. Figures for West Germany and France were significantly high at 3.1 and 3.4 respectively.

An attempt was made to compare the incidence of mortality due to accidents in coal-mines in India and selected countries in relation to the workers engaged in coal-mining (see Table IV). Unfortunately, the classification given in the ILO Yearbook, 1964, are not comparable. In the case of Canada, figures are for deaths per thousand wage-earners while for the U.S.A., France and the Netherlands, the rates are for a thousand man-years of 300 days each. In the case of Japan, the rate is for million man-hours worked, while in the case of India, the figures, relate to per thousand persons employed. It is obvious that these heterogeneous series do not throw up any useful information except that none of these countries is able to eliminate completely fatal accidents in coal-mines and is some years the ratio shoots up due to a major disaster.

If accidents have occurred in these countries, it is because mining operations are hazardous and even the best possible arrangements in coal-mines sometimes fail in the face of chance happenings. These figures are presented here not in order to minimise the severity of the blow that has brought misery to so many families at Dhori. They are set out to demonstrate that such accidents, even under the most regulated conditions, are, perhaps, not avoidable altogether. The hazards in coal-mining in this country may not perhaps get reduced in the years to come especially in the case of the much needed metallurgical coal for which we will have to dig deep in the bowels of the earth to operate difficult seams. Efforts should be made relentlessly to reduce the incidence of accidents and it is hoped that the probe into Dhori explosion will provide lessons which will be of assitance in this regard.

TABLE III

Accidental deaths in coal-mines in relation to production of coal

	Average number of deaths per year	*Average annual coal production (million tonnes)*	*Deaths per million tonnes*
	(Average for 1956-60)		
UK	343	216	1.5
Belgium	142	25	5.7
Netherlands	17	12	1.4
France	163	48	3.4
West Germany	453	144	3.1
USA	380	428	0.9
India	26	46	5.7

TABLE IV

Deaths due to accidents in relation to workers: India/selected countries

	Canada	**USA**	**India**	**Japan**	**France**	**Netherland**	**UK**
	Rate per 1,000 *wage earners*	*Rate per* 1,000 *man-years of* 300 *days each*	*Rate per* 1,000 *persons employed (average numbers)*	*Rate per million man-hours worked*	*Rate per* 1,000 *man-years of* 300 *days each*	*Rate per* 1,000 *man-years of* 300 *days each*	*Rate per* 1,000 *man-years of* 300 *days each*
1956 ...	2.23	2.48	0.73	0.72	0.79	0.46	0.56
1957 ...	2.11	2.81	0.49	0.73	0.98	0.37	0.68
1958 ...	8.03	2.67	1.10	0.64	0.97	0.51	0.59
1959 ...	2.00	2.38	0.50	0.68	0.91	0.43	0.69
1960 ...	2.64	2.77	0.59	0.79	0.67	0.30	0.67
1961 ...	1.98	2.76	0.65	0.79	0.74	0.36	0.54
1962 ...	2.11	2.79	0.61	0.77	0.63	——	0.61
1963 ...	1.21	2.67	0.59	2.12	0.60	——	0.64

VOTARIES OF A NEW AGE

B. K. NAYAR*

The United States of America is fast becoming the Mecca of Modern Science. Men and women of all calibre, the uninitiated and the initiated, the aspirant and the adept, young and old, have been flocking in ever-increasing numbers to the land of miracles. NASA is the word that thrills today even as the KAABA of an yester age. The dynamic cylindrical golden rocket sets the pace as majestically as the static cubical nubian rock had held the pride of place.

Forty thousand votaries of Science went to the States during the Nineteen-fiftys, of whom three-fifth were engineers and the rest natural scientists. They came from all over the globe—except the land of the Cosmos. Germany, Switzerland, Austria and U.K. led the European armada, India and China led the Asian caravan. Many were arch-priests in their own lands, and had become Nobel Laureates, FRS's and the like. Others had but a few scalps and were yet to be ordained. The majoirty had still to go through the fire and prove their mettle.

They went, they saw, and they were overcome. It was unlike anything they had ever experienced. No queueing for hours for a moment of worship. The seats of enlightenment were lavishly laid out with every conceivable facility, testing and protesting their excellence, waiting eagerly for the worshippers. Recognition and reward were easy to come by.

The beatitude of the enlightened makes even the mercenary feel like a messiah. In the Jehad against ignorance and poverty, spoils are galore, and easy to come by. On the march to the Moon, and the realms beyond, everything is excitement—creation and recreation in endless abandon.

And those who manage to get all these and heaven too within reach, look with disdain on the lands that kept them earth-bound. The hands that helped the shaping of a Pearl Mosque cannot easily find satisfaction in tinkering with a leaking thatch.

It may be said of USA today that if there is a heaven on earth, it is here, it is here, it is here. But all the best brains migrating to the States will not make the world a better place. Greatness lies not merely in tackling magnificent problems, but also in tackling ordinary problems magnificently. The light that kindles other lights, photo-activates other reactions, provides greater glow and warmth for mankind than the mighty effulgence of an erupting Vesuvius.

* N. R. Unit, C. S. I. R.

NOTES AND COMMENTS

Foreign exchange crisis and imports

The Committee of the Federation of Indian Chambers of Commerce & Industry have, in a communication to the Ministry of Commerce, shown great concern over the deteriorating foreign exchange position of the country.

About three years back, the Committee had made the following suggestions in regard to the imports and industrial development :

(*i*) High priority should be given to the establishment of import-saving industries.

(*ii*) Liberal imports of machine tools and capital goods will enable the country to develop the machine building potential.

(*iii*) The industrial licensing policy must be so implemented as to encourage entrepreneurs to undertake manufacture and processing of goods from the primary stage so that only basic raw materials are imported in preference to finished or semi-finished products.

(*iv*) Ideological considerations should not stand in the way of granting industrial licenses to entrepreneurs who can implement the schemes expeditiously.

Little consideration was, however, given to these suggestions. The pattern of imports continued to remain the same as ever. Rather, under the head "Consumer Goods" imports of food grains increased during the year 1964-65 and under the head 'Intermediate goods' imports of fertilizers increased.

Categories of Imports

	(Rs. in crores) 1964-65	1960-61
(i) Import of capital goods including spare parts	472.67	326.70
(ii) Import of intermediate goods	456.03	503.30
(iii) Import of consumer goods and food products	266.30	200.09
(iv) Import of unclassified items	68.30	40.07
Total	1263.30	1070.16

A substantial amount of foreign exchange is spent on items, termed as 'Capital goods', but which are not really so, like spare parts and components. A large variety of capital goods could be manufactured in the country if more of machine tools used for making capital goods, spare parts, components etc. are imported thus effecting a large saving in foreign exchange. Under the head 'capital goods' are also imported sewing machines, dry cells, batteries, office equipment, simple machines and parts. Stress should be laid on the development of the indigenous capacity of some of these items. In the group of Intermediate goods' many synthetic plastic materials are being imported in primary forms. Why should not these industries be developed in the country itself? They are a big drain on our foreign exchange. Metals like copper, tin, aluminium are also being imported. All these are vital for our industries but substitutes for them could perhaps mean a lot of saving of the foreign exchange. For instance, we have bauxite and we can manufacture Aluminium in any quantity. It would be worth-while making greater use of Aluminium in place of copper. It is possible to have aluminisation in place of galvanisation thus saving zinc. We should reduce the use of zinc & copper in making our utensils. These are costly items of imports. Steel is an other major items of import, particularly 'special steels.' The indigenous production of these should be developed. Sulphur is an other item, the production of which could be developed in the country. The development of such basic industries could alone reduce our dependence on foreign exchange.

Under items of 'consumer goods' are imported fish & fish preparations, dairy products, cereals, textile fabrics, glass & glass ware, animal & vegetable crude materials etc.—for the import of all these, there is no ample justification.

In fact, an elaborate study of each item to be imported should be made because in view of the present stringent position, even the smallest item should not be considered too small for study.

(*Abstracted from a letter to Ministry of Commerce from Federation of Indian Chambers of Commerce*).

* *

Dr. B.P. Pal has taken over as Director-General and Vice-President of Indian Council of Agricultural Research with effect from 10th May 1965.

(*Continued from page 12*)

Would such a position be interpreted as tailoring the advertisement?

(5) Whether the outside candidates who would have to compete purely on merit are at a disadvantage in the present system of advertisements? Would it be appropriate and practical, to recommend for adoption the suggestion made by a branch of ASWI that all new entrants to scientific posts should be Junior and Senior Research Fellows. After a specified period their work should be judged, and they may be directly absorbed in the organisation at a suitable level. Later on after every five years they may be considered for promotion to higher position in their own post.

These are some of the problems which merit serious consideration of the scientists. The Editor, Vijnan Karmee invites scientists in the laboratories, research institutions and elsewhere to be careful and send their views which may be published in the Vijnan Karmee.

Frankly Speaking—

TAILORED ADVERTISEMENTS

In a letter to the General Secretary (Organisation) of the ASWI, one of the branches have sent a copy of the representation made by them to the authorities of their institution pointing out that an advertisement issued by the Institute fitted in with qualifications and experience of only one of the scientists in the Institute and would preclude other scientists from competing for the post. A question arises as to what should be the policy in respect of advertisements and whether tailored advertisements are justified in certain cases. We would like to pose the issue for discussion and elicit the views and opinions of the members of the teaching, research and other scientific institutions and scientists. Specifically the problem may be stated as follows :

(1) Would it be correct to say that some of the advertisements for scientific posts emanating from the scientific organisations and institutes in the country are tailored to suit the qualifications of individual scientists?—or has it become generally the practice in most cases and hence assumed the form of a gross abuse tending to keep out talented scientist.

(2) In case the authorities or Head of a scientific organisation/institute come across a scientist who is pre-eminently suited for a particular field of specialised research, would it be possible and desirable for the authorities to offer such a scientist suitable appointment without advertisement and if such an appointment cannot be offered without advertisement, would it be wrong to frame the adveritsement in a manner as to suit the qualifications, field of work specialisation of the particular scientist.

(3) What would be the best method of recruitment to higher posts of individual scientists who have already worked and gained experience in the institutions?—Since at present all appointments to scientists' posts are only through advertisement, it is not possible to move for the direct promotion of a scientist. In such a case how is it wrong for the Head of the Institution to frame the advertisement in such a way as to provide for promotion for the scientists already working. It is but natural that the qualifications and experience would fit in with the qualifications and experience of the scientists already working.

(4) The authorities of an institution would naturally be anxious to get the best person available for appointment to a vacant post. In some cases the advertisement will have to be framed in such a manner as to have a wider number of candidates. It is likely that the advertisement may become too general and result in all types of candidates applying and later on complaining that they have not been selected. Would it not be desirable for the advertisement to be specific and hence result in limiting the field to only such candidates who may have a definite chance.

(*Continued on page 11*)

LETTER TO THE EDITOR

VIJNAN KARMEE

I do hope, dear Mr. Editor, that you will excuse me for writing this letter. The quality of the Vijnan Karmee, in my opinion, has declined. For the last several issues, one finds in it only articles like "Science in the Automobile Industry" or "Science in Ruritania" and some bits of "Science News". That such items should form almost the entire content of the forum of an organization which is the mouthpiece of the organized scientific workers of India, is as surprising as it is painful. If one were to infer the present state of the health of the ASWI from that of its forum, one would have to conclude that this "Third Republic" of the ASWI is also going the way of its late lamented predecessors.

Scanning the pages of the recent issues of the Vijnan Karmee, one fails to discern in it a tangible editorial policy. In what way, for instance, are the goals of the ASWI helped by an academic discourse on, say, the science in steel industry? If the idea is to provide scientific information, I can only describe it as ill-conceived and misplaced. The forum of the ASWI need never compete in the field of disseminating scientific information—in which venture, in any case, it can only hope to be second best. If the intention is to provide statistics, that, of course, is more pertinent. But even this can be overdone. After all, providing statistics on national industries (even when competently done) cannot be the *sole* business of Vijnan Karmee.

I have a suspicion, however, that this pattern may be related to the recent theory of 'planning'. There have been of late a good deal of romantic talk about 'planning', about scientists participating in planning for the nation, about scientific (or politico-scientific) collaboration with other Afro-Asian countries, about 'imperialist science' and what not. I wonder whether these ideas are at the back of this new policy. If so, I only feel sorry for the wishful thinking and the autohypnosis displayed. For one thing, these theories, as stated, are yet too vague, romantic and half-baked to be meant seriously. And, for another, most of the 'planning'-type articles in the Vijnan Karmee are too superficial in scope to be relevant even to these imprecise theories. Not that there is anything wrong in planning, of course; nor in scientists helping in planning. These are laudable ideas. But planning is a serious business requiring a clear objective, and hard work and study, just because you say planning, an inert collection of half facts does not become a plan.

But even granting that planning is an important business and that the Vijnan Karmee is doing an excellent job of if, is that all the forum of the ASWI supposed to do? What the ASWI should primarily concern itself with is an examination of the problems of scientific progress and scientific research in India. It should initiate and sustain a continuous tempo of frank discussion as to what impedes the progress of science in India and what measures to adopt for its remedy. And, above all, it should carry out a continuous struggle, on the intellectual level, to bring about such reforms in the scientific organization in the country as it honestly believes to be necessary. Such, in my opinion, is the chief role of the ASWI; and the Vijnan Karmee, as its forum, should furnish the leadership and inspiration for its consummation. In this role the present Vijnan Karmee is found wholly wanting.

I can of course imagine that perhaps a large part of the blame for this unhappy state lies with us, we scientific workers, for not co-operating with the Vijnan Karmee by feeding it regularly with useful articles. Perhaps so; I do not know. But if it is, we at least have not been told. Nor can I persuade myself to believe that, if true, this handicap could not have been overcome by an imaginative editorial policy.

Please believe me, Mr. Editor, that it is not my intention to hold up either you or the Vijnan Karmee to ridicule. My only purpose has been to draw pointed attention to the serious danger of sterile fossilization that the Vijnan Karmee, I honestly believe, is facing, and to bring home forcefully the urgent necessity of arresting this drift in time. I do not expect, nor hope, that you or your readers will agree wholly with what I say. But if these few lines at least generate a mild feeling of outraged shock and a little soul-searching, my purpose will have been well served.

Perhaps you will allow me to end with a few suggestions. Let us first be clear about the objective of the Vijnan Karmee. As I have said before, the Vijnan Karmee must provide the intellectual leadership for a revolution in the scientific set-up in India. Science has come to India for sometime now, but it has yet to take its roots. Meanwhile a host of weeds have grown merrily around the plant, further stunting its growth. The ASWI has the responsibility for leading the battle for clearing these weeds and providing the proper conditions for the healthy growth of the plant. Evidently, the Vijnan Karmee would be nothing if it failed to stimulate and to provoke. Any stereotyped, pedantic discussion (such as exemplified by the majority of the "planning" and "Science in......" type of articles) should be anathema to the Vijnan Karmee. Similarly, the merely informative—something which gives only inert information—should have no place in this forum. Articles published in it may well contain information, but they *must* also contain some *idea*—idea on which you can ruminate and which generates some discussion. In fact, frank discussion and debate should be the life blood of the ASWI and the Vijnan Karmee.

