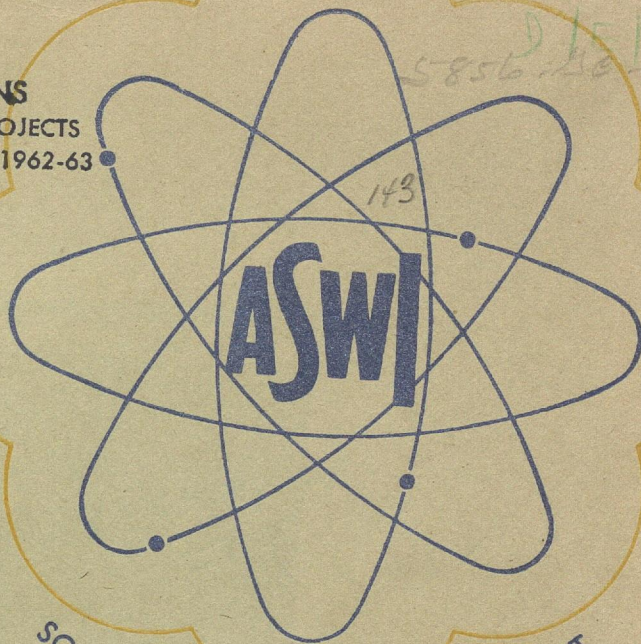


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SCIENTIA AD UNIVERSOS PERTINET

# Vijnan karmee

Vol. XIV

January, 1962

No. 1

# VIJNAN KARMEE

*Journal of the Association of Scientific Workers of India*

*(Founder-President : Shri Jawaharlal Nehru)*

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JANUARY, 1962

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*The views expressed in the journal are not necessarily those of the Association of Scientific Workers of India.*

# Editorial

## Another Milestone

We take this opportunity of wishing the best for the members of the Association of Scientific Workers of India for the year 1962. Another year of life has passed on and the Association is passing the most difficult period since its birth. The lack of enthusiasm evinced by the members in the activities of the Association has been slightly gaining strength and the year 1961 produced no change inspite of the determination of the executive to change-over the Association to the Societies pattern. The CEC for the year 1962 has been reconstituted and the Secretariat has been again taken over by the nominees from the Scientific Workers Association, Kanpur. There is no use of introspection on the past mistakes and lack of enthusiasm. The office bearers have taken a grim determination to fulfil obligations to the members of the Association.

Efforts would be made to accomodate the association in the Societies Pattern and gain much wanted recognition of the Government of India for its very existence. Once these two things are accomplished, it is expected that the Association will gather sufficient strength for its membership. It needs no saying that if the Association gets stronger in its membership, it would become a popular organisation to deal with the aims and objectives as laid down in the Constitution of the Association. Let us hope that the new year will bring the desired effects to the Association. The V.K. will try its best to dissiminate the ideals of a Scientist and his proper position in the society at large. We would, therefore, request all who are interested in the welfare of the Association to contribute their best for making this journal popular and worthy of its name.

## “ A WAY OF LIFE ”

Astounding progress made by science in almost all spheres of human activity and its role in making the “impossible” look not only ‘probable’ but even bring it within the reach of human endeavour, has made scientific career an alluring proposition for many a young man. Inducement and impetus that science, by its entrance into almost all humanistic fields, has given, can be gauged by the adoption of science as a career by ever increasing number of young peoples all-over the world. Tremendous multiplication of scientific literature is another index of the same trend. In highly advanced countries where poverty has not been a dead weight on human initiative, young scientists adopt science as profession not merely for financial benefits but with genuine motive of full exploitation of their innate energy and scientific talent for service of science and thereby service of nation and humanity at large. Even in such developed nations, the financial factors as well as individual ego as exhibited by an ambition for name and fame may not be totally absent in the minds of those who pursue a scientific profession though in most of the cases these factors are not predominant. However, the same cannot be vouchsafed for countries like that of ours which are at the threshold of progress and development. The attention of common young man is actuated more by the economic and social conditions, and material benefits are far more weighty consideration for him while taking a decision for his future career.

Scientific curiosity and the adventurous spirit fall to the background. Thus young scientists tend to be more often mercenaries than being ideal scientific workers. The idea of SCIENCE FOR ITS OWN SAKE has yet to take root in the young graduates coming out of the Universities. On comparatively rare occasions such symptoms of “germination of seed of science” are perceptible and even in such cases the young sapling withers out for want of proper care and nourishment. The glamour of non-scientific fields like the administrative, the foreign services and such other all-India services is so attractive that the research bench is the last resort for a talented young man. It all shows that something is radically wrong somewhere and the young scientist cannot adopt science as “A WAY OF LIFE” as distinguished from merely “A WAY OF LIVING” Mere improvement in the conditions of service of scientists, affecting their general life, their professional and social status may help the latter. These alone will not inculcate the spirit of science as a way of life.

This in no way means that science can be pursued on empty idealistic approach to the problem. Rather far from it, the economic aspects are also very important but they are not the be all or the end all. If we have to make striding progress in scientific field in India we will have to find out means to develop science as a mode of methodical approach for a massive number of young men

of our country and not merely make scientific living a 'lucrative' prospect. To consider this in detail we have to deal with the education of not merely a particular section of the most talented youth, but with the majority, in all probability to become an overwhelming majority of all the intelligentsia or even of the mediocre student community in almost every country. It is in this context that ASWI

has to make concerted efforts. The struggle for economic stability, social status and better conditions of work inside the laboratory, for those who pursue a scientific career is only a part of our programme, though a very important part by itself. We invite opinions from our learned members as to what further steps ASWI can take in this respect.

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#### TO OUR READERS

We are seriously thinking that this scientific journal may in addition to highlighting the scientific strides in India and abroad, give an impetus to scientific way of thinking, particularly to the medium class industrialists. The solution of the problems that every industry faces may require establishment of a separate research wing well above the financial resources the industry can afford. The absence of upto-date information on common technical aspects connected with such industry results in continuation of production of deficient or spurious material at non-economical basis. We propose to introduce a scheme by which the industrialists belonging to a cottage industry or a higher industrial unit can get expert guidance for the solutions of any day to day problem they face. In case detailed outline of the problem is provided to the Editor, we shall strive to collect from the existing scientific literature if something has already been done in India or abroad to mitigate the difficulty. The problem will be dealt with by an expert in the line and in case the available literature fails to give any solution, further line of research will be indicated. The guidance will be free of charge. The aim of such a section is to help the integration of industry and scientific research, a most important aspect in the advent and march of science into common man's activities.

We would, therefore, welcome all the medium class industrialists to help us with their problems and make these efforts a success.

—EDITOR.

## COPPER AND ZINC PRESERVATIVES FROM CASHEWNUIT SHELL LIQUID

The possibility of preparing wood preservatives from cashewnut shell liquid has been investigated at the Forest Research Institute, Dehra Dun. About 15,000 tons of cashewnut shell liquid are produced in the country every year. The production is likely to go up in the near future.

For preparing the preservative, the oil (100 g.) is reacted with copper carbonate or zinc oxide (20 g.) and benzene (50 g.). After heating for 48 hours and 72 hours respectively, compositions containing 5.64 per cent copper and 19.6 per cent zinc could be obtained. Normally, a solution containing about one per cent of copper or 3-4 per cent zinc is considered suitable for wood preservation. The CNSL preservatives could, therefore, be diluted 4-5 times with fuel oil before impregnation.

