

VIJNAN-KARMEE

OFFICIAL ORGAN OF THE

ASSOCIATION OF SCIENTIFIC WORKERS OF INDIA

No. 1]

Editors (*Ex-officio*) :- Dr. P. K. Kichlu and Mr. C. R. Mitra

[MAY, 1949.

Science and technology constitute the very basis of modern civilisation and their potentialities for good and for evil are immense. Scientific workers throughout the world are, thus increasingly realising their special responsibility to society. They can no longer keep themselves aloof from the socio-economic problems which their work is posing to society. They are vitally concerned with the application of Science for the promotion of human welfare and the prevention of the destructive and antisocial uses of science. Without organising themselves into a powerful body, scientific workers can not hope to influence national and world affairs in this direction.

Again, scientific workers in many countries have not received the recognition they deserve. They have to suffer living and economic conditions under which the proper development and application of science is wellnigh impossible. In India, for instance, trained scientific workers are frequently paid less than even unskilled workers in the same factory. Whether the employer is Government or University or Industry, scientific workers have not in general got a fair deal. This is not only hard on the scientific workers themselves but react on the society itself by keeping the scientific sector of the community weak. The improvement of the professional, social and economic status of scientific workers is an imperative necessity for the progress of the community as a whole.

Such are the considerations which have led to the formation of the various national Associations of Scientific Workers and also to the formation of the World Federation of Scientific Workers.

A similar organisation in India was launched by the Indian Science Congress which represents the widest cross-section of scientific opinion in the country, during its plenary session held in Delhi in January 1947, and was inaugurated by Pandit Jawaharlal Nehru. The objects of the Association include:

1. to work for the most effective use of science and the scientific method for the uplift and welfare of the society as whole;
2. to improve and safeguard the the economic interests, the condition of life and the professional and social status of all scientific workers in India;
3. to watch over, promote and protect the common and individual interests of its members, and to regulate the relations between members and employers;
4. to create public interest in science by organising popular scientific talks and by diffusing basic and applied scientific knowledge;
5. to secure representation upon such public and other bodies as may affect by their policy the interests of science and its profession;
6. to ensure that the national resources of the country and also the results of scientific research and development are utilized in the best interests of the community;
7. to take steps to remove prejudices, superstitions and other institutionalised social habits and customs inhibitory to progress and generally to inculcate the scientific spirit among the people;
8. to maintain a national register of scientific and technical workers;
9. to extend and improve scientific and technical education and the professional training of those seeking to become fully qualified scientific and technical workers;

The Association of Scientific Workers of India functions as a Trade Union and differs from other national scientific bodies in its preoccupation with the economic conditions of scientific workers and with the effective application of science and the scientific method to the welfare of the community as a whole. It has entered the field in pursuit of these aims in a way that the other bodies can not and will not fulfil. Its constitution is democratic—a group of scientific workers in any institution or in any field of science or technology can form a Unit of the Association, discuss their needs and problems and forward them to the local Branch for action. The Central organisation, the Council of the Association, composed of the Branch delegates, governs the policies and activities of the Association; it also elects a National Executive to carry out its functions in between the Council's meetings. It also collaborates with sister organisations in other parts of the world, in common cause, through the World Federation of Scientific Workers with which it is affiliated.

The need for an official publication of the Association can hardly be overstressed. It will not only act as a forum for discussion of the duties, rights and responsibilities of the Indian scientific workers and to effectively voice their consolidated views, but "Vijnan-Karmee" proposes to serve the people of India in promoting the cause of science and technology, and also in popularising scientific ideas. It is an humble beginning on the part of scientific workers of India in playing their great role in the colossal task of ameliorating the conditions of living of one-fifth of the population of the world, stricken with ignorance, poverty and disease, and the National Executive of the Association of Scientific Workers of India depends solely on the enthusiasm and active co-operation of the working people in general and the scientific workers in the country in particular.

O U R S E L V E S

The ASWI has been allotted a seat in the Scientific Sub-Commission of the Indian National Commission set up by the Government of India as an advisory body and to work in collaboration with the UNESCO.

The ASWI waited in deputation on the Ministry of Defence, Government of India, and discussed with them the various grievances of the Ordnance scientific workers in Kirkee, and has been assured that their grievances would be sympathetically considered. Some of the grievances have already been redressed.

The ASWI waited in deputation on the employers of scientific workers in the D.C.M. Chemical and Vanaspati Works, Delhi, in regard to the recent retrenchment of scientific workers therefrom. The management of the said firm while appreciating the cause, the ASWI stands for, agreed to review the various individual cases and help the retrenched scientific workers by re-employing them wherever possible.

In pursuance of the resolution adopted in the last Annual General Meeting of the Association, the ASWI has approached the Government for security of service of scientific workers, particularly in the industrial establishments.

The ASWI is pursuing its programme of popularisation of science and in this respect the Association is thankful to the various foreign embassies and legations for their co-operation.

A Branch of the ASWI has been formed in Dehra Dun by the efforts of the Ordnance scientific workers.

The Ordnance Scientific Workers Associations at Kirkee and Kanpur have moved for affiliation with the ASWI. A Unit of the ASWI has started functioning at Poona in the Public Works and Public Health Department.

P R O C E E D I N G S O F T H E S E C O N D A N N U A L G E N E R A L M E E T I N G O F T H E A S S O C I A T I O N O F S C I E N T I F I C W O R K E R S O F I N D I A H E L D A T A L L A H A B A D O N J A N U A R Y 4, 1949.

1. In the unavoidable absence of Pandit Jawaharlal Nehru, Dr. T. N. Seth was elected to the chair.
2. The minutes of the First Annual General Meeting held at Patna on January 3, 1948, were read and confirmed.
3. The Annual Report for the year 1948, presented by the out-going General Secretary, Dr. B. C. Guha, was read and adopted with the following amendments:
 - (a) That if there are more than one Branch Secretaries in a Branch, only one of them will be *ex-officio* member of the Central Executive Committee.
 - (b) That in future no individual names should be mentioned in the report in case of references to governments and institutions.
 - (c) That on page 19, line 9, '17' should read as '7'.
4. The audited statement of Accounts of the Association, presented by the Treasurer, Dr. D. V. Karmarkar was adopted.
5. The out-going Joint Secretary, Mr. C. R. Mitra, announced the following names of the Office-bearers and Members of the Central Executive Committee for the year 1949, elected by the Council: *President* - Pandit Jawaharlal Nehru; *Vice-President* - Dr. B. C. Guha; *General Secretaries* - Dr. P. K. Kichlu and Mr. C. R. Mitra; *Joint Secretary* - Mr. S. Bhattacharji; *Treasurer* - Dr. D. V. Karmarkar; *Members* - Dr. S. Banerji, Dr. A. N. Bose (Calcutta); Mr. Bharat Bhushan, Mr. S. K. Mohindra (Delhi); Maj-Gen. S. S. Sokhey, Dr. T. D. Patel (Bombay); Mr. N. R. Srinivasan (Bangalore); Mr. A. C. Sen (Bihar); Mr. S. C. Roy (Lucknow); Mr. Hamidul Hasan (Aligarh); Dr. B. Prasad (Orissa); and eight newly elected Branch Secretaries for 1949 from the Branches at Calcutta, Delhi, Bombay, Bangalore, Patna, Lucknow, Raniganj and Naihati.
6. It was resolved that the present registered constitution should continue to be the working constitution of the Association till the third annual General Meeting of the Association, when it may be finally adopted with amendments, if any.

7. Resolutions: (Summary)

A number of resolutions dealing with un-employment, retrenchment and insecurity of service of scientific workers, and asking for enhanced rates of dearness allowance for the comparatively low paid workers were adopted; the Association urged upon the authorities to stop the practice of keeping scientific workers in temporary jobs for an indefinite period and to grant them all the privileges during the tenure of temporary service; to assure facilities to them for appearing before competitive interviews in pursuance of betterment of prospects. The Association welcomed the formation of the Department of Scientific Research under the Prime Minister, and urged upon the Council of Scientific and Industrial Research to expedite the working of the National Laboratories and pleaded for the state ownership of research endowment funds. While pointing out malpractices in appointments and promotions on grounds other than merit and some-times even on racial and communal considerations, the latter happening in some industries, it asked for their rectification. While protesting against the practice of re-employment of superannuated persons by the Government, it urged upon the Government for effecting better co-ordination of employment of scientific workers in public service as well as in industry; it further urged upon the Government for effective rapid industrial development in the country and pursuing progressive policy of nationalization.

The World Federation of Scientific Workers in its First Assembly adopted the following CHARTER for Scientific Workers enumerating the duties and rights of scientists. The Charter is one of the instruments by which the WFSW can strengthen the mutual understanding and solidarity of scientists in the world, so that they can as far as possible speak in general agreement and with one voice on all questions of fundamental importance which affect them as scientists. It was the first time in the history of science that the scientific workers have succeeded in arriving at agreed general rules concerning their duties and rights.

CHARTER FOR SCIENTIFIC WORKERS

During the past century science has become a principal factor controlling the condition of men's lives throughout the world. From being the vocation of a secluded few it is now the main occupation and livelihood of some half million men and women. It affects directly those engaged in teaching and research in the Universities, industry and government service, and scarcely less directly millions of others—engineers, doctors and agriculturists whose profession involves the application of scientific knowledge and method. The rise of the new profession of scientific worker has been so rapid that there has been no time for the slow development of codes of responsibilities and rights, such as have grown up gradually and traditionally in the older professions of medicine and law. The evil results of the neglect of science on the one hand and of its irresponsible use on the other have in recent years been only too plainly felt. One way of preventing them in the future is to ensure that scientific workers have a responsible and recognised place in the community.

As a first step to secure this the World Federation of Scientific Workers is setting out a Charter for Scientific Workers. This is a concise statement, based on the experience of recent years of the responsibilities of scientific workers and of the conditions which must be provided to safeguard the freedom, the advancement and the social utility of science.

The primary responsibility for the maintenance and development of science must lie with the scientific workers themselves, because they alone can understand the nature of the work and the directions in which advance is needed. The responsibility for the use of science, however, must be a joint responsibility of scientific workers and of the people at large. Scientific workers neither have nor claim to have the control over the administrative, economic and technical powers of the communities in which they live. Nevertheless they have a special responsibility for pointing out where the neglect or abuse of scientific knowledge will lead to results detrimental to the community. At the same time, the community itself must be able and willing to appreciate and to use the possibilities offered by science which can be achieved only through the wide-spread teaching of the methods and results of the natural and social sciences.

Scientific workers can adequately carry out their responsibilities to the community if, and only if, they are working under conditions which enable them to make full use of their gifts. The Charter for Scientific Workers attempts to set out what those conditions are, based on the wide and varied experience of the members of the WFSW.

They include, naturally, as the vast majority of scientists today are salaried workers, the recognition of common rights and duties of all workers. The profession of science has in addition certain characteristics of its own. Because science is concerned with finding out new things, the work of the scientist cannot be reduced to a routine. Because the path of discovery depends on the co-operation of many men's minds, the scientific worker, to be fully effective, must be enabled to communicate with and visit his colleagues throughout the world without hindrance. Secrecy in any form stunts the growth of science and may cause it to wither away completely.

The scientific worker requires a long and costly training. Only a small proportion of the population have the necessary interest and capacity for such work. It is all the more essential that all who have it, whatever their circumstances, should be assisted in their training.

I. RESPONSIBILITIES OF SCIENTIFIC WORKERS

The profession of science, due to the special importance of the consequences of its good or bad use, carries with it special responsibilities over and above those of the ordinary duties of citizenship. In particular, the scientific worker, because he has or can easily acquire knowledge inaccessible to the public, must do his utmost to ensure that that knowledge is employed for good.

These responsibilities, which fall upon scientists either individually or collectively, can be summarised as follows:

I.1 TO SCIENCE

- I.11 Integrity of scientific work. Resistance to the suppression or distortion of scientific knowledge.
- I.12 Full publication of scientific results.
- I.13 Co-operation with other scientific workers, regardless of racial or national barriers.
- I.14 Securing the growth of science with due regard to the balance between fundamental and applied science.