I suggest that articles in future should be selected which *critically* analyse some important problem of the day, and which in turn generate more debate. And plenty of space should be left for discussion. This may be done either by selecting a topic and inviting a series of articles on the subject, or by the more conventional method of opening a "Letters" section wherein communications from the readers on various topics (including criticism of articles published) will be welcomed. Secondly, the subjects selected should be of general interest and not, as at present, be so far removed from life that we give the impression of being a group of old venerable people debating some abstract philosophical subject with cool detachment. Thirdly, every issue must carry a short editorial which will initiate a line of discussion on some important problem of the day. Lastly, the activities of the Branches should be publicized at greater length, including fairly detailed reports of the important discussions they have held. This will serve the dual purpose of keeping a friendly check on the activities of the Branches (thereby shaming the lazy ones into greater effort) and giving the benefit of interesting debates held in one Branch to the members of others.

To conclude, let the Vijnan Karmee be an inspiring vehicle for starting a ferment in the Indian scientific society; let it never descend into the morass of the merely existing. And, being alive and dynamic, let it not be afraid to kick up a little dust here and there.

— Kshirod Ranjan Bhattacharya
C.F.T.R.I., Mysore.

Editor's reply

Your letter, Dear Kshirod Ranjan, is out of date by at least two months but still it is interesting enough to merit publication. A Journal is as good as the members who constitute the organisation and you are not wrong in concluding that the activities of the ASWI are at a low ebb. The responsibility for the state of affairs is as much yours and mine as of anybody else. The editors have been following the well known dictum "If you cannot produce—you reproduce." At least credit must be given for keeping the Journal alive till more active friends like you wake up and take some interest. It is easy to be criticial, it is difficult to be constructive. We are not afraid of your criticism or of your ridicule if you want it that way. We are only afraid of the lethargy and prostration —the present phase through which the organisation appears to be passing. May we invite you to mobilise such talent as may be available with yourself and your colleagues to send us at least one interesting and thought-provoking article. Kick up all the dust that you like in Mysore and let us hope that when the haze clears, something clearer in the form of an article will emerge.

(*Continued from page 28*)

RESOLUTION NO. 5

This association resolves to request the government to liberalise the leave travel concession rules and

(*i*) It may be applicable to any place in the country, thereby removing the restriction of 'home town'.

& (*ii*) Reimburs the entire Journey/Railway fare in full.

Or

Issue warrant for travel by the entitled class.

RESOLUTION NO. 6

The Central body of this Association resolves to write off a amount of Rs. 85.50 which formed the arrears of subscription, could not be collected.

United Nations Inter-Regional Seminar on Industrial Research and Development Institutes in Developing Countries

Report of the Seminar

The United Nations Inter-regional Seminar on Industrial Research and Development Institutes in Developing Countries was held on November 30 through December 11, 1964 at the Industry Institute, Beirut, Lebanon. The Seminar was attended by forty-eight participants and observers from Algeria, Argentina, Austria, Ceylon, Colombia, Czechoslovakia, Federal Republic of Germany, France, Ghana, India, Indonesia, Iran, Iraq, Italy, Lebanon, Libya, Malagasy Republic, Malaysia, Mexico, The Netherlands, Nigeria, Polish People's Republic, Pakistan, Philippines, Saudi Arabia, Sudan, Syrian Arab Republic, Thailand, United Arab Republic, United Kingdom, United Republic of Tanzania, Union of Soviet Socialist Republic, Upper Volta, Zambia, and from the Battelle Memorial Institute, Arthur D. Little, Inc., the Economic Commission for Africa, Food and Agriculture Organization, International Labour Office, United Nations Educational, Scientific and Cultural Organization and the United Nations Special Fund, as well as by eight expert consultants and three members of the United Nations Headquarters staff.

The welcoming address was given by the Honorary Chairman, H.E. Najib Salha, Minister of Planning of Lebanon.

An opening statement was then read for Dr. Hilmi Abdul-Rahman, Commissioner of the United Nations Centre for Industrial Development (CID) by Dr. Azmi Afifi, Special Technical Advisor, C.I.D., and Director of the Seminar.

The Seminar unanimously elected the following officers.

(1) Mr. E. Lartey of Ghana as Chairman and Professor M. Taslimi of Iran as Rapporteur for the discussion on the Concept and Objectives of Industrial Research Institutes.

(2) Dr. S. Siddiqui of Pakistan as Chairman and Mr. I. Deschamps of Mexico as Rapporteur for the discussion on Industrial Extension Services.

(3) Mr. S. M. A. del Carril of Argentina as Chairman and Professor Ai-Kim Kiang of Malaysia as Rapporteur for the discussion on Organizational Concepts and Problems.

(4) Mr. K. N. Saad of Lebanon as Chairman of the Coordinating Committee composed of Mr. E. Lartey of Ghana, Mr. Baldev Singh of India, Professor M. Taslimi of Iran, Mr. K.N. Saad of Lebanon, Professor Ai-Kim Kiang of Malaysia, Mr. I. Deschamps of Mexico, Mr. Manuel of the Philippines and Dr. M. Halfawy of the U.A.R.

After adoption of its agenda, the Seminar proceeded with the presentation and discussion of working papers, discussion papers and country reports.

At its final session, the Seminar unanimously adopted the present report containing recommendations and the conclusions reached.

The Seminar expressed its sincere appreciation of the generous hospitality afforded by the Lebanese Government and by the Industry Institute and its gratitude to all expert consultants and observers for attending the meeting and presenting such excellent papers.

1. The Concept and Objectives of Industrial Research and Development Institutes

Research, scientific and technological as well as socio-economic, is an essential instrument in developing the human and material resources of the nation. Industrial research is of basic significance in laying the foundation of a sound industrial base and in accelerating the economic growth of developing countries.

Industrial research also plays an important supporting role in the formulation and implementation of national policy and economic development plans where these exist. It was considered advisable that industrial research should not be involved directly in the executive functions of governments.

The need was stressed to graft indigenous research on imported technology as soon as possible and to nurture such graft to full fruition to achieve increasing self-dependence.

It was agreed that the broad spectrum of industrial research should be given attention. Much discussion centred around the difference between basic or fundamental and applied research and a consensus of opinion was reached that no clear line of demarcation could be drawn *a priori*. Perhaps this subject could best be looked at in the light of the expectation of short-term as against long-term benefits. It was agreed that developing countries should emphasize applied research but fundamental research should not be neglected.

Investment in industrial research should be recognised as in fact an investment in industry and even in the future of the nation.

Industrial research should cater for all types of industry, regardless of size, and public as well as private, using such different methods of approach as necessary. It should further attempt to develop technologies best suited to local needs and conditions.

The functions of industrial research and development include discovery of new products, prospecting for and utilization of raw materials, development, improvement or adaptation of production methods, techniques, processes or suitable equipment, pilot plant trials, operational research, formulation of standards, quality control, marketing research, feasibility studies, design and productivity studies.

The institutionalization of industrial research was considered to be one of the most effective means of promoting industrialization in the developing countries. A clearer delineation of responsibilities for industrial research and development functions can thus be achieved.

It was agreed that the industrial research and development institute should also be prepared to provide these services which are required in the implementation of an industrial project on a rational and economic basis. Such services include feasibility studies covering, inter-alia, markets, raw materials, plant location, capital requirements, production costs and potential profitability. They include consulting services covering the choice of the most appropriate process and equipment and of a plant layout.

They cover also design and construction supervision services, where appropriate, and should also extend through the initial stages of production and beyond. Services to existing industries would in all likelihood include consultancy and trouble-shooting, production and quality control and advice on management problems. Such services can well, in turn, lead to further research on behalf of industry.

Whereas the integration of industrial research and development functions within one institute was given favourable consideration, it was felt that under certain conditions some functions could be better undertaken by other organizations including appropriate government agencies. However, the value of team work and cooperation should, at all times, be preserved.

The selection of industrial research programmes and projects should be made in the light of national needs in both the private and public sectors. The research institute should also be in a position to respond to specific requests from industry.

Measurements are of extreme importance in research and development. In order to measure, it is necessary to adapt reference standards and to provide calibration facilities. The formation of standards of quality and of codes of practice also is an important tool for industrial development. Accordingly, it was the consensus that research and development institute should have testing facilities to serve both the needs of its research and of production and quality control.

It was recognized that industrial research institutes can contribute significantly to the efforts in both these fields through their laboratory facilities and the wealth of professional experience available within these institutes. Research and development institutes can also assist in promoting the application of standards by industry. Mandatory application of such standards, where appropriate, should be controlled by the State.

2. Industrial Extension Services

The term industrial extension services includes the whole range of activities by which scientific, technical and economic knowledge may be transferred into industrial practice to bridge the gap between industrial research and development and the actual utilization of the results thereof.

With a view to its speedy application industrial research should not be conducted in isolation, but in relation to the practical needs and requirements of industrial development. The research organization can only meet its responsibilities towards the nation by being fully associated with its industrial development objectives. An important function of such extension services is therefore to provide close contact between the problems of commercial production and the conduct of industrial research, and to promote the closest cooperation and the association between research groups all the way from laboratory bench work through pilot plant operations and those responsible for commercial production.

Particular attention was given to the role of industrial research institutes in connection with:

(*a*) the responsibility of such institutes in the publication of the results of industrial research.

(*b*) the choice of extension methods including consultancy and industrial information services.

It was generally agreed that industrial research institutes should give most serious attention to the processes of transmission of research and development results in order that such results find effective use in the country's industries. Such institutes must also help accelerate the application of research results by industries in the developing countries. To do this most effectively, it is necessary to develop the appropriate mechanisms, first to get to know the needs of industry and, second, to stimulate interest and generate confidence in research and development on the part of industry.

In obtaining and transmitting information generated or obtained by industrial research institutes, two gaps are to be bridged. The first gap is that between the research and development institute and the world reservoir of scientific, technical and economic information and the second is between indigenous research organizations and the country's industries.

In the attempt to reach the country's industries and stimulate their interest in science and technology, maximum use should be made of various tools such as personal visits and contacts, demonstrations, training courses, in-plant trials and pilot operations, films, radio, exhibits and seminars. Seminars naturally also serve to bring research institutes into close contact with similar organizations abroad.

Library and documentation facilities were strongly emphasized not only as a *must* in the day-to-day research and development activities of the institutes but also for the provision of information services to industry. It was considered important that such facilities should be made available for direct use by industry.

Industrial information services may include:

(*a*) Technical inquiry services which offer answers to specific questions posed by industry on production methods, industrial management matters, general engineering problems, types of equipment, marketing considerations, patents, etc.

(*b*) General industrial information which often refers to trends and possibilities for using specific raw materials, promising industrial products and processes, industrial projects and programmes and wide variety of matters of a general nature.

(*c*) Technical digest services.

(*d*) Training manuals for use by technical staff and by the management of industries.

In addition to the published literature, other mechanisms should be reviewed for locating research and industrial information of a practical nature which may be available through other institutes or organisations in the rest of the world. Such information may have to be adopted to local conditions before its introduction in industry.

In this and other connections, it was considered worthwhile by the participants to explore fully the availability to research and development institutes in the developing countries of assistance in the field of extension services among others, from international organizations, specialized agencies, foreign governments through bi-lateral aid, other research institutes, and private consulting firms.

The need for adoption of the most appropriate extension techniques to meet the highly complex requirements of the whole spectrum of industrial development was repeatedly considered. It was agreed that no single solution could be devised which would automatically apply under the varying local conditions and environments prevailing in the developing countries and the methodology of industrial extension would thus have to be varied.

It was, however, considered that the circumstances and requirements of the developing countries are likely to be best served in many a developing country by a system in which the industrial research institute is also responsible for the provision of extension services in its own field of activity. Integration of responsibility for both research and extension within the one institute will often help ensure effective operation.

3. Organisational Consideration & Problems

Industrial research and development in the advanced countries is generally handled by one or more — most often a combination of several of the following types of organizations:

(*a*) Laboratories of individual factories or firms;

(*b*) Autonomous non-profit corporate institutions of broad scope, which perform work on contract for both government and private enterprises;

(*c*) Specialized institutes, set up either by government or cooperatively (or with government subsidy) to serve particular fields of industry;

(*d*) Departments or institutions under certain ministries of government;

(*e*) Private consulting and research organizations operating for profit.

The developing countries to date have comparatively few organizations of types (*a*) or (*e*). Those which have initiated industrial research have done so under a variety of organizational patterns, most of which fall into categories (*b*), (*c*) and (*d*) or combinations thereof. Many developing countries have not yet launched institutional industrial research facilities, but are currently formulating plans for them as essential elements in their national economic and industrial development programmes.

In the choice of organizational pattern for the institutes, consideration will have to be given to a number of factors, such as :

(*a*) The level of economic and industrial development and the expected scale of growth.

(*b*) The type and scale of operation of industries existing or planned for development.

(*c*) The administrative set-up in the country.

(*d*) Special needs of any predominant raw materials.

(*e*) Financial resources and availability of scientific and technical personnel.

It was felt that a major benefit deriving from the Seminar was ample discussion of such topics as multipurpose and specialized institutes, national or sub-regional institutes, and similar organizational aspects. This was of value to each developing country in making a choice of the preferred form of organization, or in some cases possible reorganization of its industrial research structure for the most effective impact.

However, where limited staff and resources are to be employed to offer a wide range of services to multiple types of industry, the multipurpose institute offers obvious advantages.

As a useful compromise, some countries have situated numerous specialized institutes within one physical complex or "technological centre", which also permits them to share the use of certain common facilities.

Concerning regional or sub-regional industrial research institutions, it was observed that some are operating successfully despite the inherent problems of regional operation. Such success depends on an unusual homogeneity of the peoples, their historic ties, and concurrent programmes of economic integration or common markets.

It is the general opinion that the industrial research institutes themselves should assume a leading role in the selection and initiation of research projects relating to industrial development, since they are best equipped to identify these problems and to estimate their chances of solving them. At the same time, such research projects, other than those requested directly by industry, should be decided upon in collaboration with economic and industrial planning authorities to ensure their relationship to overall development goals. On the whole it is felt that this collaborative form of research selection is more fruitful than systems of external direction by coordinating bodies or rigid control by government, administrative and planning authorities. Moreover, once projects have been agreed upon, the institute should have sufficient autonomy in the execution of its functions.

In the view of many delegates, the choice of research projects should not be too restricted and while applied research is the primary objective, institute budgets should allow for a certain amount of basic or background research. It is also acknowledged as essential that an institute be free to pursue promising self-initiated projects, as otherwise many valuable ideas generated by the research men themselves may be stifled.

While close cooperation between universities and research institutes should be cultivated, the primary responsibility for industrial research should be vested in the research institutes. Such close liaison will bring about free interchange and cross-fertilization of ideas and thus help bridge the gap between workers in pure and applied science.

Industrial research institutes should also maintain close working relationship with other research and technical organizations, local and foreign, as well as with institutions concerned with industrial development and finance and other aspects of national development and, above all, with the industries themselves.

The role, which established institutes and organizations could play in setting up of new ones, was recognized as a very useful one.

It was observed that most industrial research institutes in the developing countries are and must be, directly or indirectly, financed in a large measure by government. With some exceptions, however, they commonly have some degree of autonomy.

Some institutes, serving primary industries, have funds derived from taxes or levies imposed on the commodities produced. In certain countries, levies are also made on the manufacturing industries to finance industrial research, irrespective of whether they avail themselves of the service or not.

In some institutes the support may consist partly of government grants and partly of fees or contract income earned directly through services to industry. For a new institute, the latter is likely to be the smaller share until industry has learned the value of such services and the institute has gained its confidence through demonstrated performance. In any event, it is generally preferable for a research institute to charge for its work on some basis, both for proper appreciation of the services by the user and to keep the institute oriented realistically towards the actual needs of industry.

Nevertheless, it is the concensus that in all developing countries government has the responsibility and obligation to guarantee adequate financial support on a long-term basis to its industrial research institutes to ensure continuity in their work and to enable them to fulfil their basic objectives.