Practical tests showed general improvement in the service life of specimens treated with the preservatives. For instance, treated *Pinus longifolia*, had a service life of 57 months against 12 months for untreated specimen (preservative absorbed, 13 lb./cu. ft); treated *Bombax malabaricum* had a service life of 22 months against 10 months for untreated wood (preservative absorbed, 4.5 lb./cu. ft).

### Bright nickel plating with cystine

Bright nickel deposits using cystine as brightener have been obtained as a result of investigation carried out at the Central Electrochemical Research Institute, Karaikudi.

This has been possible at current densities of 30 amp./sq. ft, 0.5 g./litre of cystine being incorporated as addition agent in the Watts bath electrolyte. Exposure of the samples to three per cent sodium chloride solution for a period of two months did not show any deleterious effect on the coating.

### New copper-joining process

A new inexpensive diffusion method for joining copper, and copper to certain alloys has been developed by Chase Brass & Copper Co. (U.S.A.). Joints obtained are far superior to soldered connections in tensile, shear and fatigue properties. Corrosion resistance is also expected to be much better than for soldered joints. The technique can be used to join copper to other metals by the use of a coated strip placed between components.

In the process, a special coating on the metal surface diffuses into the parts to be joined, producing a strong, homogeneous bond without any interface. Joints retain virtually all the high electrical and thermal conductivity of copper.

Coating can be applied to copper strip before it is rolled to finished gauge, or to fabricated parts. Bonds of several types can be made by complete diffusion, braze and combined diffusion and braze.

Coated strip can be annealed in a non-oxidizing atmosphere at moderate temperatures and fabricated by blanking, deep drawing, bending or stamping to a desired shape without affecting the coating.

Fabricated and coated parts are diffusion-bonded by heating at 926-82°C in a hydrogen or inert atmosphere for about 5-15 minutes. The carrier volatilizes during this exposure and dissipates in the furnace atmosphere. Reasonably good contact of the mating surface is required.

### Adhesion of protective coatings

Sprayed aluminium coating provide excellent protection for structural steelwork against atmospheric corrosion. However, no reliable and practical method is available for testing the adhesion of the coatings under various conditions. Most of the laboratory methods are not suitable for field tests, as they demand precise machined specimens.

A straightforward practical test, known as the pull-button method, has been developed at the U.K. Ministry of Aviation Gas Turbine Establishment.

A steel button, freshly grit blasted at one end, is bonded to a cleaned portion of the coating using a cold-curing synthetic resin. After this has been left overnight and the resin has set properly, the coating around the base of the button is cut away. This is important, for it means that the test cannot be influenced by the strength of the coating. A specially designed portable machine, operated by levers, is then used to grip the surface of the coating and to apply a uniform axial load to pull the button from the surface.

The test can be applied to all types of surfaces. However, it cannot be used for special coatings which might require a pull greater than about 1-2 tons per sq. in. nor can it be used on aluminium coatings that have been painted.

### Scheme for glace kid factory

The Development Council for Leather, Leather Goods and Pickers Industries of the

Ministry of Commerce & Industry has prepared a scheme for manufacture of glace kid leather for the benefit of industry.

The main limitation for any private enterprise to undertake such a project is lack of suitable markets for the sale of the leathers and the lack of the necessary technical know-how, personnel and materials.

Glace kid leather is costly and could be marketed only in countries like U.K., U.S.A. and Germany, but the high tariffs and other restrictions imposed on the leather are somewhat prohibitive. However, it may be possible to market certain standard varieties like black and brown shades of glace kid, and chrome crust leather, processed up to the point of finishing, which could be further treated in the marketing country to meet the changing needs and fashions there. It would, therefore, be profitable to explore foreign markets and foreign collaboration for running such a project. The scheme envisages conversion of 1000-1500 pieces of goat skins per day into glace kid; another 1000 pieces will be turned into gold and silver kid, shrunken kid Suede, chrome glove, chamois, fancy leather, etc.

The scheme also provides scope for the utilization of the byproducts such as hair and fleshings. Capital cost estimates for the project are given in the following table.

### Production of Glace Kid Leather

#### Capital Costs

(Basis : 2500 goat skins per day; 26 working days per month)

	Rs.
Land and building	12,80,320
Tube well, pump overhead, water reservoir, etc.	50,000
Ancillaries : steam, water, electricity, maintenance, equipment, etc.	1,50,000
Equipment : pits, drums, paddles, machineries, etc.	6,65,740
	<u>21,46,060</u>

#### Working Capital

Goat skins, 3,90,000 for six months @ Rs. 5/skin	19,50,000
Manufacturing cost of 15,60,000 sq. ft. of leather (each skin 4 sq. ft) @ Rs. 0.50/sq. ft.	7,80,000
Chemicals for stock	1,00,000
Miscellaneous expenses	50,000
Factory and administrative staff : maintenance for six months	1,81,629
	<u>30,61,629</u>

## SOME FACETS OF SOCIOBIOLOGY

DR. B. S. KAUSHIVA

Sociobiology is hard to define. It is a multiple discipline where the whole is more than its constituent parts. It is an integrated approach to the environment, both internal and external, for visualization of a series of inter-related concepts derived from sociobiological fields of experiences. It calls for an all-round ecological recruitment and permits interchangeable concepts drawn from various disciplines and sociobiological systems. For instance, the problems of nutritional intake, disease, and population control are closely interrelated. In a way, sociobiology is human ecology viewing biological functions as intimately interwoven with socio-cultural dimensions of life.

### Bio-social Innovations

Biology and sociology share some features in common. Both are dynamic and constantly moving from novelty to novelty. Large-scale biological and social experiments cannot be undertaken. The repetition of observed events is almost impossible. Such an attempt results only in the emergence of novel experience on the part of the observer. It can never be a genuine repetition. Even if the repetition of environmental conditions is secured, there will be new conditions encountered in the organism and in the society both of which have "learned to learn". The society, as well as organism, is conditioned by past events. Novelty in physics or chemistry is restricted matter where it is merely concerned with a

new arrangement or combination of some similar elements. But social and biological novelty is unique and it is ever emerging. The successive events differ in a definite way. It is indeed a great event when a new species emerges or a new social order comes into being. Social research is important as biological research. Perhaps they are tied together.

### Heredity and Culture

Biological heredity and culture are inter-related. Culture has become a part of biology of man. They are not mutually exclusive processes. Neither socially-transmitted culture, nor genetransmitted biology, can establish their own individual claims. It is desirable to study the interrelation of purely biological and social components in psychosocial evolution. The comments of Dobzhansky are pertinent:

"About a million years ago...there appeared a biological species called man. It arose through the action of the same biological processes which gave rise of all other species of animals and plants. And yet in man the biological evolution has transcended itself.....man has an entirely novel method of dealing with his environment. This method is culture.

All organisms inherit the structures and functions of their bodies by way of biological heredity. So does man; but he acquires also a store of knowledge, belief, and ways of behaviour by learning and education.....You

cannot give your genes to even your best friends unless they happen to be your children; but you can, at least potentially, share your cultural acquisitions with anyone and transmit your wisdom or unwisdom to anyone, even to people whom you never see, and to persons not yet born, if you use writing or printing as transmission methods.

...Culture can originate, endure and grow only in the possessors of human genes. This simple fact is important, and its consequences must be appreciated. The fountainhead of the ability to gain and transmit knowledge lies in human genes. But human genes are a product of biological evolution .....Man's ascendancy is the fruit of his genetically conditioned powers of knowledge and understanding."