I.2 TO THE COMMUNITY

I.21 To study the implications of science, particularly in their own field, to current economic and social and political problems and to make efforts to ensure that this knowledge is widely understood and acted on.

I.22 To search for new ways of employing science to fight famine and disease and to improve conditions of life and work in all countries without discrimination. To co-operate in doing this with all organisations and individuals having the same ultimate aim.

I.23 To study all aspects of public administration so as to ensure that scientific methods are fully used and to keep people and governments informed of the implications of scientific advances in this field.

I.3 TO THE WORLD

- I.31 To maintain the international character of science.
- I.32 To study the underlying causes of war.
- I.33 To aid agencies seeking to prevent war and to build stable bases for peace.
- I.34 To work against diversion of scientific effort to war preparation: in particular to the use of science in providing methods of mass destruction.

1.35 To resist movements inspired by anti-scientific ideas such as irrationalism, mystical intuition, racial inequality and the glorification of force.

2. STATUS OF SCIENCE AND SCIENTIFIC WORKERS

The conditions necessary for scientific workers to give of their best, which are outlined in the rest of this Charter, can only be fully achieved in communities in which they have earned due respect. This respect must be based upon an objective appreciation of the potentialities of science, arising from a recognition of its paramount role in modern society, and an integration of the scientific method and outlook into the way in which the community deals with its social, economic and political problems.

This state of affairs will only be brought about when:

- 2.1 Science is adequately financed. This implies the provision of funds at a rate much higher than that of the past in most countries sufficient to utilise the existing research manpower of the country to the full, and to provide through recruitment and training, increasing numbers of scientific workers.
- 2.2 The results of research are rapidly developed and applied.
- 2.3 Research is planned in a way which takes account of the intrinsic developments of fundamental science and of community needs themselves scientifically assessed.
- 2.4 Scientific workers participate actively in policy formation at all levels, but especially in the higher levels of industry, legislative bodies, Government and international organisations such as U. N. O.
- 2.5 Governments support adequate publicity service for science, which shows what it is doing, and what it can do in the service of mankind.

3. OPPORTUNITIES TO BECOME A SCIENTIFIC WORKER

The opportunity to undertake a scientific career is one that should be available to every child in the world. Not only is it unjust to deprive children by reason of race, sex, social status or nationality of the possibility of contributing to the advancement of knowledge, but it is only in this way that science can be given a broad democratic basis and assured of full and continuous contact with the people. It is also essential to give some scientific training to all children, whether they are going to do scientific work later or not, as science, which helps them to understand the world and culture in which they live, is necessary for a full education; and as it is important to maintain contact between scientists and their fellow-citizens. In the past there has been a serious danger of the formation of a narrow caste of scientists because they have been drawn in the main from upper or middle class families and because science developed in the first place in the industrial countries. This has resulted in the narrowing of sympathies of the scientists themselves and consequently the creation of an attitude of suspicion towards science in the population at large, and particularly among industrial workers and the people of undeveloped countries. This attitude can only be broken down by broadening the basis of scientific recruitment. The tasks for science in the future, if properly developed for human welfare, will be such as will call for a vastly greater number of scientific workers. This greater number can only be provided, without lowering the standard of intelligence, by casting the net of scientific opportunity far more widely. It is therefore essential that the following conditions should be achieved as soon as practicable in the different countries of the world:

- 3.1 Universal science teaching in schools so that all people can have a background of science and so that potential scientists can be made aware of the existence of the possibility of a scientific career at an early age.
- 3.2 Free secondary education now for those who show sufficient promise, secondary education for all as soon as facilities become available.
- 3.31. University training to be open to all persons of proved ability, irrespective of age, without payment of fees, and with adequate financial grants and family allowances to meet living expenses.
- 3.32 Opportunities for part time studies until such time as conditions permit 3.31 above to become fully operative; facilities for sufficient time off from employment without financial loss, to secure a reasonable amount of time for rest and recreation.
- 3.33 Active participation of representative student bodies in the academic as well as in the administrative activities of the Universities.
- 3.34 Courses should include:—
- 3.341 The general cultural and social background of science, the history of science and the role of science in the current world situation.
- 3.342 Experience in actual everyday problems involving science.
- 3.35 Curricula and teaching systems should be continuously revised using scientific methods of evaluation with the emphasis on methods and not on mere accumulation of facts.
- 3.36 Universities to have adequate facilities for training new graduates in research methods, and an adequate number of research scholarships.

4. FACILITIES FOR EMPLOYMENT.

The educational policy outlined above would fail in its purpose if there was not full and organised provision for the employment of scientific workers. In the past this has not been the case. Scientific workers at all times in certain countries and at times of economic depression in all, have been unemployed or forced to take employment in occupations where their specific training was not used. Governments should attempt to ascertain the future demand for scientists of various types and take steps to ensure a supply of trained scientists appropriate to the demand. The demand for scientific workers in different categories will not of course be constant and cannot always be accurately assessed. Consequently provision must be made to ensure the suitable employment of all scientists once trained along the following lines:

- 4.1 The fullest use to be made of science in all government and industrial enterprises thus ensuring a constant overall demand for scientific workers.

4.2 Prevention of misemployment, particularly the use of trained scientists for unskilled and repetitive work or of work of little value either to the progress of science or to the welfare of the community.

4.3 Opportunities for re-education or training to allow for changes in demand for different types of scientific worker, as, for example, when a particular type of technique or skill is rendered obsolete by advances in other fields of science.

4.4 Opportunities for post-graduate education and further training to keep abreast of advances in a particular field of work.

5. CONDITIONS OF WORK FOR SCIENTISTS.

Scientific work, as any other kind of work, can be carried out effectively only if the status and conditions of scientific workers are such that they can feel secure and give of their best. One aspect of this is due recognition for work done. In addition however unless certain conditions and facilities peculiar to scientific work are provided it can easily degenerate into fruitless routine and create the feeling of frustration now so common in scientific work. The claim of scientific workers for special conditions is founded in the special character of their work and not on any idea of intellectual superiority or greater service to the community than any other worker.

5.1 SALARIES AND CAREER PROSPECTS.

5.11 Recognised minimum salaries for all grades without sex differentiation to be determined by collective agreements.

5.12 Minimum salaries not to be below the level of corresponding administrative or medical grades.

5.13 Adequate standard interchangeable superannuation services for scientists in all employments.

5.14 No discrimination against married women.

5.2 CONDITIONS.

5.21 Hours of work and holidays should be flexible for scientists and should make provision for further training, conferences, etc. (see 4.3)

5.22 Scientists engaged in administrative or teaching duties should be allowed time and facilities for research work, and those engaged in research work should be encouraged to do some teaching.

5.23 Adequate protection facilities and adjustment of hours and holidays for those engaged on hazardous work.

5.3 GENERAL FACILITIES FOR SCIENTIFIC WORK.

5.31 Library and information services designed to provide the scientific worker with the information he needs in the most suitable form and with the minimum of delay.

5.32 Efficient and rational system of scientific documentation and abstracting.

5.33 Supplies of apparatus, materials and equipment to fulfil the needs of research workers.

5.34 The provision of technical assistance on a scale to ensure the fullest use of the scientific capacities of all scientific workers.

5.35 Assistance for international contacts and travel, especially for younger workers, in exchange of positions, free travel, etc.

5.36 Freedom to discuss work freely with other scientists, and to join and participate in the activities of scientific societies at home and abroad without restriction or prohibitive expenditure.

5.4 THE RIGHTS OF SCIENTISTS OVER THE RESULTS OF THEIR WORK.

5.41 Right to publish work under the scientist's own name.

5.42 Appropriate rewards to scientists for innovations which are exploited.

5.43 The immediate abolition of secrecy in all fundamental science and its progressive diminution in industry and national affairs.

6. ORGANISATION OF SCIENTIFIC WORK.

The need under modern conditions for a degree of organisation and planning of scientific work far greater than in the past, raises a special problem, the nature of the control of scientific work. If scientific workers are treated as normal administrative or business officials and subjected to the same regulations and control as non-scientists, their work can be almost completely frustrated. It is therefore essential, for the very carrying out of scientific work, that the following conditions be adhered to:—

6.1 Direction of detailed scientific work to be in the hands of scientifically trained persons.

6.11 Scientific work to be administered by bodies containing representatives elected by scientific workers. These should include all grades of seniority, with a large proportion of active scientific workers.

6.2 Scientists to be represented at the administrative level in all organisations involving scientific work.

6.3 Scientists to have the right to take part in workers' organisations in all undertakings in which they work.

7. SPECIAL NEEDS FOR SCIENCE IN UNDEVELOPED COUNTRIES.

Science has been most unevenly developed, following closely the evolution of industrial communities and being relatively undeveloped in agricultural ones. We must work for the creation in all countries in as short a time as possible of an indigenous body of scientists working in conditions of political as well as economic liberty. This implies the assistance of scientific workers of the more advanced countries to educate the people and more particularly the potential scientific workers of undeveloped countries. In the meantime it is the responsibility of scientific workers in industrial countries to help the people of undeveloped countries with their urgent problems. To do this the following conditions must be observed:

7.1 Application of science to most pressing local needs, e.g. development and conservation of natural re-

sources, study of local agricultural conditions so that there may be maximum production of varied foodstuffs without soil erosion, attention to problems of health so that the same expectation of life is looked on as attainable in all parts of world.

7. 2 Provision for interchange of teachers with other countries and for students to study abroad.
7. 3 Provision of scientific personnel and equipment from abroad to meet immediate problems on the spot as well as for the training of workers in the country concerned.
7. 4 Complete separation of any such schemes from economic and political control by a foreign power.

The following important RESOLUTIONS were adopted in the First Assembly of the WFSW.

1. The World Federation of Scientific Workers welcomes the establishment of the Permanent International Committee for Peace, formed at the World Congress at Wroclaw and wishes it all success in its struggle for a peaceful world.

2. This Assembly is profoundly disturbed at the present drift in international events, and at the facile and irresponsible talk of a third world war.

It affirms the need and desire for peace of people all over the world, and strongly condemns all propaganda to the effect that war is inevitable. In the light of recent experience, it affirms that aggression cannot solve any social question. It declares its belief that a new war would be a disaster for the whole world, causing human and material destruction on a scale far greater than that of the last. At the same time, science as an ordered activity of mankind might be crippled beyond recovery through the destruction of its personnel, apparatus, equipment, buildings and even a loss of its stores of recorded knowledge. It believes that scientists have a particular responsibility as citizens because of their special knowledge which enables them to better comprehend this danger, and it therefore condemns those scientists who knowingly work to further preparations for an aggressive war. It calls on scientists of all countries to unite among themselves and with the people of the world to combat this danger, and to defend and further develop their common heritage against the gravest threat which has yet faced it.

3. This Assembly advises the Associations affiliated to it to propagate unceasingly the understanding of social functions of science and the necessity for scientists to participate in the social life of the community, having in mind that technical perfection alone does not constitute the highest value of civilisation and culture.

4. This Assembly considers the question of the international standardisation of academic curricula and qualifications and the organisation of exchange of teaching and research scientists on an international scale and to insert in the teaching programme for scientists chapters on the social functions of science and the history of science.

5. This Assembly recommends to its affiliated organisations that they find all possible means for increasing co-operation between scientific workers and Trades Unions and other progressive organisations.

6. This Assembly of the WFSW, having examined the threat to peace caused by the preparations for atomic, bacteriological and radio-chemical warfare, and considering that the suspension of the work of the United Nations Atomic Energy Commission was due to the political problems of control not being considered at the same time as the technical ones —

(a) demands that the manufacture of atomic weapons be suspended immediately; this manufacture constitutes a threat to peace and at the same time one of the major hindrances to the establishment of agreement among all nations. The suspension of manufacture to be enforced by a world wide system of inspection.

(b) demands of the General Assembly of the United Nations, the resumption of the work of the Commission which was charged not only with the control of atomic energy but also with all questions relating to weapons for mass destructions, within the framework of the Security Council.