Industrial research and development institutes must be staffed with the best qualified people available at all levels. An institute cannot function successfully with staff inferior to that of the enterprises it expects to advise. Thus such an institute must be in a position to compete for the best men. In a large number of the institutes reporting to the Seminar this appeared as one of the chief problems. In particular, those operating under civil service, salary limitations are experiencing difficulty, both in attracting the most able staff and in retaining them under competitive conditions. It was considered that the research institutes should have autonomy in the selection of personnel.

Apart from this aspect, in view of the common scarcity of research personnel, a number of institutes in developing countries have launched sizeable internal and external training programmes. It was felt that such training programmes were of extreme importance and should be strengthened where necessary.

Some countries experience difficulty in obtaining experts of the types and qualifications required, or in obtaining them within a reasonable time to meet the demands of the programme. The staffing problem continues to be the greatest common difficulty of industrial research institutes in most developing countries.

In the equipping of laboratories and the setting-up of facilities for research and development, adequate repair and maintenance facilities, workshops and skilled technicians should be included.

Some of the institutes in developing countries have been launched with bilateral or international technical assistance. The generally favourable reports on such assistance stress the value of help in the initial organizational stages and in counterpart training, as well as in providing individual specialists for specific work.

It was the concensus that despite the great value of external technical aid, it cannot serve as a substitute for the development of local staff, needed in larger numbers.

Recommendations and Conclusions

The Inter-regional Seminar on Industrial Research and Development Institutes in Developing Countries:

Recognizing the role of industrial research and development as an essential element in accelerating economic growth,

Conscious that the differing administrative and socio-economic conditions of the countries must influence the institutional instruments required to perform this role most effectively in each case,

Recommends and concludes that:

1. Developing countries should take the necessary steps as soon as possible to establish appropriate industrial research and development facilities or to strengthen existing ones on lines most applicable to the practical requirements and national development goals;

2. With due recognition of the importance of basic research, the emphasis of these

research institutes should be upon applied research and development programmes fully oriented toward the needs of industry;

3. Industrial research and development institutes should be given the greatest possible autonomy to enable them to function in the most efficient manner; without the inhibitive influence of ordinary government procedures and restrictions generally incompatible with the needs of successful research operation;

4. Personnel engaged in research and development should be rewarded on a scale that will at all times enable the research institutes to engage and retain the best personnel to be found and to ensure their complete devotion to the work;

5. Governments of Developing Countries should be called upon to accept full responsibility for the provision of adequate financial support on a long-term basis to their industrial research institutes to ensure continuity in their work and to enable them to fulfil their basic objectives;

6. Equipment and supplies of all kinds needed for industrial research should be exempted from custom duties and taxes, should not be subject to import restrictions or licence, and should be allocated adequate foreign exchange in all cases;

7. The United Nations should enlarge its programme to assist developing countries directly in (*a*) on-the-spot studies of industrial research and development organization or needs in individual countries with a view to establishing and for strengthening such institutions and their operating links with industry, (*b*) the implementation of such studies including the establishment, equipping and operating of such institutions and the training of industrial research personnel;

8. The United Nations should study, and keep under review and dessiminate information on the organizational aspects, functioning and programmes of the various industrial research and development institutes and similar organizations or departments, with a view to facilitating the interchange of such information between different countries. The United Nations should also assist in the interchange of visits between industrial research personnel in different countries;

9. The United Nations should assist the developing countries by undertaking detailed studies of the various systems of consulting services, patents, different types of license agreements and contracts, the systems of tenders, the various available licences and know-how, etc. The results of these studies should be made available to developing countries;

10. The United Nations should hold periodical meetings whether regional, continental or inter-regional, to study and discuss various problems and issues in the field of industrial research and development;

11. The Seminar calls upon the developing countries as well as upon the Centre of Industrial Development to take the necessary steps to further the implementation of these recommendations.

12. The Seminar wished to express its thanks to the United Nations Centre for Industrial Development for holding this meeting and to the host Government of Lebanon for its hospitality.

Association of Scientific Workers Khamaria, Jabalpur

Annual Report for the year 1964-65

Membership: During the year 21 members were admitted and 9 members resigned or were removed for nonpayment of dues. The membership as on 21st March 1965 is 161.

Trade Union Activities: The folllowing representations were made to Government on behalf of our members:-

(*i*) *Direct Recruitment:* This issue is under correspondance with the Govt. No, satisfactory reply so far has been received. This has now been handed over to Association of Scientific Workers, India, who would take this issue at All India basis. (Resolution 4).

(*ii*) 80% *Permanency:* It was observed that the staff in Ordnance Factories and allied establishments was not being confirmed. It has been presented to Government that the confirmation as a whole should be revised as the strength of Establishment has considerably increased and on this increased strength 80%, confirmation be done. We are thankful to the Government for initiating action on this matter.

(*iii*) *Three Years Bar on Promotion:* This bar has hit the staff very hard. In particular at such a time when lot of expansion in all Establishments is expected. Also at this time many of the stagnated staff were expecting to get their due. This association has strongly protested against such order. There are indications that the bar of 3 years is likely to be brought down to 2 years which is also the probationary period for promoted staff.

(*iv*) *Pay Scales of:*

(*a*) *Supervisor Tech. Gr III/'B':* Even after a lot of correspondence the Government is adamant on revising the pay scale of Science Graduates or grant them increments. This issue is hopelessly dropped.

(*b*) *Inspection Foreman:* The position is same as for (*a*) above, except that Government is willing to place those inspection foreman who are actually engaged in production jobs in the same posting as Production Foreman. This again is going to create lots of complication. This issue is still in correspondence.

(*v*) *Regradation of Draughtsman:* After a prolonged correspondence, Government is of the opinion that the new grades created would be helpful for the majority of staff.

(*vi*) *Qualifications for Recruitment:*

(*a*) *Draughtsmen:* It was observed from the advertisements that the Diploma in draughtsmanship was omitted for certain grades of Draughtsmen. Authorities concerned have agreed to include the same in future advertisement.

(*b*) *S.S.A.*: Though initial start of the pay scale of SSA is lower than Foreman, qualifications prescribed are higher. The issue is under consideration of the Government.

(*vii*) *Quarters for Staff:* The acute shortage of quarters is known to all. Representations have been sent to different departments to build more quarters for their staff. Government has assured that in new Factories most of the staff would be provided with quarters and action will also be taken to build more quarters in existing factories.

(*viii*) *Influx of Outsiders in C.I.M.E.* It was represented to Government that many of the staff from other Departments were being transferred to CIME and promoted which is causing lot of frustration to C.I.M.E. Staff. The issue is still under correspondence.

(*ix*) *Separate Pyramid No. for C.I.M.E. Staff*: D.I. (Arms) has been requested to allot a separate pyramid number for the C.I.M.E. Staff which is at present common to E.R.D.L. and A.P.D.E. Staff. The issue is under careful consideration of the authorities.

(*x*) *Dairy Farms for Ordnance Estates*: On the request of this Association Ministry of Defence has agreed to establish Dairy Farms in Ordnance Estates. On experimental basis two dairy farms have been started at SHAHJAHANPUR and AMBERNATH

(*xi*) *Transport on Amenity to Staff of Inspectorates:* The transport belonging to Inspectorates is at present not given on amenity to Civilian staff. This issue was taken up with the authorities, who are understood to have agreed in principle.

(*xii*) *Reimbursement of Tuition Fee:* The rules for payments are so complicated that the benefit granted has been reduced to nil. A resolution to this effect is being placed before the General Body. The issue has been handed over to A.S.W. (I) to be taken up at all India basis.

(*xiii*) *Leave Travel Concession*: The concession as it is now is of not much benefit to the employees. This Association is demanding free travel pass as per resolution. The same has been handed over to A.S.W. I. for their action also.

(*xiv*) *War Bonus:* The Bonus granted to the employees after the last war is being recovered by the Government in a very unsporting way. It is further more surprising that the bonus is being recovered with compound interest. This Association is in correspondence with the Government regarding this matter. (Resolution 3)

Besides above issues, the following local matters were taken up with the Authorities:-

1. Electrification of unrenovated N, P & Q type quarters.
2. Quarters for Supervisory staff in O.F.K.
3. Promotions of Supervisor 'B' to 'A. Grade
4. Repairs to Roads in O.F.K. Estate.
5. Electric Supply in Eastland: Many complaints were recorded by the Secretary regarding the failures of electric supply in Eastland. The Secretary met the General Manager, O.F. Khamaria and the matter was settled with M.E.S. Authorities then and there.

Cultural Activities: Technical Film Shows—Every month two technical film shows have been held. Many full length Hindi and English feature films were also shown to members. In this respect we are constrained to say that members have not taken full advantage of the opportunity. We are very grateful to all the Organisations who have helped us in organising these shows.

It was proposed to have some cultural programmes at the half yearly General Body but this did not materialise due to poor response from the members.

Library: This Association Library has been doing good services to members. In this respect, thanks are due to Director of Library Services, U.S.I.S., Bombay and Central Library, JABALPUR who have been loaning us their books. In addition to this U.S.I.S. BOMBAY presented free of cost about fifty books to our Library.

EC Meeting: 5 E.C. Meetings were held during the year under review. All were well attended.

Bulletin: Three Bulletins were published by this Association, which ventilated the grievances of the members.

Funds: Position of funds is satisfactory. We are very thankful to all the members who have paid their subscription in time. There are very few defaulters whose dues have been written off. Liberal donations have also been given by the members which amounted to approximately Rs. 420.02

RESOLUTIONS

1. **Probationery Period of 3 years for promotion**

PREAMBLE

At present, employees should have served at least for two years in each grade/cadre before getting entitled for consideration for promotion to the next higher grade/cadre. However, it is now understood that the Govt. of India has raised this limit of probationery period from two to three before an individual is considered for promotion. Employees of the Defence Department in general and more particularly of the Defence Production/Inspection Departments have been stangnating for a number of years in the same cadre/grade due to paucity of opportunities till the emergency started. Now, when more posts/vacancies have been sanctioned in the Departments, the above restrictions deny much employees, who have put in long service, the chance of utilising such opportunities. Even though it may be that the Government might have introduced this limit with the laudable purpose of preventing favourites getting quick promotions, yet, in actual practice, this is hindering the chances even in genuine cases.

This Association therefore submits that (*i*) the probationery period in any cadre/grade should not be raised from 2 to 3 years for consideration for promotion and (*ii*) even this limit of 2 years probationery period in a particular post should not be applicable in the case of employees with long, satisfactory service in the same departments in a similar cadre or in a grade in the line of promotion.

RESOLUTION NO. 1

This association therefore resolves to request the Government:

1. To withdrawn the order raising the limit of service from 2 to 3 years in a particular post for consideration for promotion, and
2. Not to make even this restriction (of 2 years' service limit in a particular post) applicable in the case of employees who have served for not less than 10 years in the department and in posts/grades in the same line of promotion.

2. Reimbursement of Tuition Fees of Government Servants' Children

PREAMBLE

According to certain recent orders, staff drawing pay upto Rs. 600/- p.m. are entitled to get reimbursement of tuition fees paid for their children. Apparently this seems to be a great boon, but actually this littered with such a lot of hurdles that the benefits accrued, if any, will be next to nothing.

The reimbursement is restricted to the rates approved by the respective Governments. It is widely known that most State Governments have either made education free or the tuition fees is so petty, i.e. of the order of Rs. 2.00 or Rs. 3.00 that reimbursement of such a small sum will not be considered worthwhile.

However, many Central Government employees are compelled to put their children in recognised English medium schools who charge Rs. 10/- to Rs. 25/- p.m. as tuition fees, as these employees are liable to be transferred from one regional language area to another and also because such schools, generally, have a better standard of instruction. But because their fees are in excess of those fixed by the State Government concerned, reimbursement is negligible.

Also, tuition fees paid for class I to V and kindergarten classes are not admitted for reimbursement. This according to us, is not justified and unfair. Here in Jabalpur, for example, the fees charged for the lowest kindergarten classes is about Rs. 10.00. If the reimbursement for this is not permissible, then much of the purpose of this order is nullified.

Again, this reimbursement is limited to the bare tuition fees only and excludes library fees, sports fees, etc. It is not understood why these fees have been left out of the perview of this rule. Does the Government consider that children should not make use of library or take part in games or is that the Government considers the levy of these fees by the schools irregular but such fees are, however, allowed to be charged by the schools with the connivance of the Govt.

As far as is known to us, no individual has succeeded in getting reimbursement so far since the rule came into force. If the genuine purpose of the order is to give some form of relief to their employees then the rule should be liberalised and made very clear. This Association therefore suggests that this benefit should be applicable to:

(*i*) Children studying in recognised school the fees charged by which are much more than that prescribed by the respective state,

(*ii*) all fees like games-fees, library fees, etc. charged by schools,

(*iii*) all classes in the schools from kindergarten upwards.

RESOLUTION NO. 2

This association therefore resolves to request the Government to libralise the orders for reimbursement of tuition fees so that:

(*i*) The bonafide fees paid to all recognised schools, irrespective of wheather they are according to the rates approved by the respective state government or not, are reimbursed in full.

(*ii*) Fees other than tuition fees, like library fees, sports fees, etc., are also Reimbursed.

(*iii*) The benefit of this order is applicable to all classes from kindergarten upwards.

3. **Recovery of War Bonus**

PREAMBLE

War Bonus was given to the Defence employees after the end of the war by the then Government in appreciation of the service rendered during war. The present Government, being a successor Government has to honour the then Government's commitments. It is therefore regrettable that the present Government is not only recovering the said bonus, which is unfair and probably illegal, but worse still are levying compound interest which is also recovered. It should clearly be understood that bonus was not a loan advanced to the employees. The Government should therefore be requested to desist from making this recovery. Failing this, at least, the inhuman levy of compound interest should be withdrawn and the amount, if already collected, refunded.

RESOLUTION NO. 3

This association therefore resolves to request the Government to rescind the order for recovery of war bonus paid to its defence employees.

Direct Recruitment

PREAMBLE

Of late, the trend of Government thinking seems to be to make direct recruitment to almost all categories of posts. While this Association appreciates and agrees that the infusion of new and fresh blood might be unavoidable to bring new ideas, it is felt by this Association that the direct recruitment will be very much essential and appropriate only in the Research & Development wing and should not be applicable to inspection and production departments. Here experience has got a greater part to play. Also, indiscriminate direct recruitment is very harmful and experience, with basic qualifications, will be more valuable. Such recruitment might affect adversely the morale and fibre of the departments.

RESOLUTION NO. 4

This Association resolves to recommend to the Government that:

Direct recruitments be resorted to where infusion of fresh blood is absolutely essential in departments like R&D and even in such department, it should be restricted to the barest minimum (viz. not more than 1/3 rd of the newly created vacancies).

5. **Leave Travel Concession**

PREAMBLE

The L.T.C. Rules at present in force are very cumbersome. The benefits derived from this concession are meagre and highly restricted. In these days of emotional integration, when the need of the hour is to encourage the citizens of the country to consider each and every part of the country as his home, forcing the employees to get tied up to one and only one, corner of the country and making him call it "his home, is against the very spirit of National oneness".

Moreover, to give relief to the employee from the fatigue and monotony of routine work, the employee should be encouraged to take time off and go to any place of his choice in the country, with family. Thus the employee will be fresh to serve his department with greater vigour.

L.T.C. should cover the entire railway fare in full and the present illogical restrictions should be removed.

It is also suggested, to avoid malpractices etc. warrants may be issued for travel in the entitled class, as is being done in the case of Military personnel.