Obviously, a social anthropologist who ignores the facts of biological heredity in relation to human behaviour becomes a mere physical anthropologist and he cannot be an effective agent of change in social environment. Therefore, sympathetic understanding of biological variations and proper appreciation of the laws of heredity are essential for a social worker.

### Biological Punctuality

The internal environment is as important as the multitude of external factors. The recent discovery of biological clocks in the animal body has shed new light on metabolism and has elucidated the phenomena of instinctive behaviour. Biologists, working with many animals and plants, have noticed rhythm in their activity patterns. Bats would leave their day-time shelter for nocturnal excursions at the exact time. What makes them so punctual? Biological clocks are ingenious devices to satisfy all sorts of adaptive requirements of the organism. Bats

begin to fly in the early evening just when the insects on which they feed are most abundant. Plants and animals maintain an activity pattern that repeats in a well-defined rhythm. "How the bird knows that an early bird catches no worms in a late spring is a large question? The bird can forecast the future, though not necessarily in any cognitive way and that adjustments of present behaviour to future conditions underlie the statistical constancy, not only of population but of whole communities."

Intertissue and intercellular actions may be interpretable on the basis of activity rhythm. This discovery of a kind of timing mechanism in animal bodies has other important repercussions in human physiology. A first class air passenger gets exhausted after a long travel, although he does not exert himself at all. The reason is that he is subjected not only to changes of environmental cycles, but also cycles that vary in length from the normal 24-hour period.

The biological clocks may have sociobiological implications. The factory workers who change shifts more frequently might have their physiological rhythm constantly out of tune with their physiological performance. It is not possible to tell which of the rhythms are most significant and which are more rigid. One cannot also say whether the rigidity in bats is equalled with rigidity in humans. Perhaps, human rhythms are more flexible and factory workers can develop rhythm in their biological processes to meet their situation. It is worth remembering, however, that individuals may have varying biological energy cycles. Some exhibit optimal physiology in the early hours of the morning and others are at their best in the late hours of the night.

### Sociobiological Dimensions

Sociobiology lays more emphasis on preventive aspects than on curative measures. If sufficient attention is not paid to the preventive aspects, the curative responsibilities become too enormous and prohibitive. However, the preventive aspects call for considerable public cooperation. Furthermore, the prospects of illness in some remote future have little concern for the healthy. It is so much more difficult to register their co-operation while they are still healthy. Thus preventive goals are difficult to achieve. Some dental diseases have definite social implications. The Canadian dentists have shown that children of higher socio-economic families have better dental health than those from low socio-economic levels. But the families from lower socio-economic groups were against the proposal for fluoridation of drinking water even though their children most needed improved dental health. The families with higher socio-economic status were for the proposal. It is in the nature of things that those who are in need of innovations are also the resisters to change. It is, therefore, essential to create an environment of acceptability.

Briefly, our national problems which have important sociobiological implications are : food intake; diseases, inclusive of mental ill health; and population control. Interdisciplinary research can prove a great help in solving these outstanding problems.

### Nutritional Intake

The problem of nutritional intake is a fine example of a mixture of biological and cultural factors. Here religious feelings play an important role. Besides what the nutritional experts have done for us about our food, there is the backdrop of psychology and social customs,

Most of us suffer from undernutrition and malnutrition in our country the caloric intake is about 18 per cent below the requirements of a vigorous life. In other parts of the world, some people are overnourished. However, minimal nutritive requirements vary from one individual to another. Both undernutrition and overnutrition are bad. A balanced intake is required. The current advances in biological sciences do not tell us anything about the causes why bacterial infections specially thrive among the starved and undernourished people. On the other hand, viral forms may attack only the healthy cells, perhaps a required condition for their own metabolism.

Experiments have shown that overnutrition kills rats by inducing a form of renal breakdown. In man the adverse effects are produced on the cardiovascular system. Arteriosclerosis was a rarity in twenties, but now roughly 25 per cent of us are likely to succumb to this new killer. Something has gone wrong in respect of our dietary habits. Among Japanese, who have little fat in their diet, it is almost unknown. The disease has dietary origin. Perhaps, the racial differences may also be involved. Primarily, it is a disease of prosperity and it is associated with a large intake of fat relative to the other constituents of the diet. It is a disorder in the manner fats are utilized inside the body. The quantity of fat intake is as important as the quality of fat consumed. All fats are not equally bad. The fat in fish and vegetable fats like olive oil and sunflower oil do not produce the arteriosclerotic conditions. The results of carefully planned experiments in this field can provide the necessary leads in shaping nutritional policy. If unsaturated fatty acids are necessary for our well-being, then we must consume them, particularly if we are large fat eaters.

Equally important is the problem of malnutrition among the economically backward. For example, lathyrism, which is a paralytic disability, is attributable to *Lathyrus sativus* which people in some parts of the country consume, and can be eliminated if the consumption of *L. sativus* is given up.

### Diseases and Mental Ill Health

In the ultimate analysis, all the diseases appear to have biosocial causes. Individuals may be sick or the entire nation may be in a state of imbalance. An individual or a nation which is chronically ill cannot be productive. Disease has an ecological basis and a proper understanding of complex relationships which influence the physical and mental illness in people is essential. Social pathology and social medicine are recent trends. The interrelationships of health, social and economic problems have to be understood. Social pathology is defined as a "state of community imbalance evidenced by significant prevalence of disease and its related social disorders". Similarly, social medicine is regarded as the "study of the manner in which disease may result from, cause, or accentuate social problems, and of the ways in which medical and public health efforts may contribute to their solution". Here is our real sociobiological dimension. The social environment has a direct bearing on a particular disease. Mental disorders and obsessions are peculiar to a social environment and culture. Accordingly, social influences the basis of treatment in certain category of mental disorders which are largely resistant to treatment. The sociobiological therapeutics of this nature do much to re-socialize patients with disordered personalities.

In parasitic and bacteriological diseases some aspects of the relationships may be evident, while in others the factors may remain

obscure. The number of social factors associated with diseases are innumerable. Some may be direct, and others indirect. Some are primary, and others are secondary. Certain of them are hereditary, as many mental conditions. Others are occupational, such as exposure to silicious dust. Some are due to cultural factors, as exemplified by certain dietary habits. Some have economic causes, if the person concerned cannot afford the expenses required for preventive, curative or rehabilitative services.

Thus in tackling the problem of disease, the interplay of several aspects of man and his social physical environment is of the greatest importance and it must be realized that health or diseases is the result of complex interactions of biological, physical and social factors. Investigations have been conducted to clarify the mechanism through which stress can either produce or prevent diseases. The role and participation of adaptive hormones in diseases susceptibilities is an interesting subject. Experimental diseases can be produced by disfunction of hormones secreted for adaptive purposes.

Disease is a way of life, Illness, therefore may be considered as a form of social maladjustment. The mechanism of recovery and rehabilitation are also primarily social. Public health programmes have direct relationship, for example, with increased agricultural and industrial productivity resulting in improved individual and national economies. There is a direct relationship between improved health and improved teachers and consequently health and education are also interlinked. Control of diseases will reduce absenteeism and increase the learning capacity of the students. Health-promoting steps contribute towards improvements in several fields.