7. This General Assembly of the WFSW, recognising that the standard of living of the majority of the people cannot be improved without a large extension of scientific rationalism which would lead to the increased exploitation of world resources in fuel and energy, calls on the governments of all nations :

(a) To stop immediately the manufacture of atomic weapons which wastes the precious resources of uranium and delays the day when atomic energy will make an appreciable contribution to the world's power requirements

(b) To prosecute with maximum possible speed plans for the development of industrial and peaceful utilization of atomic energy.

8. This General Assembly of the WFSW considers that secrecy of any kind in fundamental science is both illusory and dangerous and demands that all legislation leading directly or indirectly to its establishment should be abolished and avoided in the future.

9. This Assembly of the WFSW, realising that the management by the producer countries of the distribution to other countries of radioactive isotopes for uses not applicable to military purposes, has aroused criticism in some countries whilst being of no value to the producing country, recommends that the distribution of radioactive isotopes for all non-military uses be delegated to the Social and Economic Council of the UNO, the World Health Organisation or other suitable international agency, and be carried out under conditions designed to protect and support free international co-operation among scientists.

10. This Assembly considers that the dependent peoples should obtain every possibility to increase their own cultural levels, so that they would be able as soon as possible to make original contributions to human progress, that is, to the development of science, art and material culture. The essential prerequisite of this is the elimination of feudal and imperial exploitation of these peoples, so that the products of their toil will be available in the first place for their own development. Therefore, this Assembly advises the members of all affiliated organisations to do their utmost to stop the colonial wars, and foreign intervention in the colonial and dependent countries and to fight against

the idea of imperialism of certain peoples and for the effective abolition of all racial discrimination.

The scientists in the imperialist countries have also the duty of demanding for the dependent peoples:

- a. An immediate and substantial elevation of the standards of living particularly of health and nutrition as a primary necessity.
- b. Adequate educational facilities.
- c. Preferential appointment of the members of the native population of sufficient ability, to all administrative and executive positions.
- d. Research into the problems and particularities of the colonial and dependent countries, this work to be carried on, as far as possible, by native scientific workers.

11. This Assembly recognises that the future existence of mankind depends on the conservation and rational utilization and development of world resources - agricultural, industrial and scientific. It denounces the increased danger of waste and abuse of these resources through ill-balanced economies, which are one of the causes of preparation for war. It asks its members within their means to work for the most efficient utilisation of irreplaceable natural resources and to oppose the monopolisation of resources for private profit and the diversion of the world's resources for war and war preparation.

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No. 2. June—July 1949

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VIJNAN-KARMEE

Popular articles on scientific and technological subjects and on the social and economic problems of scientific workers are invited for publication in Vijnan-Karmee.

It is proposed to start a forum in Vijnan-Karmee for discussion of various important issues facing the scientific workers and the society. Communications in this respect may be sent by individuals or groups.

Letters to the Editor from the scientific public in general and members of the Association in particular will be published. Assumed names may be accepted but the authors must give their full names and addresses and the letters must be signed by them. The editors as well as the Association will not be responsible for the views expressed in the communications.

The editors reserve the right of accepting or rejecting a communication for publication as well as to make minor alterations, if necessary, before publishing the articles, letters etc. Articles, letters etc. not selected for publication can be returned only if postage stamps are enclosed.

Communications should be addressed to the General Secretary, Association of Scientific Workers of India, University Buildings, Delhi 2.

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VIJNAN-KARMEE

No. 2. JUNE—JULY, 1949

WE SEEK CO-OPERATION

It is encouraging to note that the ever-increasing social implications of science are being recognised all over the world, not only by scientific workers themselves, but by the governments and administrators as well. In order that the useful purposes and potentialities of science may be more widely appreciated, it is the moral obligation of all scientific workers to work for the increased enlightenment of the people in general regarding the social implications of science; it is also their duty to see that the national problems are tackled rationally; it is their individual and collective responsibility to seek solutions of problems with devotion to truth, and unswerving, objective and critical search for facts and their inter-relation.

The Association of Scientific Workers of India, on behalf of the scientific workers, pledges itself to shoulder these responsibilities, collectively with the people of India, in their efforts to improve the living conditions of millions of Indians. The Association stands for collaboration with the Government in pursuing a progressive policy in the interests of the community.

The vast majority of scientific workers in India suffer from a sense of frustration, not only because of their poor economic condition, but also for the lack of proper industrial and technological development in the country with the consequent dearth of scientific and technical jobs, and inadequate facilities for work. The improvement of the professional, social and economic status of scientific workers, and large-scale industrialisation and impetus to research, are the imperative needs of the hour to ensure economic progress. The Association is

destined to play a vital role in these directions, and thus, the healthy growth of the scientific workers' movement in India needs the active co-operation of all, not only to make the scientific workers feel their social and national responsibilities but also to enable them to contribute their best to the country.

This Association, the only representative organisation of scientific workers in India, offers full scope to the authorities and employers of scientific workers to come into closer contact with this very important section of workers in the country, in promoting goodwill and understanding so essential for accelerating national progress.

It is heartening to state that the Government has recognised the function of the Association in the field of international co-operation in science by inviting it to take an active part in the Indian National Commission set up for collaboration with the UNESCO. The Association has also been welcomed by the various scientific organisations in the country and *de facto* recognition has been accorded to it by some of the Ministries and Departments of the Central Government, some of the Provincial Governments as well as employers of scientific workers in industry.

The Association has already approached all employers of scientific workers throughout India and it is fervently hoped that the authorities and employers will come forward in response to the sincere offer of co-operation and give the Association its due recognition.

SCIENTIFIC WORKERS' MOVEMENT IN INDIA

Dr. B. C. Guha, Vice-President of the ASWI at a Press Conference held recently in Calcutta, stated, "The public are generally not aware of the scientific workers' movement which is increasingly becoming a force in the world today. There are now Associations of Scientific Workers in Canada, China, Czechoslovakia, Holland, France, Greece, Denmark, New-Zealand, South Africa, Sweden, United Kingdom and the United States of America. In January, 1947, Pandit Jawaharlal Nehru inaugurated the Association of Scientific Workers of India of which he is the President. This inaugural ceremony was attended by Prof. P. M. S. Blackett, President of the British Association of Scientific Workers and by Dr. Harlow Shapley of the American Association of Scientific Workers. Since then the Association has gained in momentum in India and there are now Branches of the Association in Calcutta, Delhi, Bombay, Poona, Bangalore, Patna, Lucknow, Dehra Dun, Gauhati, Rani-ganj and Naihati. The Headquarters is at Delhi.

"The aims of the Association are to work for the most effective use of science and the scientific method for the welfare of the society as a whole and to improve the economic and social status of all scientific workers in India. It is a truism that in India, as in many other parts of the world, the scientific worker has not got from society the position that is his due. Even recently the Central Pay Commission issued a report in which the special role of scientific workers in the economic development of the country has hardly got proper recognition. Scientific workers even now in India are much worse off than people of similar standing and qualifications engaged in administrative work. In industries the insecurity of service of scientific workers is a constant source of worry which freezes their initiative and energy. In some industries the scientific

worker frequently gets wages which are even lower than those of skilled workers in the same establishment.

"This situation is not only grossly unfair to scientists but is harmful to the progress of the community itself. There is for this reason a leakage of talent into pursuits other than scientific and this cannot but be prejudicial to national economic development. Science and technology to-day constitute the very basis of material advancement. A community which keeps its scientific sector weak does so at its own peril. It is on this ground that scientific workers demand that they should be not on tap but on top, and their service should be regarded as inferior to none, economically and socially.

"The other reason which has greatly stimulated the world-wide movement of scientific workers is the threat of a new war. Scientific workers cannot forget that they have in a sense a special responsibility to society. Although they are not directly responsible for the misuse of their discoveries they have a moral responsibility to see that these discoveries are not used for the destruction of masses of men or for other anti-social purposes. Unlocking of the atom and its tremendous consequences, for good or for evil, have tended to unify the scientific workers' movement throughout the world. A World Federation of Scientific Workers has been formed to which the Association in India is affiliated and it had its first World Assembly in Prague last September. This Assembly has asked the scientific workers once again to work for the prevention of a new war which would mean colossal destruction and misery for all mankind.

"The Association in India carries on its work in various directions. It seeks to make the public scientifically conscious by organising popular and semi-popular talks and

discussions on scientific subjects having social implications. Thus the Branches are organising symposia on 'Food and Population' which is a problem of paramount importance not only to India but to the world. The Association arranges film shows on scientific topics for popular education. In some industrial establishments the scientific workers are holding voluntary classes of skilled workers after their working hours in order to raise their scientific level and fit them for work of a higher standard.

"The Association is also engaged in various activities concerning the economic status of the scientists. It is making detailed studies of some industrial establishments to prepare a factual survey of the economic condition of the scientific workers working there. In some cases the Association has been able to prevent retrenchment of scientific workers in Government services as well as in industry. These

partial successes show that a strong and united scientific workers' movement can effectively promote the interests of scientific workers. The Association has pointed out that retrenchment of scientific workers and the statement that is often made that there is a dearth of technical personnel in the country can hardly be reconciled. It only shows the lack of co-ordination and planning in regard to the economic development of the country and to the placement of scientific workers in appropriate positions in the programme of development:

"The scientific workers are trying to make themselves useful to the community in different ways and it is necessary that the general public should also realise the vital role that science and scientific workers are playing in modern times and give due recognition and assistance to scientific workers in order to help forward the great task of national development."

NOTES & NEWS

Processing of monazite sand -

—State enterprise

The Government of India has entered into an agreement with two French firms to set up a plant for processing of monazite sands in India. The agreement is for a period of 15 years and provides that the plant will be manned by Indian scientists. The work of processing monazite has a great bearing on national development, for requirements of various industries such as the gas mantle industry, manufacture of special flints, aluminium base alloys etc. and it has, therefore, been decided that the enterprise will be state-controlled. The work will be managed by an Indian corporation financed jointly by the Government of India and the Government of Travancore. The Board of Directors of the corporation includes Dr. K. S. Krishnan, Director, National Physical Laboratory, and Dr. H. J. Bhabha, Director, Tata Institute for Fundamental Research.

Rural adult education :

Activities of UNESCO in South Asia

The problem of rural adult education will be considered in a conference of Asian countries held under the auspices of the UNESCO in Gwalior or Jaipur in November next.

Reviewing the activities of the office for South Asia, Dr. Wolsky Principal Scientific officer, UNESCO Science Co-operation Office in Delhi reported that the regional organisation had fulfilled its objective in establishing direct contact with scientists and scientific institutions in the area and in facilitating exchange of ideas, information, publication and personal visits. The scheme of book coupons to scientists which is being introduced by the UNESCO will be of use for purchase of scientific books in hard currency areas. Some such international scientific currency, Dr. Wolsky believed, might help to overcome national rivalries. Lack of

funds for the UNESCO was regretted and Dr. Wolsky remarked that their annual budget was not more than what was required to build a light cruiser.

Indian Scientific and Cultural Mission to Nepal

The Indian Scientific and Cultural Mission headed by Prof. S. N. Bose, President, National Institute of Sciences of India visited Nepal in the last week of May. During its 10 days visit, the mission discussed matters of agricultural and geological interest with the Government of Nepal and also studied various ancient and valuable manuscripts as well as several archaeological relics. The mission was accorded very cordial reception by the Government and people of Nepal.

Inauguration of the Poona Branch of the ASWI

In a general meeting of the scientific workers in Poona and suburban areas, the Poona Branch of the ASWI was inaugurated by its General Secretary, Mr. C. R. Mitra, on the 27th April, 1949, in the Maharashtra College Hall. In his address he gave an account of the historical development of the scientific workers' movement throughout the world with particular reference to its increasing momentum during the recent years.

He remarked that the social responsibilities of the scientific workers were increasingly greater today and they must organise themselves for creating an effective voice for Peace and welfare of society. While discussing the activities of the Association he stressed on the programme of popularisation of science and organisation of discourses on various problems facing the scientific workers *vis a vis* the country.