(*Contd. on page* 15)

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Editorial

THE SCIENTIFIC SCENE

Since Independence, the number of research organisations, research institutes, Institutes of Technology and Universities etc. has been growing rapidly. The Council of Scientific & Industrial Research, Atomic Energy Commission, Indian Council of Agricultural Research, Indian Council of Medical Research, Defence Research & Development Organisation, Railway Research Designs and Standards Organisations are major employers of scientific personnel in their respective fields. The University Grants Commission through its function of providing financial assistance to the universities has indirect responsibility to ensure proper standards of teaching and research. A number of well-equipped and staffed Institutes of Technology, set up with assistance from international agencies, are undertaking training of scientists, engineers and technicians at a higher level. The private industry has also shown increasing awareness of the needs for research. With the State assistance in the form of cooperative research associations or institutions of their own, it has taken first steps for financing its own research and development. In addition to these, there are a number of scientific societies mostly dependent on government subsidies to sustain their activities and existence. The Scientific scene would be incomplete without a mention of the Scientific Advisory Committee to the Cabinet, the National Institute of Sciences, the National and Indian Academies of Sciences, the Indian Science Congress and a host of other specialised scientific societies and bodies. The proliferation in numbers of the scientific organisations and societies is a natural outcome of the rapid growth of science, technology and industry in the post-Independence era.

A question arises, if the country has the necessary mechanism for a coordinated direction of the policies of these scientific organisations and in regard to science in general. Allocation of resources to different areas of research, regulation of the numbers of scientists to be trained in different branches of science and technology and specialisation to match the requirements of the research, teaching and industrial organisations, the standards of scientific research and science teaching, level of technology in the industry, conditions of service and emoluments of the scientific and technical personnel are matters of vital imporance having a bearing on the future growth of science and in consequence the economic and cultural progress and prosperity of the nation. Undoubtedly, we have a Science Policy embodied in the Resolution by the Parliament in 1958 under the leadership of the late Shri Jawaharlal Nehru, but with whom does rest the responsibility of enunciating, following-up, directing and orienting action on the recommendations made in the Science Policy Resolution! It is a pertinent question whether the growth of science and technology is progressing in the proper direction in the absence of a body responsible for Science Policy.

About a year ago, while addressing the Annual Meeting of the Scientific & Parliamentary Committee, the Prime Minister had indicated his desire to set up a body of eminent scientists which could be considered the repository of wisdom and authority in the field of science and to whom the government could look forward and consult on scientific matters. Unfortunately, nothing in the shape of practical measures appears to have emerged so far out of the Prime Minister's reference. By way of its nomenclature, the Scientific Advisory Committee to the Cabinet should perhaps be in a position to discharge this function but the SAC has not the machinery which should systematically provide essential data on which to base its decisions. Judgments based on inadequate data and information are likely to go wrong in their application at national levels. The Scientific Advisory Committee has so far not published a review of their annual activities and recommendations like their counterpart in U.K. Whatever their value, the decisions and deliberations of the Scientific Advisory Committee have not the necessary impact on the course of action or development of the Science Policy.

One of the major contributions of the late Shri Jawaharlal Nehru to India's march forward was the setting up of the Planning Commission, with both the authority and prestige to function as guide for the economic direction of the country's future. In his later years, the late Prime Minister did appear to feel that perhaps the Planning Commission had grown into an unwieldy administrative organisation and had lost the intellectual elan. In this context the criticism of the Finance Minister, Shri T. T. Krishnamachari is apt that the Commission could do with a bit of planning of itself. Here, we are concerned only with the organisation and apparatus available in the Planning Commission in respect of data and information for planning on scientific matters. It is regrettable that the Planning Commission has still not the apparatus for survey and collection of data and information on this. (We doubt if the Commission would itself consider its stock of information and data as uptodate or reliable). For a developing country which aspires to catch up in standards with the advanced nations, its hope lies in a consistent and vigorous application of science and technology in all spheres of activity to increase the tempo of development. This should necessitate the Planning Commission having a well documented, classified and uptodate information on all aspects of scientific activity and input of research effort required in various spheres.

The Commission should have details of scientific research undertaken, availability of scientific and technical personnel, engineers, medical personnel, agricultural scientists and others and a rational projection of the future demands. Absence of such data and proper means to collect it, seriously impairs the capability and capacity of the Commission to give a planned direction to science and its application to industrial and economic development.

As for the National Institute of Sciences of India, its claims to the status in India as of the Royal Society in U.K. are repudiated by one of its own past Presidents. Nor can it be regarded as a body representative of scientific opinion or talent at the highest level. About the Science Congress, its basic character of a 'mela' remains. There is a strong opinion amongst the younger scientists that the time, effort and money could be better utilised if Science Congress met once in 3 or 5 years. Excepting that it comes to life for the first two weeks of every calendar year it is in hibernation for the remaining period. Other scientific societies in the country are mostly lacking in vigour and even their academic activity is mostly of mediocre standard. The Academies of Sciences are really circles of groups of scientists.

Coming to the official research organisations, in the recent years, the CSIR has introduced far-reaching reforms in its administrative methods and the set up of its scientific institutes and laboratories. The distinction between the different categories of scientists created by the application of the Pay Commission's recommendations has been done away. The bureaucratic structure of scientific services and casteism between officers of different grades has been abolished. Greater autonomy and authority has been given to the Executive Councils and the Directors and the organisation as a whole given a sense of purpose and direction. These measures of the CSIR have been very much in the public eye and even the subject of controversy. Scientific Workers however cannot view with equanimity the fact that other major organisations of the scientists such as the Defence Science Organisation, ICMR, ICAR, etc. continue to observe outmoded bureaucratic procedures and methods. Their recruitment of scientists through the Union Public Service Commission causes serious delays in selection and appointment and deprives them of the services of promising younger scientists. The bureaucratic atmosphere generated by the system of officialdom and casteism among scientists affects the quality of research and the research atmosphere in these institutes. The scientific workers in these organisations have been demanding improvements and changes on the lines already introduced in the CSIR. There is no reason why the scientific workers in one organisation should be treated less favourably than in others and it would be in the interest of scientific research if a review of the conditions, methods of recruitment, salaries, grades, methods of promotion is made in all the organisations. The recent CSIR procedure of promotion of scientists in their own posts whereby the scientists do not have to wait for a vacancy to occur is a case in point and should find application in all the scientific organisations.

The conditions of work in the organisations functioning under the Ministries such as Botanical Survey of India, Zoological Survey of India, Survey of India are still more difficult. These organisations function as departments of their Ministry and under the grip of inflexible Fundamental and Supplementary rules. The autonomy of the scientific organisation like the CSIR which gives them the necessary authority to regulate their own working and to make their rules and procedures simpler is non-existent in these organisations. For that reason most of them are not able to spend even the meagre finances that are allotted to them—thanks to rules and procedures. The service conditions of the scientists in these organisations are even more disadvantageous and need being urgently looked into. The scientific organisations under the Ministries are also developing a tendency of 'closed shops.' Whereas the affairs of the CSIR have been reviewed by Reviewing Committees consisting of eminent scientists, these organisations have tended to keep their affairs behind a cloak of secrecy.

Nor is there the much desired link between scientific and technical education on the one hand and scientific and industrial research on the other. The universities have grown in numbers but fallen in standards. Even responsible officials of the University Grants Commission and the Universities admit that the first-class from one university does not even compare with the second class from another. What efforts has the UGC made and what is the success achieved in improving the standards of teaching and research atmosphere, simplifying the rules and procedures to give greater autonomy and authority to university departments, are matters which would interest every scientist.

It is the duty of scientific workers and their organisations to strive for a change in the scientific scene and for establishment of optimum conditions for creative work.

Frankly Speaking

RESEARCH FELLOWSHIPS

Recently the 'Statesman' and the "Financial Express" have taken note of the difficulties experienced by the research fellows and have brought these to public notice. That things should come to a pass as to need airing of the grievances in public by the rising generation of scientists, is a sad commentary on the methods of administration and management by those in charge of these affairs. The major complaint appears to be that fellowship grants are not received for months together even after they are sanctioned and that the system of sanction itself is time consuming and cumbersome.

Shri M. C. Chagla, Union Minister of Education had made a declaration in Parliament that the Govt. of India were wedded to the policy of giving every encouragement to the younger scientists. He had declared that every bright younger scientist who got a first class would be automatically entitled to a fellowship and there will be no difficulty for him to choose scientific research as a career if he so desired. Our administrators appear to have successfully frustrated the Minister's wishes. The system which the CSIR had introduced that they would be prepared to award a fellowship provided a competent investigator was prepared to take the first class student under his charge for further research, has been set at nought by the recently introduced procedures. Whereas the fellowships used to be available within 2-3 months of the application by the candidates, now it takes 6-9 months and even longer. The mutual rivalries between the science departments of the universities have led to distribution of fellowships as loaves and fishes of office. While a first class student in one department is unable to get a fellowship, the fellowships go abegging in another and are offered to second class students. The only effect of this procedure can be to drive the bright young scientists to seeking careers in administration or non-research, non-creative activities. The new procedure can only result in hampering the promotion of scientific research. Would it not be preferable that some fellowships are awarded to those who may not deserve it than that bureaucratic procedures are introduced to make things difficult for the younger scientific workers?

Possibilities of Extending Agricultural Research in India

Y. Kumar*

Agriculture, basically makes the backbone of our nation. Eighty per cent of the population of our country is rural and about 70% of our people are wholly dependent on Agriculture. Therefore, the development in this field is of utmost importance. A stagnation in agriculture is indeed a black spot on us. This present sluggishness in this field makes one to realise that some of the approaches to increasing production need objective study.

As Agriculture continues to be mainstay of the economy, providing employment to about 60% of the population and accounting for 45% of the national income of the country, continued stagnation in this principal sector has become a matter of thoughts. This poor performance of agriculture has not only had a direct effect on arresting the growth in national income, but also has resulted in slower growth of industrial production due to shortages of raw materials. Agriculture production is a factor of area and yield. Hence the researches in crop-improvement need their due importance in this field. The need to intensify research in relation to India's economic development and to coordinated efforts became apparent soon after India gained independence. There are national research organisations and research institutes responsible for the organisation and coordination of all agricultural researches in the country. The Government spent about 59.53 million rupees on research in agriculture including veterinary science and animal husbandry (1962-63).

The science of today has provided many foppish tools of research, enhancing the pace of development. Unfortunately, due to our foreign exchange difficulties we are not able to have the latest research equipments and know-how, which have been evolved by other countries, in our laboratories. Human is, however, still the most cogent instrument of progress. It is, therefore, important that we think more of possibilities than of difficulties and exploit to the full the wealth of plant and animal material which has been endowed to us.

Problems

Four reasons are generally attributed to the limited achievement of the higher food-grains production. Firstly, the poor progress in irrigation facilities, soil conservation; secondly the lack of the utmost and proper use of manures and fertilisers, the absence of proper use of insecticides and pesticides to reduce the menace of incidence of pests and diseases and thirdly the poor progress of over all researches, which are to be made according to the conditions stated above and the varieties of crops to be evolved, which should be higher in yields even under the limited resources which have been endowed to us. The knowledge of these researches

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will be of no use without developing the extension services. The results of all these efforts will fail until and unless our cultivators are in the know of all these facilities. Hence in the end, extension services play the most vital role in the achievement of higher production and ultimately in the preservation of economic stability and peace in the country. The farmers are still ignorant of the technical know-how, which is the foremost hurdle in getting the higher yields of the agricultural commodities.

In the case of irrigation, the Third plan was to create a cumulative potential for 29.5 million gross acres, but now it is expected that the creation of potential would be for about 67% of the targeted acreage at the end of this period. Soil conservation and other programmes have been somewhat smaller than envisaged. The area of cultivation is limited and it cannot be increased further. Still about one million hectare of land were reclaimed since 1960-61. Now the scope of increasing the area under cultivation is not much, hence the other possibilities for raising the production are to be extended. The supply of fertilisers has been significantly below the levels originally contemplated. In case of chemical fertilisers, instead of producing one million tonnes in the form of Nitrogen, 600 thousand tonnes are expected to be yielded during the current plan. The consumption of phosphatic fertilisers was also no better. The availability and utilisation of organic manures has also not been good in the previous years. The area under green manures in 1963-64 was about 8.3 million hectares. The plant protection measures or use of insecticides and pesticides are also of major importance. In this direction, there has been a very poor progress. In 1963-64, the area covered was only about 8 million hectares, while in 1960-61, 6.5 million hectares were covered under this programme. The cultivators should also be provided with better quality seeds at least for the most important foodgrain crops so as to get maximum possible yields. The coverage with better quality seeds has been so far about 15.8 million hectares instead of 59.9 million hectares, which has been proposed during the current plan period.

It is not generally realized that some of the new improved methods and researches, now sought to be extended actually aggravate the difficulties which the Indian farmers face. For instance, the extensive use of nitrogenous fertilisers under unirrigated conditions may lead to exhaustion of soil moisture during the censorious stages of plant growth and decline production. Application of chemical fertilisers without irrigation and organic manures inhibits the population and activities of the natural agencies of soil profiles like the earth worms and microflora. Large scale use of high yielding seeds without adequate manuring reduces the store of plant nutrients and moisture in the soil and lead to diminishing results.

Without paying attention to proper drainage, the extension of irrigation, results in rising ground water level leading to unhealthy situation. Large areas develop into saline and alkaline soils due to lack of drainage or defective drainage. In our country, a large area is water logged during rains due to lack of drainage and the crops are washed away. Large and improper use of insecticides etc. destroy the farmer's friends, like the frogs, snakes and bumble bees which help to keep down many noxious weeds and insects. Sometimes the misuse and defective way of using the insecticides and pesticides leads to lower yields. It is beyond doubt that an important reason for the relatively slow improvement of agriculture in recent years is the self-stultifying effect of some of the major inputs of production.

Extension Services

That all the facilities which contribute towards higher yields be made available to the cultivators is more important than to increase these requirements so that the maximum output can be derived out of them. The intensive cultivation, i.e. area sown more than once can be increased provided adequate irrigation and manuring facilities are available and used properly. This can nevertheless be accepted that yields can be enhanced because the Indian farmers obtain up to ten folds higher yields than average in crop competitions. This clearly shows that there are much more possibilities for increasing the production per unit also. Here, the most important factor is the so-called Community Development Blocks, which is the channel between the actual researcher and the cultivator. The planning should be such that the farmer accepts the facilities that are prerequisites for getting higher yields. He is to be made conscious of his capabilities to raise yields. To achieve this aim, either the peasants should be made literate or production raising demonstrations on the fields of the common farmers under the limited resources should be held. Under the present circumstances, for this purpose, we have to depend upon extension services, which make the backbone of the nation in this developing state. It is well known that the main job of the community development or extension services is to change the attitude of the villagers to leave their old practices of cultivation and to accept the new ideas for raising production. By this time there are about 5,100 development blocks in the country, which are meant for the well being of the masses primarily of the under-developed rural areas. The extension services work as a two-way channel, because on the one hand they convey the problems of cultivators to the Government level and ultimately to the research workers and on the other the solution of the problems from research workers are carried to the cultivators.

At the same time, rural cooperatives have to finance the farmers for supplying the prerequisites, needed for higher crop-production. Because, our farmers are so poor that even if they are convinced that they will get much more beneficial results by applying modern practices of cultivation than at present, they do not have funds to spend in the beginning of the sowing season. Hence, in spite of all these resources and researches, the cultivators are to be financed. Besides, one of bare facts of the current pattern of development is that the farmers are not able to avail the facilities of the cooperative credit. The result of this is that poor farmers are deprived of these facilities. Unless, these problems are solved, the creative role of agricultural research in economic development will never be achieved.