### Population Control

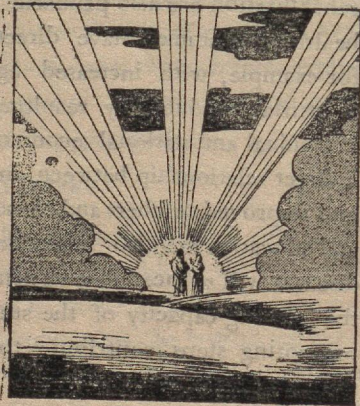
The rate of population increase was almost steady for thousands of years at 0.02 per cent a year. Some 300 years ago it began to increase so that between 1650 and 1930 the rate was 0.5 per cent a year. Between 1930 and 1940 the increase averaged one per cent a year. At present it is 1.6 per cent a year. At this rate the world population would almost double in 40 years, so that in the year 2,000 we may expect a world population of 6 billion. At the end of the Stone Age there were probably 10 million people in all the world. In Christ's days there were 300 million people. At the beginning of 1650 there were 500 million. To-day we are 3 billion.

The world population is increasing at an explosive rate and the challenge of decline in living space has to be met before it reaches a hopeless stage. If the present rates of reproduction continue, all the other problems will pale into insignificance in course of time. The problem will therefore, need to be faced on a global scale rather than considered piecemeal.

The logical answer to the present high rate of increase in world population is to reduce

and control the rate of births. Man has conquered his environment to a great extent. He must also control his numbers. Research and education are the most essential factors in exercising some form of family limitation. The size of family should be a matter to be decided by husband and wife. Their decision is dependent on their social, economic, or cultural surroundings. The motivations which influence parents in their decisions as to how many children they want to have are being studied by social scientists. At the same time, many biologists are controlling knowledge for simpler and more effective means of controlling fertility. Mankind will be in a very great debt to such workers for their discoveries.

India has included plans for fertility control her Five-year Plans for development. Some of the questions pertaining to overcrowding can be profitably studied by observing how animal populations regulate themselves. There is a year-to-year constancy in the number of sparrows and robins at their feeding stations. If populations are basically self-limiting and self-regulatory, man must also learn how to exploit this characteristic of animal populations.



Some historians say man's civilization dawned about 7,000 years ago in Iran. They base their calculations on evidence which indicated when man turned from hunting to farming.

## A MUSEUM TO POPULARISE SCIENCE

BY CHANG YU-JUN

*Head of the exhibition section of the Peking Central Museum of Natural History*

I have worked at the Museum of Natural History in Peking ever since the planning stage. Since then my colleagues and I have never ceased in our search for more dramatic ways to make the exhibits "come alive", so that visitors will get a vivid survey of evolutionary changes and development from the earliest forms of life to modern times.

Our museum, opened to the public in October 1959, is located not far from the Temple of Heaven, one of Peking's most beautiful monuments. Housed in an "E" shaped cream-coloured building with five large exhibition halls, it is divided into three sections: fossils, plants and animals.

The fossils on display showing the evolution and development of life since 500 million years ago are accompanied by models, ecological paintings and diagrams. One fossil appearing as grey streaks on a brownish red rock shows the first known algae (*Collenia*) which lived in the ocean. Thick black spots on varicoloured rock slabs are fossils of the earliest form of animal life (*Trilobita*) known in the world. Many visitors who see these immediately want to know more about primitive forms of life. The guide points out that a fossil found in Yunnan province in South China is one of the earliest algae (*Psilophyton*) to have made the transfer from growing in the sea to that on land.

The four complete fossils of dinosaur skeletons were all found in China, two of them discovered since the liberation. Supplemented by paintings they give a vivid idea of life 100 million years ago when these gigantic creatures roamed the forests and

marshes. The largest is six metres high and calculated to weigh over 30 tons. The smallest is no bigger than a cat. On display are also fossils of dinosaurs' eggs and footprints.

The section "From Ape to Man" is of special interest. Many fossils (some of which are models) of the 500,000-year-old Peking Man, and Upper Cave Man who lived same 70,000 years ago, were found at Choukoutien, not far from the capital.

To make the gradual evolution clear, we made a scientific comparison of the bones, skulls, teeth and limbs of Peking Man, Ordos Man and *Homo sapiens*.

In addition to a reconstructed figure of Peking Man, a large number of fossil tools used by him are also on display. Among the relics of Upper Cave Man are ornaments in the form of fish carved from stone, and beads with holes in the middle which were probably used as necklaces.

### Animal Life

Through the use of over 2,000 specimens and models, a full explanation is given as to how animal life first appeared and then developed from a low to a high level, from simple to complex forms, from life under water to life on land. This is shown through comparisons of external appearances, internal organic structure, and relationship with natural environment.

The section starts with an exhibit of a protozoa enlarged 1,000 times and carved on a slab of transparent plastic. Light from below makes it possible to see the details of

this single cell clearly, as though one were looking through a microscope.

Among the multi-cellular animals the medusa (*Craopedacusth sowerbyi*) is on view. This rare species is found in the middle and upper reaches of the Yangtze River. In books of the Sung dynasty (A.D. 960-1279) they were called "peach blossom fish" because they float on the top of the water like exquisite pink petals.

Representing *Mollusca* as animals of a still higher level is a giant shellfish (*Tridacna gigas*) weighing over 150 kilograms. It was brought up from the sea by fisherman on Hainan Island. The shells are often used by the islanders as basins, feeding troughs for livestock, or as a receptacle in which to build fires.

The exhibit of invertebrates shows that evolution takes place not only in external appearance but also in the completion and perfection of their internal organic structure. Thus clear comparisons are made of body types and the digestive, circulatory, nervous, respiratory and other systems of each animal.

One of the best examples of evolutionary transition is the Chinese *Branchiostoma*, a kind of "fish" which, while retaining some of the characteristics of the invertebrates, also has a notochord, gill slits, a dorsal spinal cord, and manner of embryonic growth found only in vertebrates.

#### Plant Life

The section on plant life opens with huge charts showing how plants made the transition from sea to land. These are followed by a model which changes colour to demonstrate the photosynthesis and organic functions of plants, the interrelationship between inorganic and organic matter, and the influence of plant life on nature.

Among the 200,000 species of seed plants known in the world, 30,000 have grown on Chinese soil. There is, for instance, the ancient conifer (*Metasequoia glyptostroboides*) which grew over large areas of the earth 100 million years ago. Formerly they were thought to be extinct and were studied only from fossils. In recent years living specimens were discovered in Szechuan and Hupeh provinces by Chinese botanists. A section from one of these is now on exhibit in the museum. A beautiful and wonderfully hard wood, it was used as a valued building material. It is now forbidden to fell the trees, as they are of immense interest to scientific research.

Another very rare exhibit is a kind of fungus (*Ganoderma Japonica*) with purplish stem and an umbrella-shaped top. It is considered of great value in traditional medicine. The specimen in the museum was presented by an old peasant who took a train for Peking immediately after he found it in the mountains near Paoting, Hopei province.

A third plant which attracts much attention is called in Chinese the "Winter insect, summer grass" (*Cordyceps sinensis*). A kind of parasitic eubacteria, it lives in the bodies of underground larvae in winter and shoots up through the earths like grass in the summer. It grows on the plateaus of Sikang and Tibet, and has also long been prized in Chinese medicine for its tonic effect.

In addition to explaining the evolution of wild plants, the experiences of the Chinese labouring people from ancient times in the cultivation of tea, soya beans, mulberries and other species are shown through a series of pictures and charts. Scientific advances made since the liberation by means of hybridization, grafting and change of environment

are also portrayed. There is, for instance, a new species of kaoliang with big heads and many more than the usual number of grains, developed through the hybridization of rice and kaoliang by a young peasant in the Kwangsi Chuang Autonomous Region in South China. There are also new varieties of juicy grapes, Peking cucumber which reaches a length of two feet, and long-fibred cotton bred in East China.