Dr. M. Damodaran of the National Chemical Laboratory, Poona, and Mr. P. S. R. Sharma of the Ordnance Establishments, Kirkee, were unanimously elected President and Secretary respectively of the Poona Branch of the ASWI for 1949.

Persecution of Science :

According to a note in the Montreal Daily Star (Feb. 22, 1949) an associate professor of chemistry at Oregon State University has been dismissed because he supported Lysenko's genetics teachings. This action seems to be of the same kind as some of the Russian action and equally deplorable. - *News Letter No. 7. C. A. Sc. W.*

Anti-biotic in Banana Skin

It has been reported in the symposium on 'anti-biotics' held in Washington under the auspices of the United States National Institutes of Health that the banana skins which have been called nature's germ-proof wrapper, may owe their power of stopping germ penetration to an anti-germ chemical like penicillin and streptomycin. And a banana anti-biotic may prove active against germs of the bacteria class.

-*Science News Letter, April 23, 1949.*

Important advances in anti-rust research*

A solution of rubber latex and sodium benzoate is reported to be used for spraying bulky metal articles to protect them from corrosion. The coating formed by the spray can be stripped off when no longer required and thus this new liquid preservative is stated to be invaluable for protecting machined metal surfaces against rust during transport or when in storage.

(*By courtesy of BIS, Office of the U. K. High Commissioner in New Delhi).

SITUATION VACANT

Qualification : B. Sc. or B. Sc. (Ag)., experience in Food/Fruit technology; pay : Rs. 200/ p. m. private firm; write to A. C. De, Secretary, Delhi Branch, Association of Scientific Workers of India, Observatory Buildings, Lodi Road, New Delhi.

Toll of Tuberculosis in India

One person dies per minute

About 2,500,000 Indians are constantly suffering from tuberculosis — estimates the Tuberculosis Association of India. The latest annual report of the Association says: "It is said that on a conservative estimate, tuberculosis causes one death out of every 12 in the country and kills over 500,000 people every year — at the rate of 1400 people a day or one person per minute".

The total number of beds available for TB patients in hospitals and sanatoria is, according to the report, only about eight thousand; that is, only one patient out of 300 can be hospitalised.

Tuberculosis is the foremost among the causes of death in people between the ages of 18 and 30. Malnutrition and undernutrition, over-crowding and insanitation in both rural and urban areas and lack of hygiene are stated to be the causes responsible for the high incidence of the disease.

Australia fights Tuberculosis*

Australia, which already has the second lowest incidence of tuberculosis in the world, plans to stamp out entirely the disease within a generation. With the Federal Tuberculosis Act she has launched a frontal attack on the disease with the following four-point plan:

1. a national survey on the incidence of the disease and existing methods of treatment;
2. the appointment of full time Directors of tuberculosis in each State;
3. the introduction in each State of model legislation making notification compulsory, organising interlocking records and setting up similar co-operative machinery;
4. a cross-section survey of the population to detect the presence of the disease.

[*Abstracted from an article by Norman Bartlett, received through the courtesy of the Public Relations Officer, Australian High Commissioner's Office, New Delhi.]

THE WRONG WAY TO FOSTER SCIENCE*

Since its inception, the Government of the Soviet Union has laid great stress upon the importance of science in a modern society. Almost unlimited funds have always been found for scientific research and development, inspite of many shortages and difficulties which were inevitable in a country which was initially relatively backward and which has been torn by wars. Scientists were accorded special facilities and honour among their countrymen as the pioneers in the development of a scientific, industrial, prosperous society. All these seemed, to most scientists in other countries, to be wise and commendable. In spite of initial immaturity, to be expected where there is more encouragement than well-grounded scientific personnel, a considerable amount of very important and fun-

damental research carried out in the USSR has come to the attention of Western scientists.

In the Soviet Union, there has always been a tendency to discuss scientific theory in terms of Marxian philosophy. The validity or otherwise of this philosophy is not our present concern. Suffice it to say that there has not been in the Soviet Union in the past any noticeable tendency to limit on philosophical grounds the scope and nature of scientific inquiry. However, there has recently been manifested in the field of biology the unfortunate attitude that scientific theory must conform to certain dogmatic interpretations of Marxian philosophy. The limitations so placed upon scientific development seem likely to detract from the contribution of the USSR to the world's fund of

knowledge and may in the long run even affect her own prosperity.

The controversy in genetics and evolutionary theory has been going on in the USSR for a number of years but, in the summer of 1948, it was brought to a head when the political authorities finally and unequivocally gave support to the "Michurin School", led by T. D. Lysenko, and commenced to break up all work by many competent scientists and first class institutes working on lines indicated by the genetical theory which is accepted by most scientifically well-informed opinion. The situation was brought to the attention of the press and the lay world largely by the resignations from the Academy of Sciences of the USSR by Henry Dale, eminent British physiologist (see *Nature*, Dec., 1948) and the eminent American geneticist, H.J. Muller (see *Science*, Oct. 22, 1948). The latter had at one time been favourably disposed towards Soviet science and had worked for several years in Moscow. Besides his strong letter of resignation Muller has published an article in the *Saturday Review of Literature* (Dec. 4, 1948), outlining the situation. Another informative article on the facts of the situation has appeared in *Nature* (E. Ashby, *Nature*, Dec. 11, 1948). Perhaps the most authoritative statement of the present attitude and programme with regard to biology in the USSR is an article by S. Kaftonov, the Minister of Higher Education in the USSR which was published in *Izvestia* and printed in its entirety (in English) in *Science* (Jan. 28, 1949). This article will shock most Western scientists.

We are not qualified to judge the scientific merits of the theory which has gained official support in the USSR. It is dismissed as charlatanism by some reputable scientists while, on the other hand, the Soviet authorities call the orthodox theory "pseudo-science". But it commonly happens that apparently contradictory theories both represent partial aspects of the truth and that more complete and valid

theory arises as the contradiction is worked out. Our objection is to the destructive intervention of lay powers. It is, of course, quite reasonable for a Government or private foundation, to support research along lines in which development is badly needed. The immense sums spent on physics in the USA provide one example. The Michurin School seems to have provided very useful results and may well deserve support. But to damn and suppress opposing theories honestly held by a large proportion of serious scientists working in the field is contrary to the whole spirit of science. Controversy in science, often thoroughly heated, occurs commonly and normally. It is usually a healthy phenomenon and stimulates research. Such controversies can be solved satisfactorily only by scientists. No scientist can do good honest work if he feels that his results and hypotheses must conform to predecided opinions of lay officials, particularly if these officials have the power drastically to affect his life.

In a second article (*Saturday Review of Literature*, Dec. 11, 1948), Dr. Muller points out that the unhappy situation with regard to a key branch of science in the USSR is not peculiar to the Soviet Union. He points out the continual danger to science in other countries from certain groups with political and economic power and prejudices. Basic evolutionary theory has been powerfully attacked, and biology retarded as a result, in the United States in recent times. The recent "witch hunts" by over zealous alleged defenders of democracy have driven many scientists out of certain fields and have made difficult the recruitment of good scientists for Government employment. We might also add that the activities of anti-vivisectionists constitute a continual danger to medical and veterinary science and have seriously hindered development in these fields.

Though the attitude evident in the case of genetics controversy has perhaps the most serious implications for science, we are disturbed also at aspects of the Soviet attitude to international

science. It appears that lately almost the last links of communication between Soviet scientists and the Western world have been severed. Though nearly every body recognises that free inter-communication is essential for the growth of science, the world is being divided up into isolated compartments. Secrecy is a matter of national policy, largely decided upon by political and military leaders, and scientists can do little more than deplore the apparent necessity for this policy. The USSR is by no means the only country following a policy of secrecy. (As was recently reported, authorities in the USA, by indirect action, even prevented the Soviet American Science Society from bringing Soviet scientific material *into* the USA). Nevertheless, the USSR seems to have gone further than the USA and Canada in preventing contact between their scientists and those of Western countries, to an extent far beyond what seems to be justified on ground of security. We are sorry that certain actions which might have helped promote international exchange in science have not been taken. In this connection we might mention the failure of the Soviet Union to join the UNESCO and the failure of her scientists to affiliate with our own World Federation of Scientific Workers. Rank and file scientists will also regret the cessation of the commendable policy of publishing research journals

(such as the Journal of Physics) in the traditional languages of international science, and the adoption instead of a policy of publication almost exclusively in the Russian language.

It is sincerely hoped that the Soviet leaders will modify their attitudes towards science which have been reflected in the genetics controversy and in the tendency to isolate her scientific endeavour from that of the rest of the world. We are willing to admit that nothing is perfect or completely bad and that Western scientists might learn useful lessons from some aspects of Soviet, or Marxian, attitudes towards science but we also believe that, though results of practical value may come from any skilful and enthusiastic work, they will appear in an endless stream only on the basis of hypothesis firmly based on fact and subjected to free and fearless criticism. The development and integration of opposing views is essential. We also believe that the greatest progress will be made when co-operation in science amongst scientists of all nations is restored and when all scientific work is devoted to the cultural enlightenment and material benefit of all humanity.

K. A. C. E.

P. R. W.

**Reprinted from the News-letter, No 7, of the Canadian Association of Scientific Workers.*

REGISTER OF UNEMPLOYED SCIENTIFIC WORKERS

A register of unemployed scientific workers is being maintained by the Association of Scientific Workers of India. Unemployed scientific workers may send in their particulars for entry in the register, to the nearest Branch office of the Association or to its Headquarters.

Efforts are being made to collaborate with the Government Employment Exchanges for finding suitable employment for the unemployed scientific workers. Apart from service to scientific workers it is intended also to check the drift of scientific man-power to non-scientific occupations.

OURSELVES

The Central Executive Committee (CEC) of the Association met in New Delhi on the 6th April, 1949, with Dr. B. C. Guha, Vice-President, in the chair. The following were present: S. C. Roy, S. K. Mohindra, A. C. De, P. M. Bhargava, K. L. Puri, S. Bhattacharji, P. K. Kichlu and C. R. Mitra.

The CEC accepted the Charter for Scientific Workers as adopted by the World Federation of Scientific Workers in its First Assembly in Prague in September, 1948.

The CEC nominated Dr. B. C. Guha to represent the Association in the Indian National Commission for the UNESCO.

In regard to the publication of *Vijnan Karmee*, the official organ of the Association, the CEC decided that (a) the General Secretaries, Dr. P. K. Kichlu and Mr. C. R. Mitra should be the ex-officio editors, (b) the following would constitute the Editorial Advisory Board of "*Vijnan-Karmee*": Dr. B.C. Guha (Calcutta) Dr. D. V. Karmarkar, Mr. S. K. Mohindra (Delhi), Dr. T. N. Seth (Patna), Maj-General S. S. Sokhey (Bombay), Dr. B. Sanjiva Rao (Bangalore) and Mr. S. C. Roy (Lucknow), (c) each Branch of the Association should be requested to elect an Editorial Correspondent; (d) as far as practicable the publication should be a monthly one; (e) the publication should be priced at annas four for non-members.

The CEC decided to initiate the maintenance of the Register of Scientific Workers in India and took preliminary steps in this regard.

The CEC constituted a sub-committee consisting of Dr. B.C. Guha, Dr. D. V. Karmarkar, Dr. P. K. Kichlu and Mr. C. R. Mitra to prepare a comprehensive report on 're-

search atmosphere' in the country and submit it to the relevant authorities for consideration.

The CEC urged upon the authorities of the various scientific institutions, Universities and Central and Provincial Governments to extend their cooperation to the Association and its constituent Units/Branches for organising lectures, experimental demonstrations, film shows etc. for the furtherance of the cause of science and its popularisation.

The CEC urged upon the employers of scientific workers to accord duty leave facilities to scientific workers for attending the meetings of the Association and of other national scientific bodies.

The CEC agreed to the affiliation of the Association of Scientific Workers, Ordnance Establishments, Kirkee.