Conclusion

As the area is limited, an intensive area approach, i.e. the approach which makes use of large quantities of fertilisers in areas with irrigation and assured rainfall, can be adopted. Another is the extension of the intensive agricultural programme in agriculture in the country. A third is the intensification of the production of subsidiary foods, vegetable growing and poultry farming etc.

The technical training in this direction is also required for which efforts are being made. The newly opened universities in agriculture, and training centres for researches and the research units are a step in this direction.

Agriculture was thought to be gamble with nature. But this is not a right excuse when we have to develop and keep the nation moving ahead. We have to fight against the nature to end the food crisis in the nation. The old practices are to be replaced with new modern techniques of cultivation. Though this cannot be achieved so easily, it is only through a continuous process of dissemination of the results of scientific research, through practical demonstrations on the actual fields of the cultivators at several places in the villages, of modern methods over the old ones that the goal can be achieved. Unless majority of the people engaged in agriculture are involved in this direction (extension services), the development seems to be difficult. To achieve this objective, the primary need is to give attention to individual farmer or at least to every village and to bring down planning and development to the smaller unit level or village level so that the latest researches in the field of agriculture can be carried to the cultivators in a shortest period.

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INDIAN IMPORTS
—A CRITICAL APPRAISAL

M. S. Iyengar*

1. Introduction

1.1 The country is passing through a serious financial crisis brought about mainly by the quickly depleting position of our foreign exchange. The problem has become so acute that suggestions have been advanced in responsible circles that we should give a year's holiday to the Fourth Five Year Plan.

1.2 The foreign exchange requirements estimated during the Fourth Five Year Plan are of the order of Rs. 5,100 crores. The detailed break-up is not available but it should be possible to cut down this amount considerably. In the absence of details of imports proposed for the next year and all the years in the Fourth Five Year Plan, an attempt has been made to study the import and export pattern during the period April, 1964 to 1965. During this period, we had exported goods worth Rs. 835.4 crores and imported goods worth Rs. 1,263.3 crores. In other words, there was a deficit in foreign exchange to the tune of slightly less than Rs. 400 crores. Nearly Rs. 824.9 crores worth of import is mainly from the USA, the European Common Market and the European Free Trade countries. Our exports to these countries are only of the order of Rs. 404.9 crores or nearly a deficit of 420 crores. The imports and exports pattern with the rest of the countries is more or less balanced.

1.3 Our imports on the general heads are as follows :

		(*Rs. in crores*)
1.	Food	... 248.5
2.	Crude materials like hide, wood, etc.	... 125.1
3.	Mineral fuels, lubricants, petroleum crudes and petroleum products	... 65.7
4.	Chemicals	... 90.7
5.	Manufactured goods.	... 221.8
6.	Machinery and transport equipment.	... 472.7
7.	Miscellaneous manufactured articles.	... 22.1
8.	Miscellaneous transactions	... 6.2
9.	Animal and vegetable oils and fats.	... 5.6
	Total	1,258.4

1.4 An attempt would now be made to critically examine the necessity or otherwise of these imports.

2. Food

2.1.1 The main items of import under this head are as follows :—

		(*Rs. in crores*)
1.	Wheat	... 134.8
2.	Rice	... 37.5
3.	Wheat flour	... 0.8
4.	Dairy products, eggs, milk, honey, etc.	... 10.3
5.	Fish and fish preparations	... 3.4

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		(*Rs. in crores*)
6.	Maize (corn) unmilled ...	2.6
7.	Cereals, milled and unmilled, including preparations for flour and facile of fruits and vegetables ...	3.4
8.	Fruits and vegetables ...	25.9
9.	Feeding stuff for animals and miscellaneous food preparations ...	0.3
10.	Beverages, alcoholic and non-alcoholic, tobacco and tobacco products ...	0.8
11.	Live animals, meat and meat preparations ...	0.01
	Total ...	219.81

2.1.2 Out of the total Rs. 219.81 crores, nearly Rs. 172.2 crores is due to wheat, wheat flour and rice and the remaining Rs. 47.61 crores on non-essential items like dairy products, meat, etc. which can either be substituted by indigenous industry or can be avoided being not so very essential.

3.1 Crude materials

The main items of import are :

		(*Rs. in crores*)
1.	Hides, skins and scarf skins	3.1
2.	Oil seeds and oil nuts ...	7.0
3.	Crude rubber, including synthetic and reclaimed ...	5.4
4.	Wood, lumber and cork ...	1.8
5.	Pulp and waste paper ...	8.0
6.	Textile fibres ...	79.6
7.	Crude fertilizers ...	15.7
8.	Metal-ferrous ores and metal scraps ...	2.0
9.	Animal and vegetable crude materials ...	2.3
	Total	124.9

3.2 Hides and skins

3.2.1 The details of the imports of hides and skins are as follows :

		(*Rs. in crores*)
1.	Buffalo hides mostly from African and ECAFE countries ...	1.00
2.	Cow hides mainly from ECAFE countries ...	0.90
3.	Other cattle hides including scarf skins and thick skins ...	2.50
4.	Sheep and Lamb skins of all type ...	0.20
5.	Goat skin and thick skin undressed, cured and salted ...	0.20
6.	Waste and used leather ...	0.05
7.	Hides and skins undressed ...	0·20
8.	Fur skins undressed ...	1.10
	Total	6.15

3.2.2 Most of the imports are from the African and ECAFE countries. There is, however, great scope for indigenous substitution of these. We have a large number of cows and buffaloes which though sterile are being preserved mostly for sentimental and religious feelings.

3.3 Oil seeds, nuts, etc.

The other crude materials imported are oil seeds and oil nuts. These are mainly linseed, flake seeds, cotton seeds, castor seeds, mustard seeds, til seeds, etc. Most of these imports are from African and ECAFE countries.

3.4 Crude rubber and Synthetic rubber

3.4.1 Most of the crude rubber is imported from Ceylon, Malaya and Singapore. Nearly 1.1 crores worth of synthetic rubber is being imported from the USA, Canada, West Germany and Netherlands. These imports could be avoided to some extent by accelerating the programme of making synthetic rubber from alcohol, petroleum and natural gas resources.

3.4.2 Wood, lumber and cork are being imported to the extent of Rs. 2.3 crores. Out of this, wood in the round and roughly round shape represents nearly Rs. 2 crores. These are mainly pulp wood, deodar, logs, saal logs, etc. Most of these are imported from the USA, West Germany, U.K., Sweden and Denkmark. We have large untapped sources of soft wood and hard wood in India, particularly in the regions of the Himalayas and Assam. We also have willow wood in Srinagar area. These could be developed further and the imports of the woods of all types could be stopped.

3.5 Pulp and waste-paper

3.5.1 We are importing pulp and waste paper to the tune of Rs. 8.0 crores. This mainly comprises as follows :

	(*Rs. in crores*)
Mechanical wood pulp ...	0.35
Chemical wood pulps mainly from Canada, USA, Germany, France, Sweden ...	7.40
Chemical wood pulp without sulphide mainly from Canada, USA, Germany and Sweden ...	0.30
Pulp of straw fibres ...	0.045
Total	8.095

3.5.2 These can be substituted in their entirety by developing the indigenous forest wealth, particularly those of Assam and similar areas.

3.5.3 By far the largest import under the section of crude material is under the division of textile fibre, not manufactured into yarns, threads or fabrics and waste which account for nearly Rs. 79.6 crores. The break-up for these are:—

	(*Rs. in crores*)
Cotton ...	58.0
Wool and other animal hair ...	9.6
Silk ...	0.5
Jute, including jute cuttings ...	7.4
Synthetic fabrics ...	2·7
Vegetable fibres ...	1.4
Total	79.6

3.5.4 Most of the cotton is imported from the African countries. The long staple cotton imported from the USA accounts for nearly Rs. 5.1 crores out of a total of Rs. 32.8 crores. The foreign cotton imported totalled Rs. 24.9 crores out of which nearly Rs. 1.5 crores were imported from the USA. It is worth examining whether the imports of long staple and medium staple cotton from the USA could be substituted by import from the other African countries.

3.5.5 Jute is mainly imported from East Pakistan and Thailand. The various types of vegetable fibres excluding cotton and jute flakes, could possibly be avoided. Similarly, most of the synthetic fibre imported is largely nylon, polyester, etc. which are mainly imported from the USA, Canada, Japan and West Germany which could be avoided as they could be indigenously produced by developing petrochemical industry. These items represent the luxury items and they are not immediately essential for the development of the country.

3.5.6 The division under crude fertilizers and crude minerals account for nearly Rs. 15.7 crores, out of which Rs. 3.9 crores for crude fertilizers and Rs. 11.8 crores for crude minerals. Crude fertilizers are mainly rock phosphates imported from Africa. Among the crude minerals, sulphur which is imported largely from the USA and Canada accounts for Rs. 5.4 crores and Asbestos imported from the USA, Canada, Australia and Japan accounts for Rs. 4.1 crores.

3.5.7 The entire import of sulphur which is nearly 2.8 lakhs tons, could be recovered as a by-product from the coal industry. For instance, Assam coals have a sulphur content as high as 8-10 per cent. If 5 million tons of these are burnt each year in a thermal power station, the entire imported quantity of sulphur could be recovered as a by-product. And since this coal also contains the rare element germanium, the later could also be recovered as a by-product to the tune of Rs. 700 crores!

3.5.8 Similarly, the entire requirement of asbestos could be met by indigenous sources. The indigenous asbestos does not find favour with the asbestos industry because of its non-fibrous nature. The work done at the Central Fuel Research Institute, Jealgora, indicated that this indigenous asbestos could be used by pre-treatment with detergents like tinopal. Since most of the asbestos is being used for making asbestos roofing material or asbestos sheets, investigations can be taken up to substitute these by other fibrous material like coal ash, etc. also.

3.5.9 Out of the two crores of imports of metal-ferrous ores and metal scraps, non-ferrous metal scrap alone accounts for nearly Rs. 1.3 crores. Out of this, copper scrap accounts for Rs. 0.6 crores and nickel scrap Rs. 0.4 crores.

3.5.10 Among the animal and vegetable crude materials, crude vegetable material accounts for nearly Rs. 2.0 crores. It mainly comprises of tannin substances, natural gums, resins. These can also be substituted by indigenous materials.

4.1. Mineral Fuel, Lubricants and related materials

4.1.1. The following are the main broad items imported:

	(*Rs. in crores*)
1. Coal, coke and briquettes ...	0.09
2. Petroleum, crude and partly refined	27.20
3. Petroleum products ...	41.30
4. Gas, natural and manufactured	0.01
Total	68.60

4.1.2. The import of coal and briquettes is mainly comprising of import of anthracite, hard coke, which can be substituted by indigenous products. The petroleum crude imports were 4.2 million tons. The import of petroleum crude could have been reduced by a fourth and foreign exchange saved to the tune of Rs. 6.7 crores if the surplus crude in Assam were diverted to the refineries elsewhere in the country.

4.1.3. The petroleum products imported mainly comprises of:—

	(*Rs. in crores*)
1. Light distillate	2.2
2. Kerosene oil	15.9
3. Diesel oil	6.2
4. Heavy oil	8.5
5. Lubricating oils	13.7
6. Petroleum jelly and waxes ...	0.5
7. Coal tar pitch and other products	0.6
8. Manufactured gas ...	0.01
Total	47.61

4.1.4. At the present moment, most of the kerosene is obtained by refining of the straight cut. For every ton of superior grade kerosene obtained, nearly a ton of Iomex is also produced. It does not have any off-take. By allowing this to stay in the kerosene fraction and by modifying the design of the kerosene using appliances, the production of indigenous kerosene could be boosted.

4.1.5. The required diesel oil could be produced as a by-product in the low temperature carbonization of Indian coals.

5. Animal and vegetable oils and fats

5.1.1. Nearly Rs. 5-6 crores worth of animal and vegetable oils and fats are imported. This mainly comprises of:—

		(*Rs. in crores*)
Animal oils and fats	... ...	0.7
Vegetable oils and processed oils	...	4.8
Fats	... ...	0.1
Total		5.6

5.1.2. Vegetable oils account for the bulk of the imports. The vegetable oils imported are mainly refined linseed oil, crude or refined soyabean oil, crude or refined olive oil, palm oil, coconut oil, tung oil, mustard oil, and other oils. Most of these are imported from the hard currency areas. Tung and soyabean can be grown in several parts of India, particularly in Assam and the entire import requirements can be met by indigenous processing. Similarly, the bulk of the oils and fats processed like the fatty acids, bee wax, carnauba wax can be indigenously produced.

6. Chemicals

6.1.1. Nearly Rs. 90.7 crores of chemicals are imported each year. These are mainly made up as follows:—

		(*Rs. in crores*)
Inorganic chemicals	... ...	14.00
Organic chemicals	... ...	20.80
Mineral tar, wood chemicals	...	0.04
Coal tar and dye-stuffs	...	5.20
Synthetic tannin material	...	2.70
Paints and pigments	...	1.30
Medicinal and homoeopathic products	... ...	8.30
Essential oils and perfumes	...	1.00
Fertilizers	... ...	25.40
Explosives	... ...	1.40
Miscellaneous chemical materials		10.60
Total		90.74

6.1.2. A committee of Scientists should go into the possibilities of indigenously manufacturing these imported organic and inorganic chemicals. Out of the inorganic chemicals imported to the tune of Rs. 14.0 crores, sodium hydroxide, titanium dioxide, carbon black, bleaching powder, hydrosulphide, sodium carbonate and boric acid account for nearly Rs. 7.0 crores or half of the total import. There is already a surplus of chlorine available in the country. By 1965-66 as much as 2,70,000 tons of by-product chlorine will be available. It should be possible to meet the demand for bleaching powder and sodium hydroxide from indigenous sources. Similarly, nearly Rs. 20 crores worth of organic chemicals are imported each year. Some of the items like the carbolic acid, oxalic acid, phthalic anhydride, chloroform, chlorinated para-phenol, amyl alcohol, etc. could indigenously be produced. The committee of Scientists comprising of the Directors of the National Laboratories should be provided with the list of organic chemicals, where detailed schemes for indigenous manufacture can be considered.

6.2. Dyeing, tannin and colouring materials

6.2.1. Out of the foreign import of Rs. 9.6 crores, Rs. 5.2 crores are mainly due to coal tar dye-stuff. With the growth of the steel industry and the coal tar industry in the country, it should be possible to manufacture good number of dye synthetics. The experts committee should go into the possibility of its manufacture. Over Rs. 1.0 crore of essential oil and perfumery materials are imported each year. These could readily be stopped and indigenous sources could be exploited. For instance, citronella oil, lemon oil, lime oil, orange oil, camphor oil, attar, etc., could all be indigenously produced.

6.3. Medicinal and pharmaceutical products

6.3.1 Nearly Rs. 8.3 crores worth of these items are imported each year. The list of the imports includes folic acid, nicotonic acid, vitamin B-12, yeast preparations, penicillin, caffeine, ergot and ergot preparation, calcium gluconate, plaster of paris and other pharmaceutical essentialities. Most of these could be produced within the country. A committee of Scientists should be constituted to critically scrutinize these things for indigenous manufacture.