### Everybody's Museum

Since the day the museum opened, there has been an average of 1,000 visitors a day students from universities, middle and primary schools, factory and office workers, and farmers. Many come to seek information connected with their work. For instance, those, from factories and offices are especially interested in the economic value of the various specimens of insects, fish birds and beasts. Farmers ask innumerable questions about the feeding habits of birds and insects and for evaluations to the harm or good they do to crops

We have now established contacts with over 500 colleges and schools which frequently request us to answer questions and prepare special lectures connected with current studies. This work is undertaken by our 24 guides. They came to the museum as middle school graduates and now spend their time in the exhibition halls and half in professional studies. Each specializes in the branch of science connected with his or her work. They study school textbooks in order to understand better the demands of the students. Thus while their own knowledge is improved their talks to visitors become more substantial. Very often they also make suggestion for more effective displays.

On the other hand, as our museum has become known, people from all over the country have helped us in the collection of specimens. A rare fossil of an ancient elephant tusk over ten feet long was sent to us by a country cultural centre in Hopei province; a bird of paradise came from a Chinese who had returned from overseas. A soldier from Hainan Island was so much impressed by his visit to the museum that he sent a great many rare shells after he returned there, and students have contributed many insects and butterflies they themselves caught.

Our staff members frequently accompany the "friends of the museum" on their trips and show them how to hunt out specimens and preserve what they collect. There are now a number of groups organizationally attached to the different museum sections according to their field of study. This has stimulated interest in scientific subjects among great masses of the people.

Popular science talks over the radio and television on such subjects as "The World of Dinosaurs", "Every Part of the Rabbit Is of Value" and "How to Control Insect Pests" have also proved very popular. To get material to illustrate television talks, we go out in the countryside to take pictures of harmful insects, helpful birds and the various stages of plant growth.

Much of success is due to the great support given us by various research institutes such as those of zoology, botany, entomology, vertebrate palaeontology, geological palaeontology and marine biology and by individual scientists.

## A NEW STAGE IN CONQUEST OF SPACE

BY V PARIN

It is clear to every sensible person that the creation and successful launching of mighty space vehicles demands the tremendous effort of many sciences. It calls for great achievements in chemistry in order to create new fuels containing enormous reserves of power, in metallurgy to provide the light, strong, refractory alloys for the vehicle, in electronics and automation to create the perfect means of communication and control, in aerodynamics, mathematics, geophysics and many other sciences. Much has been done by the medical and biological sciences. In an extremely short period of time the effects of the many factors of space flight on living organisms and the elaboration of effective means of protecting them from the hazards of outer space were accomplished.

Only a few years have passed since biology and medicine were first confronted with the problems of space flight and stood at the threshold of the unknown; they had to solve a scientific problem without precedent in scale or importance. Today we can claim that a new science has developed and matured—the science of space biology and medicine, with its theories and methods and its specific content and tasks. Moreover, this science has passed serious practical tests with flying colours. Medico-technical systems ensuring the bodily functions of man in space flight have been elaborated, and a comprehensive programme of physical and special training of space pioneers and medical observation of them in flight has been worked out and successfully employed.

### Highways of Progress

Throughout the ages the supreme aim of

all scientists was to blaze new trails through the unknown and, by concerted creative effort, to expand those trails step by step into broad highways of human progress.

The factors of space flight which may affect a living organism are complicated and varied. They come into play simultaneously and in an integrated way during the flight. Their biological effects are superimposed on one another, essentially changing the ultimate reaction of a living being. Therefore, it was the disclosure of their integrated influence on vital functions in real conditions of space flight that acquired special significance, and all the more so, because certain factors, for instance, weightlessness and cosmic radiation, cannot be reproduced on earth.

The achievements of space medicine in the last few years were applied in solving all the problems of space flight.

First of all, several experiments were made with test animals in vertically-launched rockets.

The next stage was the epoch-making space journey of test dog Laika in the second artificial earth satellite.

The creation by science and engineering of new space ships, large in capacity and, most important of all, capable of returning to the earth, made it possible to go over in August, 1960 to the third stage of space biology tests, that of sending large groups of animals and other biological specimens out in space flights and studying them at length in laboratories after their return to the earth. It was thus possible to establish that an orbital flight between

170 and 300 km above the earth and lasting from 1.5 to 24 hours does not cause any undesirable after-effects on the most diverse living creatures.

Finally, the scientists came to the conclusion that from both technical and medical viewpoints everything was ready for a manned space flight. This highly important conclusion was likewise backed by the spaceship flight conducted in April, 1960.

### Programme of Selection

Long before that however the scientists had drawn up a programme of most thorough selection of future astronauts. The basic principle of this programme was a most detailed study of functional defects of an organism in response to increased strain on it. Chosen nominees had to go through months of serious, persevering training, which included the study of space flight theory and practice as well as general and special physical exercises, under constant medical control and strict sequence of gradually rising intensity of factors effecting the organism.

When the time came to pick out the first cosmonaut, the important assignment was entrusted to Yuri Gagarin. the whole

world knows how seriously and proudly he accepted this epochmaking mission and how brilliantly and heroically he carried it out.

Later, a new spaceship, the Vostok-II, piloted by Gherman Stepanovich Titov, made an inpetuous flight around the globe. Everyone in the world followed his unparalleled space voyage with admiration. The results of this flight provided an answer to the question as to how a prolonged orbital flight around the earth affects the human organism and a lengthy stay in conditions of zero gravity tells on man's working capacity.

The information provided by an analysis of radiotelemetry of Gherman Titov's physiological functions and his messages on what he did and how he felt inside the spaceship made it possible to draw extremely valuable conclusions on the preservation of health, clearness of mind and working capacity of a human being in condition of a lengthy space flight. The great prospects these conclusions hold out for future daring feats are obvious to everyone. Gherman Titov's epoch-making flight is a beacon brightly lighting up the road to new, decisive victories in the peaceful conquest of space for the benefit of all mankind.

## RIDING IN A STELLAR CHARIOT

BY COSMONAUT GHERMAN TITOV

The first sputnik...it seems it was so long ago. But its coevals here on earth are still little kids. Four years is a pre-school age. But how much has been done in four years by this "pre-school child" and those that followed it into the sky along new orbits! They have unriddled the great secret of the radiation belts, counted micrometeors, photographed the back side of moon and blazed a trail to the star of the morning dawn, venus. Scientists, engineers and workers succeeded in harnessing 20 million horse-power which lifted a gigantic rocket, the carrier of "Vostok" spaceships. It is clear even to a lay man that four years are an infinitesimally small period for carrying out the colossal amount of work that preceded the sending of man into outer space. During this period the weight of space vehicles was increased from 83 Kilograms to several tons. It was precisely these tons that made possible the building of the "Vostok" and ensure man's comfortable accommodation in it, with everything necessary for life and work.

### Fast Riding

But it is not only a question of increasing the weight of the orbital ship. Sacrificing comfort, one could have found room for oneself already in our third Sputnik. The rocket lifted then a payload of 1,327kg. But before "mounting" the rocket a thought had to be given to the means of dismounting from a "horse" hurtling into space at a terrific speed, at an altitude of several hundred kilometres. The past four years saw the solution of problem, too, a problem of rare scientific and technical complexity. The Soviet scientists and engineers developed the

technical means of bringing the sputnik safely back to earth. Yes, the Russians are really fast in harnessing tremendous power into their wonderful, stellar chariots. As regards fast riding, nobody can deny that more than 28,000 km. per hour is as fast a speed as the fastest rider in his wildest fancy might wish to achieve.