In compliance with the amendments to the Indian Trade Union Act for compulsory recognition, the CEC adopted the following amendments to the Constitution as Article 42-A and Article 42-B after the Article 42 of the Constitution :

"42 A. In case of a trade dispute between the Member(s)/Unit/Branch/Region/CEC of the Association and an employer or employers of scientific workers, before resorting to a strike by the Association or its constituent Region/Branch/Unit/Member (s), necessary steps shall be taken to follow all the provisions relating to the settlement of a trade dispute as laid down in the Indian Trade Union Act and Industrial Disputes Act and/or amendments thereof in force for the time being.

"42-B Strike issues shall be decided when asked for by the CEC by secret ballot vote of the members concerned in the Unit/Branch/Region/Association."

The CEC decided that in the matter of affiliation of other bodies with kindred objects, Article 16 of the Constitution of the Association will be operative and that it was not necessary to amend the constitution so as to give it a federal character for this purpose.



The CEC viewed with deep concern the refusal of *visa* to Mr. J. G. Crowther, Secretary-General of the World Federation of Scientific Workers, Prof. J. B. S. Haldane and Prof. J. Kuczynski for attending the Peace Conference sponsored by Dr. Harlow Shapley, President of the the American Association for Advancement of Science, in USA.



The Association of Scientific Workers, Ordnance Establishments, Kirkee, has been affiliated with the ASWI, and henceforth the affiliated Association will function for all practical purposes as a constituent Unit of the Poona Branch of the ASWI.



The Poona Branch of the ASWI has been constituted on the 27th April, 1949 with Units in the Ordnance Establishments, Public Health and Public Works Department of the provincial Government and the National Chemical Laboratory. Organisational activities, it is reported, are progressing satisfactorily.



Prof. A. C. Sen, Entomologist to the Govt. of Bihar, and a member of the Central Executive Committee of the ASWI, has been sent on deputation to England by the Government of Bihar. Prof. Sen has been authorised to represent the ASWI in meetings of the allied Associations in Europe during his stay there.



Mr. C. R. Mitra, General Secretary of the ASWI, visited Poona in the last week of April at the invitation of the Association of Scientific Workers, Ordnance Establishments, Kirkee. While at Poona Mr. Mitra attended a meeting of the Executive Committee of the ASW,

on the 24th April, and finalised, on mutual agreement, the terms of affiliation of the ASW, Kirkee, with the Association of Scientific Workers of India. On the same evening, while addressing the general body of the affiliated association, he stressed upon the importance of solidarity amongst the scientific workers in India, which was necessary in the interests of the scientific workers themselves as well as in the larger national interest. While welcoming the fellow scientific workers of the affiliated association to the common platform of brotherhood, he expressed his appreciation of the spirit of co-operation of the members of the ASW, Kirkee, and particularly its Secretary, Mr. V. R. Joshi. Mr. Mitra further stated that their enthusiasm to add momentum to the scientific workers' movement in India would be followed by the fellow workers throughout the country.



A deputation consisting of Dr. P. K. Kichlu, Mr. C. R. Mitra and Dr. D. V. Karmarkar waited on the Government of India in the Ministry of Defence in regard to the various grievances of the scientific workers in the Ordnance Establishments, Kirkee, and the Government of India, as a result of the deputation, accepted some of the suggestions of the ASWI and redressed some of the long standing grievances. The prescribed scale of Laboratory Assistants has been revised from Rs. 80-5-120-EB-8-200 to Rs. 100-5-120-EB-8-200, provided he is a science graduate; the proviso that he should possess two years practical experience has been deleted. It has also been decided to redesignate the post of Laboratory Assistant as Scientific Assistant, Junior, Grade II. Earlier, a section of junior scientific workers in the Establishments were declared "not-non-permanent", thereby removing the causes of various hardships of the workers.



With a view to improve the standard of technical training of the scientific workers in the

Raniganj Branch, regular classes have been organised for the members employed in paper mills. Courses on paper technology and allied subjects have been taken up and it is expected that this facility will enable the scientific workers to qualify themselves for recognised diplomas.

The Branch has also organised popular scientific talks and a number of technical papers

dealing with the different problems of the paper industry were read and discussed in the Branch meetings during the last few months.

The authorities of a local paper mill are very helpful in enhancing the cause of the scientific workers.



The Association has been recognised by the Government of the United Provinces.

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VIJNAN-KARMEE

Popular articles on scientific and technological subjects and on the social and economic problems of scientific workers are invited for publication in Vijnan-Karmee.

It is proposed to start a forum in Vijnan-Karmee for discussion of various important issues facing the scientific workers and the society. Communications in this respect may be sent by individuals or groups.

Letters to the Editor from the scientific public in general and members of the Association in particular will be published. Assumed names may be accepted but the authors must give their full names and addresses and the letters must be signed by them. The editors as well as the Association will not be responsible for the views expressed in the communications.

The editors reserve the right of accepting or rejecting a communication for publication as well as to make minor alterations, if necessary, before publishing the articles, letters etc. Articles, letters etc. not selected for publication can be returned only if postage stamps are enclosed.

Communications should be addressed to the General Secretary, Association of Scientific Workers of India, University Buildings, Delhi 2

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VIJNAN-KARMEE

No. 3 AUGUST 1949

FOOD AND SCIENCE

During the last few weeks the attention of the people in India has again been focussed on the problem of food. Pandit Jawaharlal Nehru, the Prime Minister, spoke to the nation on the 29th June, 1949, calling for co-operation in Government's efforts to stop import of food after 1951. Shri C. Rajgopalachari, the Governor-General, in his broadcast asked the people to produce all the food we needed or invite famine and chaos. Pandit Nehru said that the first item on the programme was intensive and better cultivation of the land at present being cultivated. One of the great achievements of science in food production is in the development of methods for producing or selecting new strains which give higher yields. Agricultural experts working in this country have evolved suitable strains of improved seeds which would raise the yield per acre at least by 10 per cent. We think that unless the multiplication and distribution of seeds is done by persons who understand the importance of the work, no real benefit is expected to accrue simply by usual administrative machinery. It is a sad tale to read in the report of the Food Grains Policy Committee that under the 'Grow More Food Campaign', the so-called improved seeds distributed were often ordinary seeds purchased by the Government from the open market at a premium and resold to the producers on a subsidised basis. Such practices do an irreparable harm to the cause and usefulness of science to the society. Full use should be made of the available information on the subject in increasing

the production of food per acre. Lala Shri Ram, Vice-Chairman of the Central Subsidiary Food Production Committee of the Government of India in his press conference on the 25th June 1949, referred to the need of growing sweet potatoes, tapioca and bananas to meet the shortage of cereals. India as a whole consumes cereals in a much higher proportion than any other part of the world. It is desirable therefore to reduce the present rate of cereal consumption and replace it by other foods, such as fish, vegetables, fruits and tuberous roots, wherever possible. It has been reported that on a dry matter basis the yield per acre of sweet potato is 33 maunds against the yield per acre of 8 to 10 maunds of wheat. This shows that by growing sweet potatoes in place of wheat in those areas where sweet potatoes could be grown, an increase of about 200 per cent in the caloric value could be obtained. Sweet potato lacks in protein. In order to make a balanced diet it would therefore be necessary to fortify sweet potato flour with other products which are rich in protein. Fortunately, as pointed out by Lala Shri Ram, India has got a big store of groundnuts which are very rich in protein. At present India is exporting a considerable proportion of groundnuts in the form of seeds. India could very well utilise this important source of protein to improve the nutrition in the country and export the oil, if necessary, for earning foreign currency. This calls for a complete change in outlook in the ideas regarding food and the readiness on the part of the people to assimilate

late new products as food. It will be for the nutritional workers in this country to show the way in which different foods could thus be utilised in making a balanced diet and at the same time limiting wastage to the minimum, and utilising them in the most efficient manner.

Bananas have been referred to as one of the subsidiary foods because bananas are reported to give very high yields of food per acre. Nutritionists have pointed out that we are far short of fruits and vegetables in the country and it would therefore be necessary to provide for a part of the land for growing fruits and vegetables. Intensive cultivation of fruits such as bananas, is difficult at the present juncture as we have, practically, speaking no arrangements for the speedy and efficient transport of such perishable articles and we would not progress in this direction unless we provide ourselves with sufficient cold storage and refrigerated transport facilities.

We have received the first number of *Science and Mankind*, the official organ of the World Federation Of Scientific Workers. The publication was eagerly awaited and we are sure that it will be welcomed by the scientific workers throughout the world. Persons who are responsible for moulding the destiny of the world will also feel interested in ascertaining the views of the world scientific workers through their official organ. The Editorial Board of the Journal consists of Prof. F. Joliot-Curie (France), Prof. J. D. Bernal (England), J. G. Crowther (England), E. Kahane (France) and R. C. Murray (England); and it is edited by J. G. Crowther, the Secretary-General of the WFSW. The leading article of the first number introducing the Journal is reprinted in this issue (page 6).

The first number of *Science and Mankind* starts with an inspiring message from Prof. F.

Another direction in which we could improve the production of protein food is by intensive production of fish. It has been shown that it is possible to produce fish in larger quantities in tanks if fish are grown under scientifically controlled methods. A part of the population in this country is not allowed by tradition to eat fish. Would it be too much to expect them to leave off the tradition and to use fish in their daily diet in order to improve their health?

The Prime Minister has spoken of our great valleys and other major schemes and the expected increase in production by leaps and bounds. We are quite justified in looking towards such prosperity when we could loosen the tightened belts and sit down with a sense of security as the knowledge of having plenty to eat results in developing a sense of security in the population. It is unnecessary to stress that only by scientific methods we could approach the happy end of our journey.

Joliot-Curie, the President of the WFSW in which he states,

".....our society is involved in difficulties principally due to the fact that our control over natural forces has developed more quickly than our realness to organise the distribution of wealth.

"We shall attack the problems without prejudice and, in the journal, we shall discuss scientifically the social functions of science.

"The WFSW will, through this journal, which I wish all success, make its contribution to the effort for international understanding, an indispensable contribution for progress and peace."

A comprehensive account of the First Assembly of the WFSW and the Charter for Scientific Workers have been published in the first number of the Journal.

As reported earlier a number of grievances of scientific workers in the Ordnance Establishments, Kirkee, have been redressed as a result of a deputation from the Association waiting on the Ministry of Defence and explaining to them the various view-points of the scientific workers concerned. It may be mentioned that the deputation was welcomed and its spirit of co-operation in settling the matter was appreciated by the Government, who reasonably considered the grievances and accepted the suggestions placed before them. This attitude of the Government of India is fully appreciated by the scientific workers, and it is hoped that this mutual understanding and co-operation will be maintained. This example of a right approach to the problem will inspire the scientific workers as well as the administrators of all ranks, who are directly responsible for the execution of the Government policy of co-operation with the workers, and foster better relations between them. It is high time that the old bureaucratic attitude, where it still exists, resulting in unnecessary antagonism of the workers, is given up in the interests of the nation.

While it might be necessary for the present to bring in foreign experts for the planning and proper development of science and technology in certain spheres, full utilisation should be made of the available Indian talent and encouragement be given to them. It is thus suggested that suitable Indians should also be

appointed to carry out the work jointly with the foreign experts. This becomes all the more necessary as the Indian scientist with his knowledge of conditions of work and the availability of men and materials in the country will contribute to a very great extent in supplementing the specialised technical knowledge of his foreign colleague. More so, because the Indian scientist and technologist will have to take up fuller responsibility in the foreseeable future.

It is reported that the Tata Chemicals Ltd. have closed down their soda ash plant and as a result of this 1500 workers have been retrenched. This includes hundreds of skilled labour, technicians and scientific workers. Surprisingly enough, such an affair, affecting the production of 90 tons per day of an important commodity, has not yet drawn the due attention of the public in general and the Government in particular.

Again, attention of the Government is drawn to the paradox of planning to increase the strength of scientific man-power and asking the people to produce more on the one hand and retrenching the scientific workers and closing down production on the other. Added to it, the recent closing down of a good many textile mills in Western India is causing grave concern. When the country needs more and more production such a situation should be dealt with by the Government with all seriousness and without any loss of time.

The Secretary General to World Federation of Scientific Workers
invites opinion for defining qualifications and training for "Technicians."