6.4. Manufactured fertilizers

6.4.1. We are importing nearly Rs. 25.4 crores worth of fertilizers each year. These are mainly, ammonium nitrate (Rs. 12.4 crores), ammonium sulphate (Rs. 0.4 crores) Urea (Rs. 20.5 crores), Phosphatic fertilizers (Rs. 2.7 crores) potassium fertilizers (Rs. 2.1 crores). While the programme for setting up additional capacities of fertilizer plants should be accelerated, at the same time to recover these as by-products from the coke oven plants already commissioned in various industries should be tried. All these factories should be requested to immediately put up necessary auxiliary units.

6.4.2. We are exporting each year nearly 72,000 tons of crushed bone estimated at a cost of Rs. 2.8 crores and importing superphosphate to the tune of 41,000 tons estimated at a cost of Rs. 0.8 crores. This seems to be rather an absurd situation and steps should be taken to remedy this. Further, it is estimated that each year we are burning cow-dung as fuel which is equivalent to 4.2 million tons of fertilizer. In terms of cost this is equivalent to nearly 126 crores. By providing alternative fuel, it should be possible to divert all the cow-dung for use as fertiliser. By this method it should be possible to considerably reduce the imports of all type of fertilizers.

6.5 Explosives and miscellaneous products

6.5.1 Under this head nearly Rs. 1.4 crores worth of explosives and Rs. 10.6 crores worth of miscellaneous products are being imported. Possibly, the explosives should continue to be imported. Steps have already been taken to minimise the import of explosives. Some of the miscellaneous materials imported are as follows :

	kg.	*Rs.*
M. Formaldehyde	5,970	23,426
Urea formaldehyde moulding powder	62,070	36,313
Urea formaldehyde resins	236,849	32,421
Cresol formaldehyde moulding powder.	10,000	30,240
Phenol formaldehyde moulding powder.	305,612	6,63,022
Phenolic moulding powders.	15,916	8,596
Cresol formaldehyde resins.	8,426	31,758
Phenol formaldehyde resins.	42,006	23,779
Phenolicresins.	88,105	3,50,803
Alkyd resins.	17,248	83,566
Cellulose acetate.	1,055,257	3,22,461
Cellulose acetate moulding powder	217,544	7,96,200
Cellulose acetate multi-moulding powder.	629,075	40,68,721
Polyethylene moulding powder	3,186,710	71,68,360
Upastree moulding powder.	136,851	4,72,196
Vinyl resins.	1,522,930	3,59,560
Other plastic materials	25,408,979	1,72,34,640

6.5.2 Insecticides	*Rs.*
Chlorinated cresols.	60,584
Insecticides based on phenolic groups.	46,605
Refined tar.	9,68,805
Total	10,75,994

6.5.3 Most of the above could be indigenously produced by setting up processes for recovery of phenol and cresol during the tar distillation at the coke oven plants as well as at the petroleum refineries

7. Manufactured goods

7.1.1 The amount of goods imported under this head was Rs. 221.8 crores made up as follows :—

		(*Rs. in crores*)
1.	Leather and leather manufactured goods.	7.3
2.	Rubber manufactured goods.	1.4
3.	Wood and cork manufactured goods.	0.5
4.	Paper and paper board and other articles.	13.1
5.	Textile and yarn fabrics.	16.0
6.	Non-metallic manufactured minerals like cement, clay, glassware, etc.	6.9
7.	Silver, platinum and other precious jewellery.	2.0
8.	Base material such as iron and steel, copper, etc.	165.6
9.	Manufactured materials.	16.2

7.1.2 The leather goods imported are mainly buffalo scarf skins, hide, tapestry, chrome tan buffalo leather, chrome tan scarf skin and leather belt. Most of these could be indigenously manufactured. In any case these represent luxury items and the imports could readily be stopped.

7.1.3. Among the rubber fabricated materials, items mostly imported are tractor tyres and tubes, vehicle tyres and tubes, truck tyres and tubes and cycle tyres and tubes and belt conveyors. Possibilities of indigenous manufacture of these items should be explored.

7.1.4. Under wood and cork manufactured goods, the items imported are as follows :—

	(*Rs.*)
Plywood, plywood boards veneer sheets.	32,926
Fibre boards.	6,00,170
Artificial wood and other wood products.	23,56,773
Wood manufactured items.	1,759
Builders wood.	6,606
Manufactured wood.	1,32,790
Total	31,29,030

7.1.5 Most of these items are luxury items and in any case it can be manufactured indigenously.

7.2 Paper and paper boards

	(*Rs.*)
Newsprint (coloured).	2,92,163
Newsprint (wood pulp white)	7,33,25,176
Newsprint (paper and others)	3,62,818
Pulp and waste paper	7,97,43,135
Paper and boards	12,85,12,422
Articles of paper	24,39,071

7.3 Textile and yarn fabrics

7.3.1. Most of these are luxury items. The import of these should be completely stopped or restricted. In any case, the items of import should be scrutinized and only basic essential items should be imported.

7.4 Non-metallic minerals

7.4.1. The items imported under this head are made up as follows :

	(*Rs. in crores*)
Lime, cement and fabricated building material.	0.12
Clay, construction material, refractory construction materials	2.50
Mineral manufactured goods, articles of sand material, graphite, carbon, carbon brushes, carbon electrodes, etc.	3.00
Glass.	0.60
Optical glass.	0.20
Glassware.	0.30
Total	6.72

7.4.2 The import of *cement and building* materials could be stopped and they could be indigenously manufactured. Similarly, clay construction materials like wall tiles, floor tiles, brick tiles, etc. could be completely stopped. Refractory bricks, high temperature fire bricks, etc. to a large extent can be manufactured indigenously.

7.4.3. There is a surplus of carbon in the country and it is not being fully utilized. The import of carbon products could be completely stopped and their indigenous manufacture can be raised. *Optical glass* is being manufactured in the country and all imports should be stopped. The import of all types of *glasswares* and tumblers, bottles, flasks, fibre glass, etc. should be stopped.

7.5 Silver and precious stones

7.5.1. Under this head, nearly Rs. 1.6 crores worth of precious and non-precious stones like synthetic stones, pearl, jewellery, etc. are being imported. These are all luxury items and are not essential for the country.

7.6 Base material such as steel, copper, etc.

7.6.1. Nearly Rs. 107 crores worth of iron and steel are being imported each year. These comprise mainly items like pig iron, bloomed billets, scraps, joists, girders and its tees, bars, beams, pillars, channels, plates, sheets, stainless steel sheets, iron and steel sheets, galvanized corrugated sheets, steel tubings, conduit pipes, and pipes fittings. Thorough scrutiny of these items is essential. Most of the items imported are put to such non-essential uses like making of furniture, steel almirah, fileing cup-boards, tables, cooking utensils and other house-hold goods and the building construction where other type of materials should be substituted. It should be realised, that for installing of a 1 million ton capacity plant, the total foreign exchange required is of the order of Rs. 200 crores. For the total amount spent for the import of iron and steel during the Third Plan period, we could have had two one million tons capacity steel plants in operation.

7.6.2 Quite a good amount of the import of copper is used for making brass which again is used for making house-hold goods. Possibilities of replacing of this by other materials and also possibility of developing indigenous sources for copper could be explored.

7.6.3 The possibility of reducing the consumption of aluminium and tin which account for nearly Rs. 15 crores of imports should also be examined. Most of these are used in luxury items like making canned tins, or other house-hold appliances which are not really essential.

8. Machinery and transport equipment

8.1.1. Under this head, over Rs. 472.7 crores worth of goods have been imported. The break-up of these figures are as follows :

	(*Rs. in crores*)
1. Power generating machinery	43.80
2. Mining, construction and other industries.	199.90
3. Electrical machinery, apparatus and appliances.	88.80
4. Metal working machine.	59.30
5. Tractor other than steel.	7.10
6. Office machinery.	4.10
7. Aircrafts.	8.50
8. Ships and ship building.	3.30
9. Railway vehicles.	22.10
10. Road and motor vehicle.	33.10
11. Agricultural machinery.	2.00

8.1.2. Barring perhaps the office machinery, most of the other equipment is essential for the industrial development of the country. Efforts can, however, be made to cut down the import of these further either by using them more efficiently or by indigenously developing the fabrication capacity. This is particularly true of the diesel engines, IC engines, agricultural machineries and crushers, workshop machineries like lathe, drilling machines, material handling equipment. Facilities already exist for fabrication of these in the country and these could be further increased.

8.1.3. The paper mill machinery including parts of paper mill machinery annually imported is of the value of Rs. 3.7 crores. Attempts should be made to have the design of these machineries with the help of the Regional Research Laboratory, Jorhat, the Central Mechanical Engineering Research Institute, Durgapur, and the Regional Research Laboratory, Hyderabad. Similarly, facilities for fabricating the textile machinery should also be explored. In any case, the committee comprising of Engineers, Chemical Engineers, various Scientists and Directors of the National Laboratories should examine in detail the imports under this head and suggest methods of conservation.

9. Miscellaneous manufactured articles

9.1.1 Under this head, nearly Rs. 22.1 crores worth of articles have been imported. They are mainly non-essential luxury items like pre-fabricated buildings, sanitary plumbing, furniture, travel goods, clothing, footwear, musical instruments, etc. Most of these are non-essential items. Under the provision scientific and control instruments, nearly Rs. 14.7 crores have been spent. A scrutiny of this will indicate that the scientific instruments actually imported is considerably small. The details of scientific instruments imported are given below :

		(*in Rs.*)
1.	Balances.	9,85,413
2.	Drawing instruments.	65,712
3.	Gauges plug.	86,732
4.	Gauges pressure and vacuum.	12,37,735
5.	Gauge ring.	27,861
6.	Gauge clip.	1,22,779
7.	Geodesi instrument.	3,75,376
8.	Measuring instrument.	3,41,302
9.	Calorimeters.	4,05,129
10.	Manometers.	98,540
11.	pH. meter.	1,20,900
12.	Polarimeter.	33,879
13.	Refractometer.	88,921
14.	Tachometer.	88,503
15.	Tensimeter.	1,750
16.	Flow meter for gas.	6,30,211
17.	Taximeter.	3,66,009
18.	Viscometer.	65,831
19.	Water meter.	2,99,095
20.	Mathematical instruments	2,25,960
21.	Seismographic instruments.	2,11,244
22.	Speedometer.	64,249
23.	Thermostats.	1,63,800
24.	Thermocalipers and micrometers.	8,08,330
25.	Compasses.	2,230
26.	Model, industrial & demonstration.	7,61,576
27.	Other instruments.	6,78,71,836

9.1.2 A perusal of this would indicate that most of the equipment imported are mainly pressure gauges, flow meters, thermo calipers, etc. Details of sophisticated equipments imported are lacking. Possibly, they are covered under other instruments for which a sum of Rs. 6.8 crores have been stated to have been spent. In any case, there is considerable scope for increasing the imports under this head and without the essential equipment it would be impossible to carry out research.

10.1.1. It world appear that there is ample scope for making further savings in the foreign exchange. At least Rs. 137.0 crores have been spent on importing luxury items, the details of which are given below :

Luxury Items Imported

(*April*, 1964 *to March*, 1965)

		Rs.
1.	Live animals chiefly for food.	61,114
2.	Meat and meat preparations.	72,237
3.	Dairy products, eggs and honey (milk evaporated).	10,31,77,450
4.	Maize (corn) unmilled.	2,63,70,629
5.	Fish and fish products.	3,36.07,537
6.	Cereals, unmilled other than rice, wheat, barley & maize.	4,14,412
7.	Cereals, milled except wheat flour.	3,33,07,115
8.	Cereal preparations including pieparation from flour and fecile of fruits and vegetables.	79,622
9.	Fruits and vegetables	25,89,16,418
10.	Feeding stuff for animals	14,91,981
11.	Miscellaneous food preparation.	15,09,723
12.	Beverages.	76,65,093
13.	Tobacco and tobacco manufacture.	......
14.	Hides and skins and skins undressed.	3,13,56,121
15.	Oil seeds, oil nuts and oil kernels.	7,04,29.045
16.	Fuel wood, wood in round or squaire or simply worked.	1,83,36,682
17.	Textile fibre not manufactured into yarn, thread or fibre and waste.	79,64,24,096
18.	Manufactured goods of leather.	7,31,901
19.	Manufactured veener, plywood or wood manufacture.	50,15,004
20.	Special textile fibres and related products.	1,67,88,611
21.	Lime, cement, fabricated buildings, clay, glass and pottery.	6,87,35,164
22.	Precious and semi-precious stones and pearls.	1,63,78,329
23.	Prefabricated buildings, sanitary plumbing	28,72,124
24.	Furniture	11,87,750
25.	Travel goods.	1,25,877
26.	Clothing.	2,36,575
27.	Footwear.	5,683
	Total	137,71,88,910

10.1.2. A thorough scrutiny of the above items may enable us to make the following saving in import :

		(*Rs. in crores*)
1.	Machineiy items.	138.00
2.	Iron and steel.	100.00
3.	Manufactured machinery	30.00
4.	Petroleum and petroleum products.	10.00
5.	Vegetable products.	5.00
6.	Sulphur.	5.40
7.	Asbestos.	4.10
8.	Pulp, waste papei and paper board.	35.00
9.	Essential oil.	1.00
10.	Inoiganic chemical.	4.00
11.	Organic chemical.	8.00
12.	Fertiliser.	2.00
13.	Phenol formaldehyde, and other moulding material.	3.00
14.	Other finished material like, aluminium, copper, etc.	5.00
	Total	350.50

10.1.3. The details of our imports and exports during the year for various countries are given below :

(Rs. in crores)

	Imports	Exports
1. U.S.A.	462.65	168.49
2. E.C.M.	169.36	57.19
3. E.F.T.	192.88	179.22
4. Other European countries	3.38	7.61
5. E.E.C., & U.S.S.R.	148.85	148.32
6. ECAFE	196.16	181.23
7. Other Asian countries	23.29	27.06
8. Latin America.	4.68	15.37
9. Other American countries.	0.07	1.70
10. African countries.	65.75	49.31
Total	1,262.30	835.50

10.1.4. A perusal of this would reveal that there is a deficit of nearly Rs. 404 crores. This is mainly in the hard currency area. Our trade with African and East European countries more or less balance and only with the USA and European countries there is a large deficit. This could be made good by cutting down our imports of luxury goods and other non-essential items and also by increasing our trade with the rupee payment countries.

NOTES AND COMMENTS

All India Wheat Research Workers' Seminar on Wheat*

Mr. C. Subramanian, Union Minister for Food & Agriculture, while inaugurating the seminar, commended the attempt of the Punjab Agricultural University in breaking new ground in integrating research, teaching, training and extension as related to agriculture. The Punjab had shown the way to achieving this synthesis. He said, "I do hope that the other Agricultural Universities —both already established and those underway—will be able to resolve some of the administrative and procedural difficulties which are still hampering the evolution of this type of perfect synthesis and that in their ultimate structure they would emulate the example of Punjab."

"We have recently been engaged in the reorganisation of the organisations connected with agricultural research. You know that until a few years ago, research work tended to proceed in isolation not only as between Central and State Research Institutions, but also even within a State or Central Institution. The outcome of such isolated activities is well known. The inbreeding in thought and action which such isolation promotes has led to a very narrow circumscription of the horizons before a research worker. Where horizons are limited, action and aspiration are equally restricted. Even when an isolated activity leads to a result of great importance, this fact never comes to light because the results are neither tested nor applied on a scale necessary to realise their significance. This is where the coordinated approach has already helped us very greatly and awakened us to entirely new vistas in yield in crops like maize, jowar and bajra. In every crop where coordinated trials have been organised the wide adaptability of some varieties have been revealed."