The new rocket techniques demanded from scientists, engineers and designers solution of countless numbers of new, typically "cosmic" tasks, and the people who had been chosen for space flights had to undergo a gruelling course of special "cosmic" training.

### Future Cosmonauts

I recall today my fellow cosmonauts, Yuri Gagarin and...others, whose names you do not know yet. The cosmonauts are a close-knit, cheerful group of people. Working together with them I saw the gradual change in the characters of the members of this family, in the way conducted themselves, spoke and left. On many occasions I, too, experienced the influence of this education in a collective. It is possible that the programme of the third cosmonaut will be more complicated than Gagarin's and mine. This means that more physical effort, greater will-power and richer knowledge will be needed. I visualize my friends before new take-offs, walking clumsily in their orange space suits towards the lift in the launching rack. Here is one of them. He is probable the calmest person among all of us. I can imagine him in any state except being at a loss. This man made a forced landing in a jet plane far from the

aerodrome. Only his composure saved his life. And here is another. I am least of all suitable for the role of a tutor, but at times he seems to me to be just a boy. Impetuous and hot-tempered, often hardly able to suppress his emotions, he at the same time possesses an unbending will and persistence. I know that he will never retreat. He will do everything humanly possible and then find more strength to do the impossible.

### More Active Role

I envy the future cosmonauts. With every new space flight the technics and the equipment of the ship will be improved and the flights themselves will become more and more interesting. But at the same time the cosmonaut himself will play a more active and important role, both as a pilot and a scientist. As is known, during my flight I conducted test of the manual control of the orbital ship. I shall never forget the feeling I experienced when I felt that the space giant was obedient to me. I could turn it at my wish. True, such notions as "up" and "down" are meaningless in conditions of weightlessness. I was asked, for instance now I had slept while in outer space. Possibly, with respect to the earth, I slept in the standing position. Zero-gravity enables you to take rest in any attitude.

When I speak of envy for the future cosmonaut I have in mind first of all precisely this possibility of doing more active work in outer space. Thousands and thousands of people fly by air today. But only pilots know what it is to be one with your machine, to feel that its wings are becoming your wings. It is of this harmony with the rocket that I dream today. These are perhaps too bold dreams, but I know that they will be realised.

### Builders and Designers

I recall the builders of our rockets, people whose acquaintance I had the good fortune to make during preparations for the flight. It was my good fortune indeed. These people not only helped me with many technical questions, they will always be for me a model of not only selfless work, but also of humane-ness, simplicity and modesty.

I shall never forget my first meeting with the head designer of our space rockets. A thick-set, simply dressed man of average height with slightly grey hair entered the room. We were to be given a general theoretical course in rocket technics, and the head designer decided to read the first lecture to us. He told us about the design of the rocket, its main units and the particulars of the work of its stages. Then he presented each of us with a pentagonal pennants, an exact replica of the pennants now lying somewhere in the dust of lunar seas.

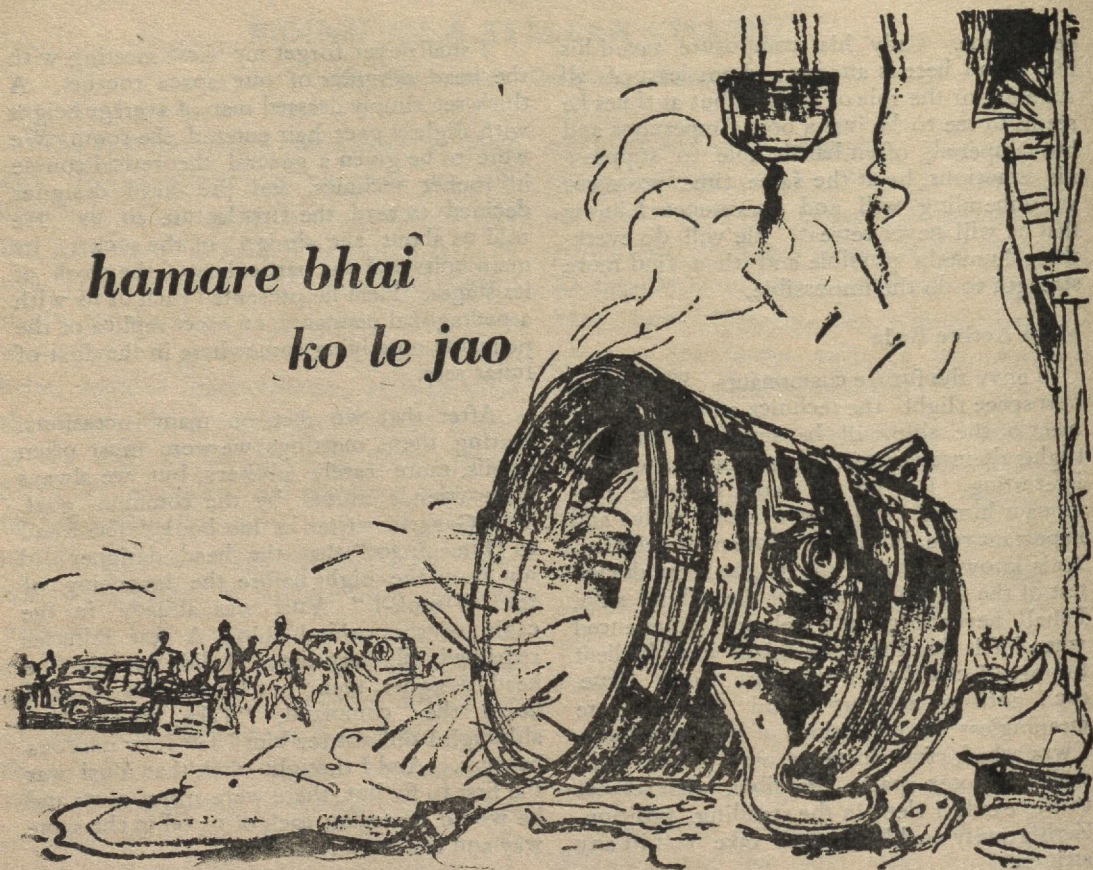
After that we met on many occasions. During these meetings we were most often pupils, more rarely advisers, but we always were friends united by the common goal. Yuri Gagarin writes in his book "The Road to Outer Space" that the head designer did not sleep the night before the launching of the "Vostok-1." Yuri was already in the cabin of the orbital ship. A few minutes remained till zero-time. I did not see the head designer then, but I heard his voice, I heard the command, "Take off!" And although I did not see him I felt how nervous he was. And I thought then that Yuri was the first to fly but there were many of us and he would be seeing each of us off in the same way and feel equally nervous.

### Autographs in Outer Space

The scientists helped us cosmonauts not only while on the ground, but also when the orbital ship was in the sky. During my flight I could put questions to the head designer and other specialists. They asked me how I felt, and I constantly felt their concern. I was very anxious to present something to them, and after return to the earth I was especially pleased to present the head designer, the theoretician of cosmonautice, and other specialists in charge of preparations for flight with autographs made in outer space.

The era of the conquest of outer space dawned four years ago. A soaring rocket has become a symbol of our country. And every new take-off to outer space is a new, triumphant salute to the people.