Your opinions and comments, if any, may please be sent to the
General Secretary, Association of Scientific Workers of India.

OUR FOOD PROBLEM

The Prime Minister in a broadcast to the nation on 29th June, 1949, said,

"...We may do without luxuries and even without many necessities, but we cannot do without food. If we do not produce enough food in our country, we become dependent upon other countries and in a matter like food we cannot afford to be so dependent. Therefore we have to tackle this problem of food production first of all and put an end to the deficit that has compelled us to pour out money into buying food from abroad. Because of this the Government has laid down a programme which states that we must have enough food produced in the country for all our people by 1951 and that after that date we do not intend to import food. We have not fixed that date without full thought and calculation. We intend to stick by that date and we intend by that date to be producing enough food for all the millions who inhabit this country. We have taken into account the possible increase in population and we even dare hope that the individual quota for food then will be somewhat higher than it is today. For today's quota is poor enough.

".....I am convinced that we can do it and we will do it. But we shall do it only with a great effort in which vast number of our people join and co-operate and so I appeal to you for this co-operation in a mighty drive for food production, which is ultimately a war against poverty and ignorance, against malnutrition and high prices. It is a war in which every citizen can be a soldier and can serve his or her country. All of us will have to work hard and all of us will have to tighten our belts.

".....We are thinking at present of the next two and a half years. Some years after that our great river valleys and other major schemes will begin to produce results and then production will go up by leaps and bounds. I am not worried at all about that period. It is the next

two years that count and are vital and which will govern our future. It is the short term programme for these two years that I wish to emphasise.

".....The first item in this programme is intensive and better cultivation of the land at present being cultivated. It is well-known that yield per acre in our country is very low, compared to most other countries. It should, therefore, be possible for us to increase that yield by at least fifteen per cent given the right methods. I am referring here to the land at present under cultivation. Even that land, therefore, should yield to us that fifteen per cent, if we can provide better manure, fertilisers, better seeds and generally better methods of cultivation. I might inform you that experiments on a small scale have shown that, given these facilities and better methods, the yield increases by far more than fifteen per cent.

".....The second item of this programme is the growing of supplementary foods and I should like to lay special emphasis on this. Our people subsist mainly on wheat and rice and we have, therefore, to lay stress on these two basic cereals. But there are other good foods apart from cereals, which are not only good for us from the point of view of a balanced diet, but which can easily be produced in far greater quantities than wheat and rice. These substitutes for cereals are sweet potatoes, tapioca and bananas. There are others also. In some countries banana and sweet potatoes form almost the staple article of diet. I am not asking you to go thus far. But in the emergency today, it is important that we use foods, other than wheat and rice, to the largest extent. Every country has done so under stress of war or emergency. Are we so tied down to habit that that we cannot do some thing that the good of the nation requires ?

".....It is necessary, therefore, for every town and village to put a few new acres of land

under cultivation and this cultivation should be chiefly devoted to sweet potato, tapioca and banana. In our towns and cities there are many compounds which should be used for cultivating any of these foodstuffs or vegetables.

".....There is one thing else that I consider most important to which I would like you to give earnest thought. While we should all try to limit our consumption of wheat rice and take, as far as possible to other foods, it is of special importance to reduce the consumption of rice in this country. At present to import rice from abroad costs us more than the import of wheat. At present prices, double the quantity of wheat could be imported for the same price of rice. It is possible that the price of wheat will go down and the difference be even greater.

".....Some figures may interest you. Owing to the war there was hardly any import of rice between 1941 and 1944. In 1945, 70,000 tons of rice were imported. In 1946, 3,31,001 tons, and in 1947, 4,54,000 tons and in 1948, 80,00,000 tons.

".....This shows that we are consuming more and more rice when we should be trying our utmost to reduce its import. It shows that we have imported rice at the cost of a far greater quantity of wheat. It shows that most of us have paid no heed to this very serious problem and though we talk loudly about the food problem we do not think that it affects our individual lives. The food problem is ultimately the totality of what happens in millions of homes, It is astonishing that we should be so prodigal in our consumption of rice, when every consideration demands that we reduce it.

".....Remember that we produce ourselves twenty million tons of rice so that our total import even at the high level of 80,00,000 tons, is a very small proportion of our total requirements. To give up this import of rice completely

by taking to other foods would thus be a very small sacrifice and it would mean a great difference to the country's economy. Many of us eat bread as a rule and use rice more or less as a luxury article. I suggest that those of us, who normally eat bread, should give up rice completely. Those for whom rice is the principal diet should reduce their consumption a little and take to wheat or other foods. This can hardly be called a sacrifice. Because so very little is given up. As a matter of fact it would lead to a more balanced diet and consequently better health for the nation. May I add also that polished rice, which look so attractive, has little nutritive value and sooner the use of it is given up, the better.

".....May I add that procurement of food grains within India is an essential part of this programme, because the more we procure, the more we lessen the deficit that has to be made good by import. Some people have unwillingly come in the way of procurement. That is a very unwise policy which does harm to the nation. It does not do good to the farmer even, although some may imagine so for the farmer's good is bound up with the national good today even more than at other times.

".....There is another thing of great importance, both practical and psychological. There must be no waste and there must be no feasting while we fight for every ounce of food. I trust that there will be rules made to limit the feasting business strictly. But it is primarily to the good sense and decency of the people that I appeal. To waste food at any time in a vain display is the height of vulgarity. In these times it is a crime. Public opinion must condemn this, so that any person who indulges in this waste is looked upon as doing something that is indecent and anti-social.

SCIENCE AND MANKIND*

There had never been a time when the unity of all scientists of goodwill was more urgent. While science has produced new powers over nature at an unparalleled rate, conflicts in society have become more intense. There is a grave danger that these new powers provided by science will be used, not for the welfare of mankind, but as weapons in these social conflicts. Scientists have the prospects that the results of their successful work may be used to damage human society, and thus destroy the conditions for the continuation of their own work. The future of science is at stake. All scientists are agreed on the need to preserve and extend science, they differ among themselves only on how science may be best preserved and extended, and what they should do to insure the future of science.

The most pressing need at the moment for science, scientists, and indeed, for all mankind, is the defence of peace. In the present world situation, where the preparations for war are being advanced on a gigantic scale, both in the manufacture of weapons, by the signing of pacts, and by aggressive propaganda, scientists have a particular responsibility. The organisers of war are becoming ever more dependent on their knowledge and skill. It is the duty of scientists to mankind, to science, and to themselves to strive with every effort to prevent the misuse of science, and its application to destruction instead of construction. Though the scientists' duty is exceedingly important in this connection, it is not simple and easy. *Science and Mankind* will help scientists to understand how to act by publishing resolutions of the World Federation of Scientific Workers, securing articles from leading world scientists dealing with the most important questions and assisting the scientists of the world to discuss their common problems.

The publication of the first issue of *Science and Mankind* will coincide with the World Congress for Peace being convened in Paris

in April, 1949, and it is hoped that our pages will provide valuable suggestions for the highly important discussions on Science and Peace which will occur there.

One of the first aims of *Science and Mankind* will be provision of pages where all scientists of goodwill may discuss every aspect of the relations between science and society, in order to resolve misunderstandings, and remove, as far as possible, differences of opinion. A large measure of agreed opinion among scientists as to what role science should have in society, how it should serve mankind both in the individual and in the mass, what society expects of scientists, and what scientists expect of society, would greatly strengthen the probability that scientific knowledge will be used wisely for the benefit of mankind. When scientists have not given sustained consideration to these questions, or discussed them among themselves, the danger that their discoveries will be used for destruction rather than construction is great. In that situation, the scientist's work is used by others who are not equipped fully to understand its implications, for the scientist is the only one with the scientific knowledge requisite for full understanding. If he has not thought out what his knowledge implies, how can mankind in general understand the implications of science for society?

The World Federation of Scientific Workers has chosen *Science and Mankind* as the title for their journal, to emphasise their concern with the humanistic aspect of science. They will publish contributions on every aspect of science as it appears to the individual scientist, as an activity which extends human knowledge and dignity. Equally, they will publish contributions on every collective aspect of science; on the organisation of scientific and technical societies within countries, on the organisation of science in the universities, in government services and in industry.

As the journal of the World Federation of Scientific Workers, it will give particular attention to the organisation of scientific workers, the various national associations of scientific workers and their activities. Contributions dealing with the special problems of associations of scientific workers will be published. The arguments for and against organisation in trade unions will be discussed. The size of subscription fees, the benefits and services that should be provided by an association of scientific workers, can be defined and illustrated from the wealth of experience possessed by the Federation's affiliated bodies. Some associations of scientific workers have had great successes in improving the salaries of their members, others have secured big increases in rates of pay for authors of scientific text-books and articles. Some have had considerable influence on government policy for science in their own countries; others have given impetus to research in new branches of science.

All of this experience will be brought together in *Science and Mankind*, so that valuable ideas and achievements that have lain concealed in a single national experience, and in the lesser-known languages, will be brought to the notice of scientific workers throughout the world.

The existence of the World Federation of Scientific Workers has created a new possibility for collecting world-knowledge on all questions affecting scientific workers. The eighteen bodies already affiliated to the Federation are in fifteen countries, which are distributed among the five continents. The Federation is indeed world wide. The growth of the Federation will increase the coverage of the world, and thus increase the value of this already unique position for securing comparative knowledge on the problems of scientific workers. The results of questionnaires on such problems as secrecy in science, national expenditure on science, methods of organising research, etc., will be published in the journal.

In addition to the news and experience of scientific workers, there will be contributions on general problems affecting scientists as a whole, and attempts made to find generally agreed solutions to them. Owing to the lack heretofore of effort to find agreed opinions among the scientists of the world, remarkable advances in this direction may judiciously be anticipated. Discussion has in the past been largely restricted to national journals, so that in each case unconscious national assumptions have biased the arguments. This has been seen very notably in the discussion on the control of atomic energy.

Scientists, like other members of the community, have to take their part in solving the difficulties that are endangering the progress of civilisation. Though they are not strong in numbers, they have a particular responsibility, for in modern society which depends so much, and increasingly, on science, there are many problems which can not be solved without the scientist's knowledge and advice. The scientist today happens to occupy a strategic position in human affairs. He has the opportunity to make an exceptional contribution to the progress of mankind. He is discovering new knowledge of the whole face of nature, any aspect of which may have revolutionary implications. At any moment, new facts may be discovered in astronomy or nuclear physics, in evolutionary biology or genetics, which may have the most profound significance for both the spiritual and material needs of man.

Science and Mankind will give to all scientists of goodwill a free and unfettered medium for the expression and development of their views and the formation of a true world opinion of scientists on those universal problems with which they are concerned as scientists.

The contributors, from many and very different countries, will express themselves in the manner to which they are accustomed. Contributions will not be moulded into a particular style: a freedom which will add to their attractions.

The first number of the Journal contains a report of the Organisation of Scientific Workers and its Bearing on Research, and a report of the First General Assembly of the World Federation of Scientific Workers, held in Czechoslovakia in September 1948, through the generous invitation of the Czechoslovak Association of Scientific Workers.

The first general Assembly was a most encouraging occasion. Its sessions were held in the Castle Dobris, the magnificent palace belonging to the Czechoslovak Syndicate of Writers. The officers of the Czechoslovak

Association of Scientific Workers made the most charming and untiring efforts to arrange for all the needs of the Assembly, and the World Federation of Scientific Workers is deeply indebted to their Czechoslovak colleague, for helping to make their First General Assembly such an inspiring success. It is a service to the World Federation of Scientific Workers which will always be remembered.

* Leading article of the first issue of *Science and Mankind* (January, 1949), the official organ of the World Federation of Scientific Workers.

SCIENCE AND THE SCIENTIST IN AMERICA*

By

John M. Steeves

*First Secretary and Chief Public Affairs Officer,
United States Embassy, New Delhi.*

I am sure that I will be pardoned if I express a word of due humility for assuming to address this illustrious group of men on a subject, to technical aspects of which I am an interested bystander and in practice at best a rank amateur.