The Minister said, "One of the factors to be taken into consideration in developing collaborative research on an enduring basis is the need to develop high standards of integrity among all those who are privileged to be scientists. Science is the pursuit of truth. Scientific work minus integrity will not lead to any progress but could even do much harm by leading to wrong administrative and political decisions. Integrity is also essential for promoting mutual trust and confidence and without mutual confidence it is impossible to bring about a healthy state of cooperative research....

The second aspect of cooperative research is the promotion of individual initiative and responsibility. Coordination should not imply that certain decisions are taken by the coordinators and all other research workers adopt them. For a dynamic research programme to be concieved and implemented, it is necessary to promote much individual thinking which could contribute to the evolution of a collective concept. The individual research worker, therefore, has an important role to play and his freedom and his personality should not be obliterated. The striking of a balance between individual initiative

*The Seminar was held at the Punjab Agricultural University, Ludhiana on 5th August, 1965.

and collective endeavour, again is a matter for gradual evolution. It cannot be defined or enforced. What is important is to recognise the need for safeguarding academic freedom and scientific initiative, as otherwise it would be difficult to attract and retain competent research workers in a programme. ......Unless we can create a research climate and temper in the country, our intellectuals will have to go in search of lands where such a climate prevails. In this task, it is the scientists themselves who have to take a lead because it is the Scientist alone—Head of the Department or Director, who can spark off the chain reaction of progress. Recently a scientist in the Class I scale at the Indian Agricultural Research Institute, turned down the position of a Director of a large Institute involving nearly 60 per cent rise in his salary solely for the purpose of continuing his scientific work. This confirms my belief that the brain drain we are currently experiencing is not solely caused by our poverty in economic resources and our consequent inability to pay salaries as attractive as those in the developed nations. The creative human spirit, which is what one should expect in a good scientist, craves for satisfaction in the results of the work done. If conditions will not permit the attainment of such a satisfaction, the spirit is frustrated and either trends to become cynical and destructive or else to emigrate to a better and more satisfying atmosphere. If only the right conditions can be created, India would be a paradise for agricultural scientists. In this task of creating an atmosphere in which productive work thrives, scientists themselves have a part to play, since by Governmental action alone, little change can be produced."

Other factors which are equally important requisites for the development of cooperative research relate to service conditions, absence of administrative hindrances and handicaps and opportunities for travel and free exchange of ideas and information. These problems are being examined currently and the Scientists' Panel attached to the Ministry of Food & Agriculture has suggested the creation of an All-India Agricultural Research Service.

Population control and increased food production are the two important tasks before the country. The Minister urged all research workers in the field of agriculture to take interest as individuals in the propagation of population control methods, since otherwise whatever work might be done might ultimately become fruitless. He said "At the present rate of growth in population we may have twice as many people to feed by the end of this century as we have today. Even if we achieve the annual growth rate of 5 per cent in agricultural production, which I am confident we can achieve, provided we are wise enough to recognise priorities and allocate resources in accordance with those priorities we will be always living hand to mouth, if the growth rate in population is not checked."

"The Indian Agricultural Research Institute, through the assistance of the Rockefeller Foundation and the Mexican Ministry of Agriculture, introduced into India in 1963 a large volume of wheat material containing factors for dwarfing. Through the efforts of research, some of the varieties like Sonora 64 and Lerma Rojo and V-17 and V-18 have performed very well in many parts of India. These varieties, having been developed under conditions of high soil fertility, have the capacity to utilise nitrogen very efficiently. In Delhi State, some of the members of the Forty Maund Wheat Club organised by the I.A.R.I. have obtained a return of nearly 40 lb. of grain per lb. of applied fertilizer by growing these wheats.

Arrangements have been made for importing 200 tons of seeds of Sonora 64 from Mexico."

The Minister went on to say "While we attempt to grow these high yielding Sonora varieties of red colour, we should take steps to meet by breeding new varieties of our own consumer preferences if possible without sacrificing yield.

The potency of modern scientific tools is so great that changes of this kind can be brought about within a short period of time.

......Annually now, more than one-third of our consumption is met by imports from abroad. This is really a very dangerous situation for any country, particularly for a big country like ours where the requirements are of a large magnitude. We have to do everything possible to become self-sufficient in the very near future."

"The intensive Agricultural Development Programme in Ludhiana District is an outstanding example of what is possible in the country by proper execution of such a programme. The oustanding results obtained are evident from the fact that the wheat district average of 16.9 maunds per acre in 1960-61 has shot up to 25.1 maunds per acre —a phenomenal increase of over 48 per cent in four years. Not only has there been a vertical increase in per acre production but also in the horizontal direction. The area under cultivation in the district has increased due to double cropping, from 1.99 lakh acres in 1960-61 to 3.12 lakh acres in 1964-65 —an increase of over 60 per cent. Use of nitrogenous fertilizers in the district stands at 40,000 tons—an eight-fold increase while, the 10,000 tons of superphosphate used in the district, is about half of the total consumption in the whole state. I would like to further analyse the factors that have led to the increase in production. These may be listed as remunerative prices of wheat grain, availability of good seeds, adequate credit facilities, use of fertilizers both, nitrogenous and phosphate, increase in irrigation facilities by sinking of private tube-wells with power supply for pumping, increased use of tractors and other machinery, besides plant protection service."

* * *

Indian Technical Personnel for African Countries

A delegation from Ghana is currently touring India to recruit 40 engineers for the newly created Ghana Public Corporation. A Nigerian delegation will also arrive in New Delhi in the near future to recruit Indian technical personnel on the basis of the recommendations made by the Chairman of the Nigerian Public Service Commission after his visit to India last year. Another team is expected in New Delhi from Ethiopia to recruit teachers.

India has offered Afghanistan ten teachers required by that country for operating its secondary education programme.

The Government will soon depute a few doctors and teachers to Somalia.

* * *

Exchange of Scientists between India and the West

A programme for exchanges of senior scientists between India on the one hand, and U.K., West Germany and France on the other, has been agreed upon.

During his recent visit to these countries, the Director General of C.S.I.R., Dr. Husain Zaheer had discussed such an arrangement whereby senior scientists from one country would spend a few weeks in institutions of another country.

The United Kingdom Ministry of Overseas program, West Germany and France

(*Continued on page 32*)

OPENING REMARKS

by DR. N. P. GUPTA
President, ASWI
at Annual Council Meeting of Association of Scientific Workers of India held in March 1965, *in New Delhi*

Colleagues & Friends,

The Association of Scientific Workers of India has completed another year of its existence. This year has been full of events of vital significance. It was during this year that the Founder-President of the Association, the great leader of Indian people, Jawaharlal Nehru passed away. Even before he undertook the task of shaping India's destiny through a scientific and industrial revolution, he thought of the men and women who would be required to work for it. That is how the Association of Scientific Workers of India came into being.

Today Jawaharlal Nehru is no more but his vision and his teachings are still with us. Over the years they guided us and they still are a source of inspiration to us.

It was also during this year that the great scientist J. B. S. Haldane who had opted for Indian citizenship, passed away. This fearless experimenter, theoretician, popular science writer was always in the forefront in championing the cause of science and scientists. The Scientific Workers of India mourn his loss.

It was also during this year that the Association of Scientific Workers of India organised the Symposium on "Science and the Nation", which attracted world wide attention. It was our humble effort to associate Indian Scientists with the problem of planning scientific and industrial advancement of our country.

The International Scene

It was during this year that the Chinese exploded their first atomic device thus extending the area and possibility of nuclear wars. Ever since the first test explosion at Alamagordo nuclear explosions increased until the signing of the Moscow test ban treaty. Scientists repeatedly pointed out that nuclear tests were leading to a dangerous increase in radioactivity in human environment.

By 1963 enough stockpiles of atomic and thermo-nuclear bombs had accumulated which could completely destroy all forms of human life on this planet. Nuclear bombs have thus become weapons not for warfare in the traditional sense but for mass destruction of all that human civilisation has built so far. Compelled by the rising voice of scientists, peoples and governments, the test ban treaty was signed in 1963. The test ban treaty by itself could not be considered as an act of disarmament but it did produce a climate of opinion in which further steps towards disarmament could be taken. The Moscow treaty was signed by over one hundred countries of the world despite the fact that it allowed underground tests which were carried on by the great powers.

But some powers refused to sign the treaty and even launched a compaign against it and called it a fraud. The demand for a partial ban was counterposed by a demand for total and complete disarmament. The real reasons for their opposition to sign the treaty became obvious later. In 1964 at Lap Nor in Central Asia, the Chinese joined the club of nuclear powers. It is indeed interesting to note that prior to this explosion, the Chinese scientists hotly denied any suggestions that they were preparing to explode an atom bomb.

The explosion of a nuclear device by China and the reported preparations for another, pose another great threat to the people of the world in general and of Asia in particular.

But India has once again given the lead to the rest of the world. Prime Minister Shastri declared that India will not enter the race for atomic bombs. The Scientific Workers of India fully support the Prime Minister and assure him of their ceaseless campaign both in India and abroad to enlist ever increasing support to the idea of nuclear neutrality. We from the Association of Scientific Workers of India appeal to scientists all over the world to raise their powerful voice, for extension of the Test Ban Treaty and against further preparation, testing and dissemination of nuclear weapons and for steps for a general and complete disarmament.

World peace is threatened not only by the continued testing of nuclear bombs but also by the proposal to organise the multilateral force (M.L.F.) which will spread the nuclear bombs to many powers including Western Germany.

At the last meeting of the Pughwash Conference, eminent scientists of U.S.A., U.S.S.R. and many other countries of the world came to the conclusion that "an international agreement should be concluded, committing the nuclear powers not to give, and the non-nuclear powers not to accept, nuclear weapons, material for nuclear weapons or aid in their development." The A.S.W.I. should fully support this move initiated by the Pughwash Conference.

The atomic bombs explosions are likely to pose many new problems. Plans are said to be under way to use nuclear explosions to dig another Panama Canal. Harbour digging is being planned with the use of atomic explosions. Mountains are sought to be moved with such explosions. Will the powers who undertake this task using nuclear explosions for peaceful purpose also use them for weapon testing? This appears a difficult question to answer.

Nearer home another area of conflict concerns us. The war in Viet-Nam has taken an unfortunate turn threatening to escalate which may even lead to a world war. At this juncture our thoughts go out to the suffering people of Viet-Nam. The scientists of both North and South Viet-Nam are keen to build their country for happiness and well being of their people. We are one with the statement of our Prime Minister that foreign troops have no right to be present on the soil of that country.

Our own frontiers continue to face a threat, The Chinese atomic explosion has further increased this danger. A heavy responsibility rests on the shoulders of Indian scientists to develop India's strength to meet this challenge.

While two thirds of World's Scientific effort is geared to war preparations, in Asia, Africa, and elsewhere in poor countries, a vast effort is being made for scientific, technological and industrial advancement for human welfare. The problems are immense and scientific and industrial progress occurs very slowly. This requires trained manpower, capital, foreign exchange and the national will to effect a change. The people of Africa, for instance, are moving forward. The Lagos plan for African scientific development is a document worthy of study by all scientists and planners in this country. African states intend to spend 0.5 per cent of the gross national product for scientific research on national resources. In 1970, the total African allocation for research will be Rs. 100 crores and will be raised to Rs. 160 crores in 1980, excluding amounts spent on fundamental research. In advanced countries there are 1000 scientists per million of the population. In Africa there are only 40 per million but they plan to raise the number to 200 per million by 1980. They also plan to have a 60:40 ratio for science and non-science students.

Many in advanced countries consider that the new scientific revolution is likely to create so much affluence that science may not seem to have a purpose. It is only the full application of science and technical know-how to 2/3 of the world, for the humanity struggling for survival, which may restore the purpose of scientific effort. The agencies of the United Nations are already working in this sphere. The U.N. Conference on advancement of science and technology in developing countries which met in Geneva in 1963 highlighted the problems. The UNESCO Conferences on these subjects have been of great benefit. The World Federation of Scientific Workers is holding a symposium on the same subject in September, 1965.

The Pughwash Conferences are considering the question of scientific development of poor countries of the World. The Afro-Asian scientists who came as guests to our national symposium last year have recommended convening of another symposium in India towards the end of 1965. A great movement is afoot to build human happiness. Our Association is proud of its place in this great movement and our contribution through the success of the Afro-Asian Symposium will be unique indeed.

The National Scene

Scientists and scientific workers in India face a very heavy responsibility. India had a lead in scientific development over many countries of Asia and Africa. In 17 years after freedom, considerable progress could be recorded; science and technology received full attention of the government and of the late Prime Minister Nehru. But there is a feeling of apprehension in the minds of Indian scientists that this lead may be lost. Be it noted that the rate of progress of advanced countries is much higher than that of ours. Therefore, disparity grows despite development. Therefore, all obstacles to scientific and technological progress and independence have to be removed.

The following factors may be considered as hinderances to rapid scientific and technological development in this country. First of all the need for full implementation of the Science Policy Resolution of the Parliament. This resolution sought to associate scientists with all aspects of planning and give them place of honour in society. The first conference to consider steps for its implementation was held in 1958 and the next in 1963. At the second conference it was reported that little progress had been made with regard to implementation of the resolution. A committee was appointed for this purpose. But this committee was soon abolished. The Association should suggest that a larger and more representative conference should be called each year to discuss, evaluate and suggest steps to implement the Science Policy Resolution of the Parliament.

The Chinese exploded their atomic device in October 1964. About the same time Indian papers reported cut in government sponsored funds for scientific research. The renewed Chinese threat made Indian scientists conscious that they have to work harder to keep India's research efforts at par with those of other countries. Shortage of funds is a factor to be faced in any growing economy but one may ask : Is the only way to make up the deficit is to ask for cuts in funds for scientific research and education? Prime Minister Shastri's announcement in the Parliament that Indian know-how will be given preference to foreign know-how heartened every scientist. But how Indian scientists are to provide the competent know-how when they are faced with cut in funds when they need them most.

Thirdly the worsening economic situation and consequent hardships have upset the otherwise peaceful sections of our people. The strike by young doctors in different parts of the country focussed attention on their poor emoluments during in-service training. The system is a legacy of the past when an apprentice was thankful to the guild master for an opportunity to learn the trade. But all over India large hospitals services are being run by these very young doctors. The ASWI should fully support the demands of the doctors for a better deal and hopes that they will not be forced to resort to extreme actions again.

The doctors in Central and State health services are also dissatisfied and are demanding abolition of multiple grades. It is not often realised that India is committed to achieve a socialist society and by implications a socialist system of medical care. It was expected that experiences gained from Contributory Health Scheme and Employees State Insurance scheme and from some pilot experiments, enough experience would accumulate to enable the beginnings of socialised medical service. But surely one cannot build a satisfactory health service on the mass of disgruntled doctors. We in our Association should study these problems and take suitable steps to assist the medical scientists to get their legitimate demands accepted.

The role of scientific agriculture and the dire need for intensification of research for increased agricultural production has been amply evinced by the recent food crisis all over the country. The premier Agricultural Research Institute at Delhi is celebrating the Diamond Jubilee of its inauguration in 1905. The Agricultural Research Institute of the States and other institutions have been in existence for scores of years. The food crisis in agricultural produce is a reminder that all is not well with these organizations. One of the major causes appears to be the deep unrest among the scientific workers with regard to their economic, professional and social status as well as their conditions of work. The Association of Scientific Workers of India is pledged to safeguard such interests so that each scientific worker can give his best in the interest of the nation.