## hamare bhai ko le jao



It happened some years ago in the steel melting shops at the Jamshedpur works. A large ladle, carrying 75 tons of molten iron, suddenly crashed to the ground with a deafening noise from an overhead crane. The spattering sparks and red-hot metal seriously injured a number of brick-layers working at what seemed to be a safe distance. The air was rent with the frenzied shouts of the men and the hissing of steam.

The first ambulance could remove only five of the injured to the hospital. General Manager Keenan could take only three more in his car. He chose the three who had a better chance of survival than the rest. One of these men, a Hindu worker, however, re-

fused to go. "Do not take me away", he said. Disregarding his own agony, he feebly nodded towards a half-burnt Muslim colleague, and said: "Hamare bhai ko le jao." As Keenan recalls, "The Hindu who was in pain and danger of death remembered, not that the Mohammedan was of a different faith, but that he was his brother."

This feeling of comradeship, born of the common bond of labour, is the spirit that characterises Jamshedpur, where industry is not merely a source of livelihood but a way of life.

## JAMSHEDPUR

THE STEEL CITY



## C. E. C. MEETING

**Minutes of the 3rd CEC (1961) Meeting of the Association of Scientific Workers of India, held on 2-1-1962 at the Ravenshaw College Hall, Cuttack at 10.00 AM.**

### Members Present

Professor M. S. Thacker (President), Dr. M. S. Iyengar, (Jealgora), Mr. A. K. Singh, (Kanpur), Mr. B. A. Nabar, (Kanpur), Dr. B. S. Kaushiva, (CDRI Lucknow), Dr. B. K. Nayar, (CSIR Delhi), Dr. S. Z. Ali, (Jealgora), Mr. U. B. Kanchan, (Kanpur), Sri S. Ramabadran, General Secretary).

The Meeting took place with the President Professor M. S. Thacker in the Chair.

### Confirmation of the minutes of the 2nd CEC Meeting

The minutes were read out and confirmed.

### Reports of the General Secretaries

The report of the General Secy (Org.) and report of the General Secy. (Pubn.) were read out and approved.

### Reports of the Treasurer

The report of the Treasurer was read out and approved.

### Conversion of ASWI from Trade Union to Societies Pattern

The members of the CEC were informed

that the objections raised by the Registrar of Societies, U.P., Lucknow have been referred to the Law Ministry and the final opinion from that Ministry has not yet been received. Further action will be taken after receipt of the information.

### Increase in Membership of the ASWI

As this also depend on item 4 above, the draft letter will be published later.

### Recognition of ASWI by the Government

This question will also be pursued after action on item 4 above.

The meeting came to a close with a vote of thanks to the Chair.

S. Ramabadran  
General Secretary.

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**Minutes of the Council Meeting of the Association of Scientific Workers of India held on 2-1-1962 at 2.00 PM in Ravenshaw College, Cuttack.**

### Members Present

Prof. M. S. Thacker, (President), Dr. B. Mukerji, (Vice-President), Dr. B. S. Kaushiva, (CDRI, Lucknow), Dr. S. Z. Ali, (Jealgora), Dr. M. S. Iyengar, (Jealgora), Sri Subramanian,

(CFRI), Dr. B. K. Nayar, (CSIR Delhi), Dr. J. P. Mittal, (CSIR, Delhi), Sri S. C. Datta, (CSIR, CIMPO), Sri A. K. Singh, (Kanpur), Sri U. B. Kanchan, (Kanpur), Sri B. A. Nabar, (Kanpur), Dr. Nityananda, (CDRI, Lucknow), and Sri S. Ramabadrán, (General Secy).

The Meeting took place with the President, Professor M.S. Thacker in the Chair,

**Confirmation of the minutes of the last Council Meeting held at Roorkee.**

The minutees were read out and confirmed.

**Introduction of the Delegates**

All the Delegates present introduced themselves to the Chairman.

**Reports of the General Secretaries**

The annual reports of the General Secretaries were discussed. The reports were adopted and recommended to the General Body.

**Report of the Treasurer**

The annual report of the Treasurer inclusive of the Auditor's report for the period ending 31st March, 1961, the Income and Expenditure Account for the period 1-4-61 to 25-12-61, the Estimates for the period 26-12-61 to 31-3-61 were considered and adopted.

**Reports from Branches**

The reports from various Branches were heard/read out at the Council Meeting.

**Proposals/Resolutions**

Dr. S. Z. Ali moved two resolutions to be adopted for the General Body Meeting—one for the consideration of the Departmental candidates who are recommended extra increments by UPSC at par with an outside candidates (which at present is not being agreed to by the various Govt./Semi-Govt. organisations) and another for bringing-down the period of 5 years to 3 years for incumbents recommended for foreign Scholarships under different Aids and Schemes.

**CEC for the year 1962**

The CEC was constituted as under :

- |                                                                             |    |                          |
|-----------------------------------------------------------------------------|----|--------------------------|
| 1. Prof. M. S. Thacker                                                      | .. | President                |
| 2. Prof. B. C. Guha                                                         | .. | Vice-President           |
| 3. Prof. P. C. Mahalanobis                                                  | .. | "                        |
| 4. Prof. D. S. Kothari                                                      | .. | "                        |
| 5. Dr. B. Mukerji                                                           | .. | "                        |
| 6. Dr. A. Lahiri                                                            | .. | "                        |
| 7. Sri A. K. Singh                                                          | .. | General Secy.<br>(Org.)  |
| 8. ,, G. M. Verma                                                           | .. | General Secy.<br>(Pubn.) |
| 9. ,, Y. H. Rao                                                             | .. | Jt. Secretary            |
| 10. ,, U. B. Kanchan                                                        | .. | "                        |
| 11. ,, R. M. Chitnis                                                        | .. | "                        |
| 12. ,, J. S. Jadav                                                          | .. | Treasurer                |
| 13. Dr. S. Zaheer                                                           | .. | Member                   |
| 14. Dr. M. S. Iyengar                                                       | .. | "                        |
| 15. Mr. A. Rahman                                                           | .. | "                        |
| 16. Sri S. Ramabadrán                                                       | .. | "                        |
| 17. ,, M. R. Raman                                                          | .. | "                        |
| 18. Secy. Hyderabad Br.                                                     | .. | "                        |
| 19. ,, Bangalore Br.                                                        | .. | "                        |
| 20. ,, Mysore Branch                                                        | .. | "                        |
| 21. ,, Jealgora Branch                                                      | .. | "                        |
| 22. ,, Lucknow Branch                                                       | .. | "                        |
| 23. ,, Bahadradab Branch                                                    | .. | "                        |
| 24. ,, CSIR Delhi Unit                                                      | .. | "                        |
| 25. ,, Calcutta Unit                                                        | .. | "                        |
| 26. ,, CTRI Unit                                                            | .. | "                        |
| 27. ,, F. D. S. W.                                                          | .. | "                        |
| 28. ,, ASW (Kanpur)                                                         | .. | "                        |
| 29. ,, ASW (Khamaria)                                                       | .. | "                        |
| 30. ,, ASW (Kirkee)                                                         | .. | "                        |
| 31. ,, UP, PWD Research<br>Institute Scientific<br>Workers Assocn., Lucknow | .. | "                        |

32. Secy. Southern Rly. Chemists Member  
& Metallurgists Staff  
Association, Madras

33. „ ASW (Pimpri) „

### Arrangements for the General Body Meeting

It was suggested that Dame Kathaleen Lonsdale, F. R. S. be invited for being the Chief Guest to inaugurate the General Body Meeting of the Association.