In order not to place myself in complete disgrace in this scientific atmosphere, I should probably make my confession complete by admitting that I am one of those who has strayed from the pure ways of scientific research having taken my undergraduate and graduate study in pure science in the field of organic chemistry. I now like many an academician upon release from the formal atmosphere of an institution of learning, betook myself to other pursuits allowing my purely scientific tendencies to completely atrophy.

It is, however, a truth and a principle easy of defence, that, all of us are vitally interested and concerned in the progress of science. In the broader aspects of scientific research no one can be considered as a lay man.

Our every day life from the cradle to the grave and from the early morning shave with an electric razor to our night's repose in the artificial atmosphere of an air-conditioned unit is inextricably tied to scientific research and development.

Departing from this facetious vein, we must in all seriousness recognise that our future destinies and future welfare of all mankind is very definitely dependent upon adequate and appropriate scientific progress. The world which we are able to make for ourselves to live in and for our children after us, depends to a very large degree on the use which we made of scientific skills.

In connection with my work in the Diplomatic Service, I devote my attention chiefly to the educational, social and cultural aspects of our International Society. There is, even if I so

*Lecture delivered on April 30, 1949 under the auspices of the Association of Scientific Workers of India, Delhi Branch.

choose, no possibility of ignoring the implications of scientific research.

In comparison with other periods of the millenniums now passed I think it not bigoted for us to say that we, of this particular generation, are in some respects the most honoured and privileged people of all time. Even in the single life span of most of us here and certainly if we include the generation of our fathers, we have been privileged to witness the scientific revolution of the millenniums. There are certain aspects of that revolution or if you would prefer, evolution, which are not only extremely interesting but almost inexplicable. The sequence and coincidence of scientific discovery and research is one of the most fascinating studies. If it had not been for the almost accidental discovery for instance, of the process of vulcanising rubber, which made possible the development of the pneumatic tyre, the limitations which would have been placed on the use of the internal combustion engine in modern transportation would have been indeed marked. To what extent the impetus for research in one field has been supplied by success in another is sometimes difficult to discern but allowing for the maximum opportunity for cross pollination of ideas, it is still nothing short of miraculous that the corresponding progress in the various fields of scientific endeavour have been so closely complementary one to the other.

In speaking tonight, about American science and the American scientist, I do so with the full consciousness that science and scientific knowledge, like the finer arts, knows no national boundary and is a universal heritage vouchsafed to all who objectively pursue it.

As an American boy studying my first lessons in general science, I am afraid the whole subject would have been rendered rather empty and meaningless if such names as Galileo, Newton, Mendeleev, Curie and a long list of other notables, had been stricken from the texts. The organic chemistry book, which I used as a text

in some of my graduate work in the University of Washington, was written by one of your illustrious Indian chemists, at the time in the University of Bangalore. I regret that at the moment I have forgotten his name. It is true that in the course of her short life, by comparison, America has had the privilege of contributing largely to world scientific achievement. There may be many explanations. But I believe one of the reasons worthy of consideration is that in the creation of a new nation far apart from the old, that scientific investigation was possible with less restrictive measures brought about by preconceived ideas than was possible in older societies where the thought patterns of men had become somewhat stereotyped and restricted. History teaches us that there is unfortunately, at times, a tendency to resist change, to condemn the expression of opinions or the further exploration of findings which do not conform to generally accepted theories. All of us the world over, owe a great deal to those courageous souls who refused to allow themselves or their minds to be bound by these narrow conceptions and were, if necessary in the pursuit of learning, willing to be burnt at the stake as witches, or hailed before ecclesiastical diets as heretics. If some had not been willing to question the dictum that the world was flat and that those that dared to venture beyond the rim of possible existence were sure to be dashed to oblivion, the voyages to the great beyond which resulted in the discovery of America would not have been possible.

The New World and with it America, were therefore not only a geographical discovery but of possibly more importance, a discovery of an environment where with the assistance and the sympathetic support of great minds of all kinds, has proved to be a great and free laboratory in which many of the intellectual pursuits have taken place, without the restricting influences which unfortunately existed elsewhere.

While speaking on the resistance to the change of the existing order even we in the New

West certainly did not altogether escape. I recall with some humor, my father's recital of some of the difficulties encountered in his particular locality of the New World, when some of these new ideas began to be taught and when some of the results of modern science were imposed upon society. He recalls, that his father instructed him to tell his modern-minded country school teacher that such nonsense as the world being round could very well be disproved by the fact that if this were the case, all the water would run out of the wells at night.

The first appearance of a railway in that particular section of the country resulted in the calling together of community mass meetings to fight this intrusion, for they said that this horrible invention tearing through the countryside belching smoke would so disturb the peaceful cows that none of them would give their milk.

As we look back at it now, it is cause for some mirth, but in the minds of our forefathers there was not an iota of humour in it.

Let us as scientific workers, with a basic interest in intellectual freedom and integrity not forget that there are in this modern day, comparable impediment to progress, advancement and intellectual freedom in a much more insidious and powerful form than that which existed in a somewhat harmless form in the days of my grandfather. There is ample evidence that there are those who would use their power, political, or ecclesiastical to thwart the normal growth and evolution of society which could result from unfettered scientific investigation.

There are to my mind, certain necessary elements which must be found in the atmosphere in which a scientist works, if he is to function normally and produce worthwhile results. I do not think that this is the time to discuss the whole field of intellectual honesty and integrity as it affects all fields of study but in respect to the scientist there is certainly no room for coercion or for the deliberate distortion of the experimental data which come out of a test-tube or a metre reading. Scientific investigation is not

engaged in, to substantiate preconceived theories or to support ideologies and beliefs previously held.

Second only to freedom from coercion, is the right for recognition and remuneration. The product of the scientist's mind is as much his property as the product of the artisan's hand. Scientists are often accused of being poor administrators and traditionally careless of their material interests without making the situation more acute by deliberately exploiting their intellectual gifts. Modern civilization has provided such devices as patent laws governing manufacturing processes and protection for inventions which are an aid to giving the scientific worker the just rewards of his labour, but far beyond this, society in general, must be kept mindful by the process of education, of the debt which it continually owes to the great men of science. In all the annals of history, there probably are no better examples of unselfish labour for the common good than can be gleaned from the biographies of the equivalents of our Edisons, Franklins, Carvers and a long list of others too numerous to mention.

Thirdly, there must be the recognition that the private rights of the individual collectively accrue to the industry or organisation in the protection of its activities in scientific research. A very large portion of the colossal sum spent in the United States annually, is that expended by industry and private organisation on basic research. Call it selfish if you will, but it reduces the incentive which has delivered to the modern world the high standard of living within the reach of the average man's income.

Fourthly, there is beyond the individual and the industry, the general field of research which must be fostered and financed from the public purse, and government must be responsible for the promotion of research for the private good and welfare for which no immediate remuneration is in sight except the advancement of the common good.

I might deviate for a moment to give you a

brief picture of what the United States government is doing in the field of scientific research. There are approximately 40 government departments and bureaus and agencies already functioning in one aspect or another, of scientific research and development. Thought is being given to the establishment of a National Science Foundation, which might result in the amalgamation of some of these organisations, thus reducing the total number.

There is for instance, the National Academy of Science, established as far back as 1863, under President Lincoln. It was given a broad charter to investigate, examine experiment and report upon any subject of Science or Art.

The National Research Council's sub-division of the Academy, set up in 1916 under the Wilson Administration dealt primarily with measures of National Defence but in the post war years following the first world war the interests of this group spread into all fields of scientific endeavour. We, now have the Atomic Energy Commission created by Act of Congress in 1946. This organisation is responsible for developing and utilizing fissionable materials. Its sub-divisions deal with all phases of research, production engineering and the public utilization thereof. The Research and Development Board now largely engaged in matters of national defence, was originally set up as an Army-Navy Joint Research Development Board. The Naval Observatory, aside from its main duties, is charged with private navigation, aerological services and instruments, conducting research in electronics, celestial mechanics, astronomy, optics, timing devices, etc. etc.

Under the auspices of some of the great departments of the government which correspond to your Ministries, we have many agencies interested in research. Take for instance the Department of Agriculture. One of the principal functions of the Department is in scientific research as it relates to agriculture and all its many component parts. It affects such matters as our dairy industry, improvement

of plants disease control, soil conservation engineering, protection of national forests, and a host of other allied activities.

During the past 18 months I have taken the opportunity to drive across the U. S. and back twice, a distance of some 9,000 miles by car. One of the most interesting and inspiring parts of the trip so far as I was concerned was not particularly the magnificent national preserves known as our national parks, although they are a truly wonderful place for recreation. It was not even the colossal flood control and irrigation and power supply schemes such as the Hoover Dam on the Colorado, or the Grand Coulee on the Columbia, although the dimensions of these projects offer us a study in statistics which staggers the imagination, but the most impressive thing to me was found on the plains of Kansas. In 1935, I had traversed this same state during the period when they were experiencing some of their worst dust storms in history causing widespread devastation, soil erosion by winds in untimely dry weather. In 1947, I viewed this same area after the Agricultural Department's scientific efforts had been brought into play to control the destructive elements.

Once where there were vast areas of wind driven sand as far as the eye could reach, there are today some of our most flourishing wheat producing areas. The wind brakes and re-establishment of grass lands to attract moisture and hold back erosion in 12 brief years had turned a desert into a veritable granary.

The Department of Commerce includes such bureaus as the coast and geodetic survey, the patent office, the U. S. Weather Bureau, Textile Foundation, Office of Technical Services, the National Inventors Council and the Civil Aeronautics Administration.

Besides these there are the National Advisory Committee for aeronautics, Geological Survey and the Bureau of Mines, and lastly an organisation which comes more closely to meeting the individual's daily needs than is discern-

ed in many of the other government foundations the U.S. Public Health Service, established in 1798. Today the Service is charged with the protection of disease, biological products control, dissemination of health information and it conducts such institutes as the National Cancer Institute. To support this vast programme which is the responsibility of the National Government, President Truman pointed out last year, that we were expending approximately 1 billion dollars annually for research and development. In his address before the American Association for the Advancement of Science, he was not pointing out to this figure, with any particular pride, but rather called the attention of the public to the need for expending a far greater portion of the national income on such endeavour.

The recital of some of these figures is meaningless unless we interpret them in terms of the need of the common man. It is significant therefore to note that some of the tangible results have been shown to the common man.

In 1789, in the U. S. it took 19 persons to produce enough food for themselves and for one non-productive person. Today these 19 persons can furnish the necessary food for themselves and 66 additional individuals in non-productive urban areas. As a result of the application of scientific principles life expectancy in the U. S. has grown from a brief of 20 years 350 years ago, to 35 in 1850, 49 in 1900, to 63 at the present time. In the pursuance of these programmes in National Health, we have literally wiped out such scourge as small pox, yellow fever, malaria and tuberculosis.

In terms of the earning power of the individual, recent statistics indicate that the average American worker works $38\frac{1}{2}$ hours to earn the equivalent of the price of a high quality woollen suit. In some sections of the world, the figure is 583 hours of labour for the same item, for a pair of shoes, $5\frac{1}{2}$ hours in the U.S. as against 108.

In terms of comforts and the modes of life and for the achievements of that for which all

organised society labours these are truly worthwhile accomplishments and outstanding testimony to the benefits which can be derived from close co-operation between the scientists in the laboratories, the farmers in the fields and the output of industry.

Thomas Jefferson said many years ago that "The main objectives of science are the freedom and happiness of Men". If the measure of success is as this practical scientist has said we do have some cause for satisfaction in observing results. There is no intelligent person of course who is going to be deceived into believing that we have done all that we should for there are still great unconquered areas in the realms of human misery and need that modern science could and should alleviate, if we can only engender in the minds of men a proper appreciation of the possibilities and willingness to concentrate the greater portion of our assets to the achieving of these objectives.

It has been estimated by some economists and statisticians that despite ever-increasing populations and allowing for the ever-increasing demands of modern society, for a higher standard of living that if all our energies and scientific skills could be addressed and brought to bear upon the basic needs of this perverse generation there could be plenty for all for the foreseeable future.