Even more alarming is the strike by Secondary School teachers. All over India, teachers are on the march, undertaking protests, fasts and boycotting examinations. The teachers are obviously desperate. Teachers occupy the most important place in national life. They act as mentors for the future generations. All that is hoped for in the centres of higher learning, depends so much on what is achieved in the schools. What do the teachers demand? First they draw attention to unfulfilled hope enshrined in our Constitution that education for 6-14 years age groups shall be compulsory, free and universal. They ask for 10 per cent outlay on education in the Fourth plan and appointment of a Secondary Education Commission. They ask for a small rise in their D.A., old age pension and security of service. They only demand that two pay scales be implemented all over India: Rs. 250-500 for graduates and Rs. 200-400 for undergraduates. Could anyone disagree with these demands?

The Association of Scientific Workers should study the demands of the teachers and should impress on the government to accept the suggestions put forward by teachers which they so richly deserve.

I should make a reference to two more problems which are hindering scientific advancement. Firstly little attention has been so far paid to the assistants, laboratory technicians and technologists. Many young scientists join these services under compulsion of poverty and limited opportunities. During service they have few opportunities to improve their qualification. Continuous facilities for education for those in service should become the responsibility of the employing authorities.

The CSIR has done the right thing in accepting our suggestion on the need for abolition of hierarchy. The multiple grades have been abolished. The promotion of a scientist does not depend upon a vacancy. But this principle has to be accepted by other science institutions, particularly universities before this achievement can be considered stable. There is a vast number of frustrated young scientists who demand to be heard but do not have any place in the hierarchial system which is prevalent at most places.

The last but perhaps the most important at this moment of Indian history is the language problem. The whole country is torn with conflicting opinions on the issue. Passions have run high and destruction of life and property has taken place.

One might ask at the very outset : why must the scientific workers speak on an issue which engages the attention of the tallest in this land? Our answer is that apart from our interest as citizens of India, we scientists have a special responsibility. We are vitally concerned with the rapid transformation of Indian society with the help of modern science and technology. And language is an important factor in bringing science, scientific attitude, knowledge and the fruits of scientific achievement to our people.

This subject was debated by the Association in 1953 and certain conclusions were reached. The time has come again when we must review the position.

First of all, everyone agrees with the need for development of India's fourteen national languages which are spoken and which have a script and literature. The people who speak these languages are very proud of them. It is, therefore, obvious that the medium of expression, and instruction will be the mother tongue. Different Indian languages will be used in different parts of the country.

Every support, therefore, should be given for full development of these languages.

The teaching of science should obviously be carried out in these languages. The main problem centres round the use of scores of thousands of technical terms which do not exist in these languages. More are added each year on the basis of scientific research by advanced countries. These words become part of the pool of international scientific terminology. No attempt should be made to translate these terms into regional languages of India. These words from English should be incorporated as such and accepted as words belonging to the language concerned. Phonetic or grammatical changes may be made to fit them into our languages. This would enrich the language and keep a living contact with English from which most of the technical words would be derived. Translation of words, whatever, the influence for doing so, will do a great disservice to the development of Indian languages themselves and would deprive a whole generation of youth of contacts with science in other countries. English has to be replaced by the mother tongue but English words particularly technical words should find ready acceptance by the vocabulary of every regional language.

But scientific research, advanced technology and higher scientific education demands that the people of each region should know at least one foreign language. Our own backwardness in science and technology and the rate of scientific growth compel us to learn from advanced countries. This international language can only be English. Knowledge of English should be compulsory after class VIII and a good knowledge of English should be considered essential for entrance into universities, medical, technical and science institutes. This is mainly for reading and understanding the English language and not necessarily for expression in speech and writing.

A good proficiency to read and understand English can be acquired with much less effort than required for expression of thought. In other non-English countries too, science students and scientists learn English only for reading and understanding it and not for expressing their ideas. Use of English for expression will put a very heavy load on the people and as Jawaharlal Nehru put it, a real upsurge of the people cannot occur unless all the knowledge is made available to them through their mother tongue.

The need for a link language arises out of political and economic considerations and not from the point of view of continued rapid dissemination of scientific and technical knowledge. There is no Indian language which can claim to have an All India character so far as the scientific vocabulary and terminology is concerned. Use of technical words translated into Hindi will do greater harm to Hindi itself. It is the Hindi areas which will be cut off by imposition of Sanskrit words in place of English technical terms.

Link language can only evolve because people themselves will feel the need for it. It can not be imposed. Perhaps certain general rules can be accepted for this evolution. (*i*) Words common to different languages of India will be the first to be accepted into the link language. (*ii*) If a word exists only in one Indian language or dialect and is in common usage, it may be accepted as a part of the link language. (*iii*) If none of the Indian languages contain any word which is needed, it may be borrowed from English or some other foreign language. (*iv*) All technical words will be accepted as such from English to become the vocabulary of the link language. One must find a name for the link language. It could be "Hindi" but it would be better to avoid this term which is used for the language of Hindi-speaking areas.

Psychological reasons also indicate that some words other than Hindi should be coined if it were to be called "link", "federal" or "Union" language. Bharti has been suggested before and is worthy of consideration as a term for the link language. Even more difficult question is that of script. In the absence of any agreement, to allay the fears of non-Hindi areas and to make our people nearer the advanced countries of the world, Roman script or its modifications may be tried. I am aware of the opposition to this idea by Mahatma Gandhi and also of doubts expressed by Jawaharlal Nehru and many others. But India's national unity demands that we should have an open mind on this question.

Lastly when should one change over to the link language. This again can be settled by mutual agreement. On multilingualism I would say the greater attention should be directed towards arrangements for simultaneous translation in all Indian languages. But actual work of a Union Government in 14 languages may be impractical. Canada can experiment with two languages and Switzerland can have three national languages. But the size of the population and number of languages will make it impossible in India. It would inevitably lead to tendencies which will break up the Union. The quota system on the other hand may look attractive to some, it is surest way of retarding the progress of science and technology in the country. Only the very best talent should be used for scientific advancement. To have a common Union service and allow quotas for scientific posts would defeat the very objectives of that service. The language has to help and facilitate the task of scientific and industrial transformation. This can be the only basis for solution of this problem.

Tasks before ASWI

The Association of Scientific Workers of India have always had two objectives:

(*i*) To look after the interests of scientists and scientific workers,

(*ii*) To do all it can for advancement and proper utilisation of science for the welfare of the community and to see that fruits of scientific labour and achievement are not misused.

We consider that a total perspective plan for India's scientific and technological development should be prepared. In the absence of a direction the efforts of scientists may not be properly utilised. We believe that Science Policy Resolution passed by the Parliament should be implemented without any further delay and a National Commission appointed to go into the details of the question. We consider it important that Indian scientific workers, true to the international spirit of science, should work shoulder to shoulder with scientists of Asia and Africa for mutual collaboration in promotion of science and technology in these countries. We once again dedicate ourselves to the tasks of working for maintenance of world peace. The ASWI and its branches should draw the attention of all those who are concerned with the language problem to the urgent need for continued scientific advancement. Language policies should promote our scientific effort. An emotional approach may even retard it.

In the end, I would once again repeat that I said last year. India desires to achieve democracy and socialism in a planned peaceful manner. Science and technological knowledge will play a part in this process and we once again pledge to achieve it.

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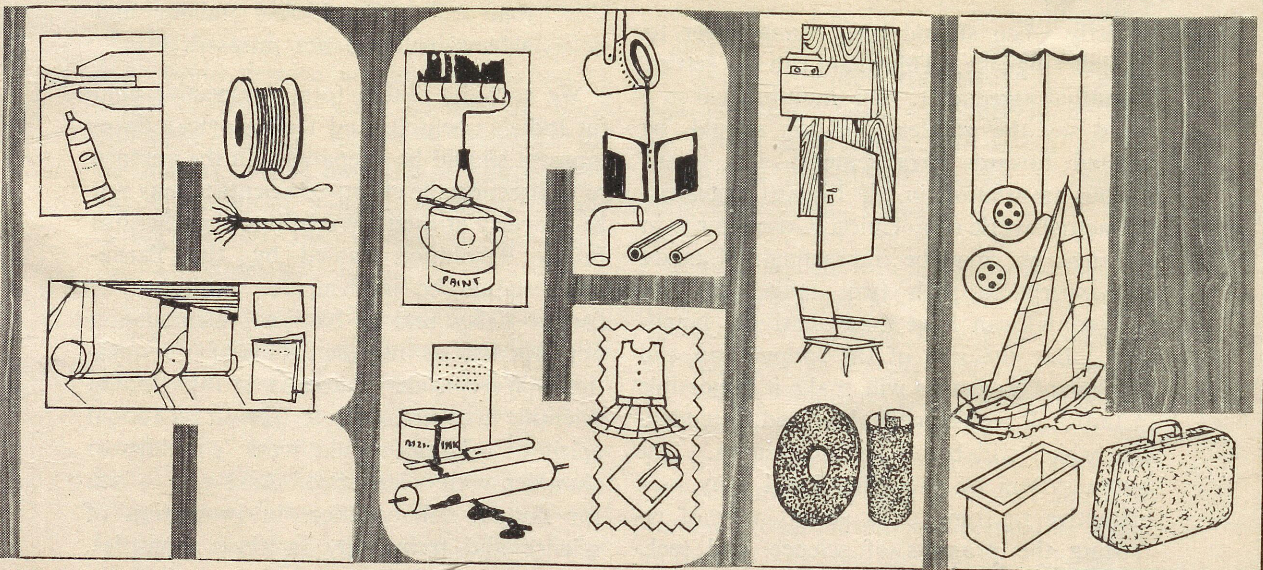

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Aswi Activities

Bureau of the Central Executive Committee

Five meetings of the Bureau of C.E.C. were held during April-June 1965. A summary of the discussions and decisions is given below :—

(*i*) The Bureau considered the request of NPL Staff Association (New Delhi) for affiliation and authorised the General Secy. (Orgn.) to work out the details.

(*ii*) The Govt. of India have sanctioned a sum of Rs. 4 lacs for organising a Symposium of scientists from Afro-Asian countries in Delhi during the winter of 1965-66. The first meeting of the 10-Country Preparatory Committee for the Symposium was held in Cairo on April 24 and 25, 1965. It was attended by Indian delegation consisting of Dr. S. Husain Zaheer, Dr. N. P. Gupta and Shri Y. R. Chadha.

(*iii*) It was proposed that the name of Vijnan Karmee be changed to 'Indian Scientist.' The proposal was circulated to members of the Council for their approval. There being some objections to the changeover, it was proposed to discuss the matter in the next council meeting.

(*vi*) Articles and Letters published in Vijnan Karmee may be paid for—Articles at the rate of Rs. 25/- per page subject to a maximum of Rs. 100/- per contribution and letters at the rate of Rs. 15/- per page subject to a maximum of Rs. 25/- per letter. It was also decided to send copies of Vijnan Karmee to members at their individual addresses.

(*v*) The change in the design of the cover of Vijnan Karmee was proposed by General Secretary (Publications) and approved by the Bureau. (The change has been given effect from June '65 issue of Vijnan Karmee.)

(*vi*) It was generally agreed that the subject matter of some of the letters received by the Centre from Branches may be published in Vijnan Karmee and a discussion forum be started in Vijnan Karmee based on some topical letters (In June '65 issue of Vijnan Karmee, a discussion forum on 'Tailored Advertisement' has been started.)

(*vii*) It was decided to send one representative of ASWI to participate in the 3rd Symposium of East African Academy to be held in Dar-es-Salaam on 17th September, 1965.

Khamaria Branch
Jabalpur

At the annual General Body Meeting of this Association held on 4th April 1965, the following Office Bearers have been elected for the year 1965-66.

President	:	Shri A. Rajagopalan
Vice-President	:	,, P. K. Naronkar
Secretary	:	,, S. K. Chaudhuri
Jt. Secretary	:	,, N. R. Aphle
Treasurer	:	,, P. S. Gupta
E. C. Members	:	,, P. S. Subramaniam
,,	:	,, A. V. Subramaniam
,,	:	,, R. K. Mukherjee
,,	:	,, T. Kurian
,,	:	,, M. V. Veeraraghavan
,,	:	,, E. S. Nilkanthan
Auditors	:	,, R. V. Viadya
,,	:	,, H. B. Phadke

Bhavnagar Branch

Central Salt and Marine Chemicals Research Institute, Bhavnagar

The following have been elected Office Bearers for the year 1965-66 :

Executive Members

President	:	Shri L. G. Shukla (M/s Jahangir Vakil Mills Ltd., Bhavnagar.
Vice-President	:	Dr. D. M. Desai
,,	:	Shri H. V. Parekh
Secretary	:	,, P. R. Mehta
Jt. Secretary	:	,, H. B. Gohel
Treasurer	:	,, E. R. R. Iyengar
Members	:	,, K. K. Bokil
,,	:	Dr. D. S. Datar
,,	:	Dr. R. L. Datta
,,	:	Dr. D. J. Mehta
,,	:	Shri A. R. Rao
,,	:	,, R. S. Dave
,,	:	Dr. M. M. Parekh
,,	:	Shri W. S. Rajadhyaksha
,,	:	,, P. D. Jhala.

CMRS Branch

Dhanbad

At the Annual General Meeting, which took place on the 7th April 1965, the following members were elected to the Executive Committee of the Branch :

President	:	Shri D. P. Dutta
Vice-President	:	Dr. S. Ramachandra
	:	Dr. R. N. Chakravarty
Secretary	:	Shri V. S. Narasimhachar
Jt. Secretary	:	,, B. N. Chatterjee
Treasurer	:	,, K. P. Mukherjee
Members	:	Dr. A. K. Ghosh
,,	:	Dr. D. Kanungo
,,	:	Shri B. P. Bhaduri
,,	:	,, R. G. Singh
,,	:	,, B. K. Burman
,,	:	,, N. M. Raju.

(*Continued from page 22*)

have agreed in principle, and the details are to be worked out.

The Ministry of Overseas Development of the United Kingdom is expected to sponsor visits of senior Indian Scientists for research work in the United Kingdom. Similarly, British scientists will be invited to work in India for periods ranging from two weeks to six months.

West Germany has also agreed to increase the number of scholarships for C.S.I.R. sponsored scientists from eight to sixteen every year.

In Paris, Dr. Zaheer also discussed with the French Institute of Petroleum, the extension of the agreement for its collaboration with the Indian Institute of Petroleum, Dehra Dun for a further period of five years.

* * *

India-USSR Agreement for Training of Personnel

India and the Soviet Union on June 28, 1965 signed an agreement for the training of Indian personnel in the design work of thermal power stations.

The agreement envisages in the first stage, training of five people for designing of thermal power stations and two for operating them. Training will be given in Soviet plants.

The Soviet Union will help India in creating additional power of 600 megawatts in the Fourth Plan period. This was agreed to when Prime Minister Shastri held discussions with Premier Kosygin in May last.

Institutional Subscribers for Vijnan Karmee

The Association of Scientific Workers of India has decided to enrol institutional subscribers for Vijnan Karmee, Journal of Association. Research laboratories, educational institutions and industrial concerns can now become institutional subscribers and receive copies of the Journal as also other literature published by the ASWI. The institutional subscription will be Rs. 25/- per annum.

Vijnan Karmee is one of the few scientific journals in the country devoted to the cause of science and scientific workers. The Journal has achieved more than 16 years of steady growth and rising circulation which now stands at about 2000, amongst the scientific community of the country. A number of well known scientists are associated with the Journal in advisoryand collaborative capacity.

Research laboratories, educational institutions and industrial concerns are invited to subscribe to this Journal. Subscription forms can be had from:

ASWI, Post Box No. 137, New Delhi-1.

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