It may be proper at this juncture to say that with the advancement of modern science there needs to be the constant recognition by scientists of the social responsibility and the moral obligation which he has towards modern society. For a lack of better term we probably should say that the man of science needs to be a spiritual individual as well as a man of high technical attainments.

One of our greatest scientists, James B. Connant, President of Harvard University and a distinguished research worker in the field of organic chemistry has said, "Through many advances gained by science we hope that as never before man may be free from want, but science alone

untampered by other knowledge can lead not to freedom but to slavery”.

“At the root of the relationship between science and society in the post-war world must lie the proper educational concept of the inter-connection of our new scientific knowledge and our elder humanistic studies”

One of the grand old men of Physics, Dr. Millikan of the California Institute of Technology has for years insisted that his students spend at least a quarter of their time studying Economics, Literature, Political Science and Philosophy.

I recall that one of my Physics professors, who rose to eminence as nuclear physicist was one of the finest violinists of his day.

This change of outlook on the part of the modern scientist is receiving increasing recognition. At a recent meeting of the Council of the American Association for the advancement of Science one of the resolutions makes as one of its objectives, the examination of the profound effects of science upon society, and that Association extends to all other scientific organisations with similar aims throughout the world, the invitation to co-operate not only in advancing the interest of Science but also in promoting peace among nations and in intellectual freedom in order that science may continue to advance and spread more abundantly its benefits to all mankind.

A Chinese student the other day put this concept very beautifully. He said ‘Only Science can solve the pain of human beings, make up the defects of Nature, raise the standard of living of human beings and make the whole of a human being struggle with Nature but not with mankind.’

I was reading the other day a brief review of the most important events in 1948 scientific calendar in terms of what we have been talking about. The imagination is indeed fired when one considers the latent possibilities suggested by these recent endeavours. It is believed

that a treatment has been discovered for the prevention and the possible obliteration of gonorrhoea. The discovery of the golden drug aureomycin promises to be revolutionary in the treatment of diseases due to certain viruses.

There are now hints of cancer conquests to come. A new high speed X-ray Camera technique promises to discover earlier more cases of stomach cancer and there is hope that cancer blasting radio activity can be worked into chemicals that will travel into the particular parts of the body where cancer is found to exist.

The use of an insecticide “Methoxychlor” promises results not touched by such outdated techniques involving the use of DDT. Man, this year will be able to learn more of the Universe in which he exists, as a new 200 inch telescope on Mount Palomar is finally in place and in operation. Of outstanding importance is a new process for the manufacture of “cold rubber” which will surpass all uses yet made of natural or synthetic fibre such as Nylon.

In closing this address, may I refer briefly to the yet unexplored possibilities envisioned by the President of the U.S.’s reference in his inaugural address last January to the using of the facilities of our technological and scientific resources to meet if possible some of the existing needs of certain areas. What will actually evolve is a matter which must be decided in close co-operation between Economists, Scientists, Educators and people of goodwill not only in the U. S. but also in the countries concerned. But in as much as I have assumed to say a few words this evening on behalf of the American Scientists, I think I can without fear or misrepresentation assure you that there is no body of people in the world today, who are more anxious to make a vital contribution to the ultimate goal uppermost in every human heart, a world of reasonable plenty in which we may live in tranquility and peace.

NOTES AND NEWS

Further developmental programme

Formation of a National Research Development Corporation by the Government of India for the purpose of commercial exploitation of the results of research carried out by Indian scientists, setting up of a Board of Engineering Research, pilot plant investigation into the manufacture of synthetic petrol by Fischer-Tropsch process, botanical research on indigenous drugs, establishment of a Salt Research Station and model farm, were some of proposals adopted by the Council of Scientific and Industrial Research which met in New Delhi in the second week of July.

National Research Development Corporation

In order that the processes discovered by Indian scientists be fully developed and exploited in large-scale production, the C.S.I.R. has recommended that the Government of India should set up a National Research Development Corporation with the primary object of giving new processes developed in India a try-out on a semi-commercial scale, so that Indian industrialists may be encouraged to adopt them on a large scale.

It has been recommended that the Corporation should be floated with a capital of Rs. 50 lakhs and recurring expenditure of Rs. 5 lakhs to start with, and the co-operation of all state-owned and state controlled industries and of such private concerns as are agreeable would be sought in the discharge of its functions.

The C.S.I.R. further approved the setting up of pilot plants in the National Research Laboratories so that the Council's researches may be made of immediate practical benefit to industry. Demonstrations to show industrialists how newly developed processes could be operated on a full production basis will be arranged in these pilot plants. In order to make Indian industry research conscious, the

Council has adopted proposals for rendering greater technical assistance to Indian industry.

Board of Engineering Research

The establishment of a Board of Engineering Research to stimulate and co-ordinate research in various branches of engineering in India has also been approved by the C.S.I.R. The primary function of the proposed Board will be to co-ordinate the research activities in different aspects of engineering carried out in various Government institutions as well as to look after civil engineering of all types, irrigation, mechanical, electrical, power and textile engineering.

Projects on Synthetic Petrol

The Government of India is enquiring into the possibility of producing synthetic petrol from low grade coals and two projects, one costing Rs. 23 crores and the other Rs. 40 crores, prepared by American experts, are under consideration. Pilot plant investigations have been recommended by the C.S.I.R. in order to evaluate the low grade coals and to ascertain manufacturing conditions before actual production is taken up.

High Altitude Research Station

A High Altitude Research Station equipped to handle snow survey and glaciology, astronomy and cosmic ray research and investigations on mineral resources and the flora and fauna of the Himalayan regions, is being set up. The research station will function under the joint auspices of the Council of Scientific and Industrial Research, the Central Water Power, Irrigation and Navigation Commission and the Indian Meteorological Department.

Symposium on Radar

A symposium on radar and ultra-short and

micro-waves is being organised in Delhi in October this year. An exhibition of radar and micro-wave equipment will also be held on the occasion, and the Ministry of Defence and other Ministries of the Government of India are expected to take part in this.

+ + +

Silk Research Institute

A Silk Research Institute will be established in Bombay with a munificent grant from the Silk and Art Silk Manufacturer's Association. The Institute will take up research in weaving and manufacture of rayon as well as silk, and processing, dyeing, bleaching, printing and finishing of silk and art silk fabrics.

+ + +

Dr. Kreidel, the Director of Research in

the firm of Bausch and Lomb, U. S. A., has been appointed as the Director of the Central Glass and Ceramics Research Institute, Calcutta.

+ + +

Manufacture of essential drugs :

Considerable progress has been made towards the establishment of a factory near Poona for the large-scale production of the well known antibiotic, penicillin, two important sulphur drugs, sulphathiazole and sulphamerazine and some synthetic antimalarial drugs. Maj-Gen. S. S. Sokhey, Director, Haffkine Institute, has been entrusted with its planning and working, under the penicillin Committee of the Government of India.

VIEWS

On Popularising Science

I have had the following incident narrated to me by a friend of mine in the Broadcasting House, New Delhi. A casual visitor stepped into the Studios and enquired rather surprisedly how such a vast organization as the All India Radio managed to transmit its messages all over the world using its only small aerial at the top of that building. Though one would not like to believe, my trusted friend maintains emphatically that an employee had to explain that the aerials were scattered almost on all sides along the frontiers of the city, for the sake of clarity and precision in the messages, ending with the remark that what the visitor mistook to be an aerial was perhaps just the flag mast. Apparently, the inquirer was educated and therefore satisfied with the detailed explanation given. On the other hand, I remember well, how only a few years ago, a young and fresh illiterate employee of an electricity concern in my home province played on the live wires of the street mains supply with a deliberately mischievous touch and paid the penalty by laying down his life.

Now, these instances, unconnected that they are, have been quoted only to show how the vast majority of our population is utterly ignorant about matters scientific and technical. Scores of other examples can be piled up to convince one further of the great need to popularize science. When considerable proportions of even the educated ranks remain ill-informed with the fruits of this scientific age, how then the purpose of popularizing science is to be achieved? Is it a problem to be specially pursued by the Government or to be pondered over by the public themselves? Or is it that scientific bodies also can contribute their mite to the solution? These are the questions that naturally arise in the circumstances. One might expect the answers to be as variant and I hope readers will discuss them in these pages. And here I shall merely state what has been done by the ASWI so far in this direction and what the ASWI can do in the future in co-operation with the scientific bodies.

To achieve our aim, it is generally agreed, three most important means have to be

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employed : they are

- (i) Cine-films, (ii) Public Lectures and
- (iii) Pamphlets and books on popular science.

It is a well known fact that the ASWI has been exhibiting to the public varied and interesting films. Particularly in Delhi one or two foreign Embassies have also extended their co-operation in educating the citizens on health and scientific topics. The ASWI has been arranging from time to time, public lectures also by distinguished men of science. In fact the residents of big towns are singularly fortunate, because the opportunities of listening to eminent scientists are admittedly greater in the cities where there are high academic and research institutes. But all will agree that lectures and film-shows have always been confined to the urban localities. Rarely, if ever, has a talk by a scientist of importance been addressed to the villagers who are still in the dark as before, as far as the advancement of science is concerned. It is however a good sign that the Governments, both Provincial and Central, have begun to realize the necessity of educating the rural population through film shows as well as broadcast of talks by scientists. But there is one field, however, which can be efficiently explored and extended only by scientific bodies - and that is the publication of popular scientific literature.

Few books have been published in our country on the noble cause of spreading science. There has been in our land, in recent years, a growing interest in science in the minds of the masses but the attempts taken to quench their thirst for knowledge are not equal to the situation. It should be remembered also that pamphlets form the easiest medium for propagating ideas. Quite a handful of the books that have been published here in English and a few Indian languages as well, have been either not quite so intelligible to the ordinary reader, I have in view, or they are beyond his means to

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buy. So it is here that the scientific bodies including our young organization, should step in and venture to produce, for the general public, books and pamphlets on upto-date science, at reasonable rates, written by eminent men in a way specially appealing and understandable to the rural and general readers. It is to be hoped that our learned bodies and the ASWI will make, in right earnest, a modest beginning with leaflets on popular science both in English as well as in the Indian vernaculars.

Such a valuable task can be undertaken more successfully by a 'Corporation' of scientific bodies than by the Government, because the Governmental machinery is almost a poor medium for the publication of books to disseminate scientific knowledge. However, it is essential that the state should subsidise in a considerable measure, any scheme undertaken by the scientific bodies to enable the masses of this country to understand science better. I am sure that publication of such pamphlets will be a great step in the right direction. It is also an urgent need for, it may be stated without fear of exaggeration, scarcely any of the popular books published here so far on scientific and technical topics, compare well with the foreign

productions, both in cheapness and in standard. The only other source of general scientific information is a number of articles published in the various multipurpose journals. Needless to mention that they are hardly exhaustive and capable of holding interest.

A word to the ASWI before I conclude. It will do well to provide commentaries in Indian languages, depending on the place of exhibition, to the scientific films exhibited at special shows for the illiterate. We should not be content with informing the already fairly-well-informed but should attempt to widen the appeal to others as well. It may also be mentioned here that the ASWI will, by undertaking these new activities, not only satisfy the needs of the society but also serve its own interest.

Finally, the necessity of close co-operation between the ASWI and other scientific bodies cannot be over-emphasised. I look eagerly forward to the day when the coordinated efforts of all scientific bodies will be canalised in the directions indicated and will make our motherland magnificent with its millions of men and women, mature in scientific thought and masters in technical skill.

A. VISWANATHAN

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The Secretary General to the World Federation of Scientific Workers in a communication to us desires that the affiliated Bodies and Members thereof may co-operate and contribute articles to the *'Science and Mankind'* the official organ of the W. F. S. W. and further informs that a regular feature entitled "Science in the Service of Humanity" will be started from the next issue. In this section the following will be dealt with :—

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- (b) the progress that has been made into research in some problems,
- (c) any considerable changes in the organisation of science, inspired by the desire to gear it more effectively to the rising of living standard,
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