### Auditors for the year 1961-62

M/s. Gupta & Co. Chartered Accountants,

The Mall, Kanpur were appointed as Auditors for the year 1962.

### Any other business

The remuneration of the office Secretary was discussed and an increment of Rs. 20/- p.m. w. e. f. 1st January, 1962 has been approved by the Council. The part-time honourarium of the orderly was raised from Rs. 3.00 to Rs. 5.00.

The Meeting came to a close with a vote of thanks to the Chair.

**S. Ramabadran**  
General Secretary.

## Minutes of the Annual General Body Meeting of the Association of Scientific Workers of India held on 3-1-1962 at 11.00 hrs. in the Ravenshaw College Hall, Cuttack.

Members Present : About 50 members of the Association attended the Meeting.

### Chief Guest

Dame Kathaleen Lonsdale, F.R.S. was the Chief Guest. The Chief Guest was welcomed by the President Prof. M.S. Thacker and the General Secretary, S. Ramabadran.

### Inaugural Address by Dame Kathaleen Lonsdale

Dame Lonsdale gave a talk on "Popularisation of Science". Her opening remarks were based on the fact that Popularisation of Science has started as early as the American colonisation by Britain. The present day approach in Britain for the popularisation of science by the British Society for the advancement of science is as follows:-

(i) Along with the annual session, a junior section comprising of school going children is also held where they used to have illustrative lectures on Scientific topics,

(ii) in all regional centres, the Society arranges for learned lectures and Corporation, Towns & Cities are asked to arrange for audience,

(iii) popular magazine is being published which gives a number of information on latest current scientific topics and fundamentals of science,

(iv) arrangements have been made with the Radio Stations over Britain that scientific popular lectures will be given at regular intervals for the benefit of junior children and those who are interested in science.

(v) proposals are also in hand to arrange lectures with practical demonstration of experiments by Television so that the listeners would be able not only to hear the lectures but also see the actual working of the Scientists.

Dame Lonsdale stressed that these measures have paid dividence for the popularisation of science in U. K. today.

### Annual Reports

The reports of the General Secy. (Org.) and General Secy (Pubn.) as per enclosures were adopted.

### Officebearers for the year 1962

The General Secretary Sri S. Ramabadrann announced the names of the office-bearers and members of the CEC for the year 1962.

### Treasurer's Report/Budget for 1962

The Treasurer report inclusive of actual of income and expenditure accounts for the period 1-4-61 to 25-12-61. Estimates of Income & Expenditure for the period 26-12-61 to 31-3-62, Balance Sheet for the year ending 31st March, 1961 and Budget Proposals for the financial year 1-4-62 to 31-3-63 were adopted.

### Proposals/Resolutions

The resolutions proposed by the Jealgora Branch were adopted unanimously.

### Address by Professor M. S. Thacker

The President, Professor Thacker raised the question of Conversion of ASWI into the Societies Pattern and impressed the General Body that much depends on the action taken by us during the year after the advice of the Law Ministry. An introspection of the working of the Association during the past two years show that we have reached a saturation limit and the Association can brighten up and do things only if sufficient strength is available. All the members have to think about this fact seriously and decide in the next CEC as to the steps to be taken by office-bearers and the organisational units for improving the strength of the Association.

The meeting came to a close with a vote of thanks to the Chair.

S. Ramabadrann  
(General Secretary)

## Annual General Meeting

# ANNUAL REPORT OF THE GENERAL SECRETARY (ORGANISATION) 1961

The factual report of the work carried out by the Association during the year 1961 is given below :—

## ORGANISATION

### Meetings

Three meetings of the CEC have been held during the year. One meeting of the Council and one meeting of the Annual General Body Meeting was held in January, 1961 at Roorkee.

### Branches/Units/Affiliated Organisations

The Association has its Branches/Units/Affiliated Organisations in the following places :

#### Branches

Hyderabad, Lucknow, Jealgora, Mysore, Bahadrabad.

#### Units

Calcutta, Delhi and Rajahmundry.

### Affiliated Organisations

Khamaria, Kirkee and Kanpur (federation of Defence Scientific Workers), Lucknow (UP, PWD Research Institute Scientific Workers Association), Madras (Southern Rly. Chemists & metallurgists Staff Association), Pimpri, Poona (Association of Scientific Workers).

### Membership

Except for a new affiliated Organisation

viz : ASW Pimpri, the membership position of the Association has not improved during the year.

### Registration under the Societies Act

On the basis of the resolution passed at the last Annual Meeting held at Roorkee, regarding the conversion of the ASWI from the Trade Union to Societies pattern, steps were taken to give effect to the same. The resolution was given wide publicity through the V. K. A circular letter was also issued to the Branches/Units/Affiliated Organisations. A formal endorsement of the resolution was also obtained from the Branches/Units/Affiliated Organisations. In the light of the resolution for the conversion and also the amendments drafted at the last Annual General Body Meeting, the Constitution of the Association was re-drafted and this was also circulated to the members of the CEC for their cognisance and signatures. The Registrar of Trade Union was informed of the steps taken by the Association regarding the conversion.

An application in accordance with the procedure was filed with the Registrar of Firms and Societies at Lucknow. The Dy. Registrar of Societies has since informed that the clause in the constitution pertaining to the protection of economic and service conditions of the scientific workers was not within the terms and reference of the

Societies Act. This question has been taken up with the Ministry of Law with the help of the Law Adviser of the CSIR.

At the 2nd CEC (1961) Meeting of the Association held in New Delhi, it has been decided that the Association will maintain the status-quo in case both the main clauses of the Constitution (viz: (a) & (b) of the constitution) are not fulfilled by the registration under the Societies Act. The CEC has however noted that the situation is an enormous one in that scientific workers are not strictly covered by the Trade Union Act and at the same time, the Societies Act is unable to cover the aspects pertaining to the professional and economic interest.

#### **Increase In Membership**

During the year, the question of increase in membership by means of a direct appeal from the President to the scientific workers in the country particularly after the conversion of the Association to the Societies pattern was taken up. However, the matter is pending because of the delay in the registration under the Societies Act.

#### **Recognition of the ASWI by the Government**

The question of applying for recognition of the ASWI with the Government was also considered by the CEC and as this is also related to the registration of the Association to the Societies Pattern, the draft letter has been kept pending.

#### **CSIR SWA**

At the last Annual Meeting, the formation of one Central Association for the CSIR viz: CSIR SWA was considered. An effort was made to get the CSIR Branches together for this purpose. Subsequently, on the basis of the CSIR circular for formation of Staff Association in the various CSIR Establishments (consequent to the Pay Commission recommendations), the CEC decided during the year that wherever our branches exist in the CSIR Estt. efforts should be made to convert them to an autonomous associations in the light of the CSIR circular mentioned above. A detailed circular letter was issued to the concerned branches outlining the procedure to be followed for this purpose. The efforts in this direction have not materialised so far.

#### **Economic and Service Condition Problems**

A number of economic and service condition problems were referred to the Centre either directly or in the form of resolutions on behalf of the concerned Branch/Unit/Affiliated Organisations. These were pursued by correspondence/negotiations with the concerned authorities. The progress on these matters have been periodically published in the Vijnan Karmee. A list of few such problems is given below for the information of all the members:

Problem	Sponsored by	Persued with
1. Pay-Structure of the Scientists vis-a-vis Lower Cadre	CEC/Council of ASWI	1. CSIR & Ministry of Defence 2. AEC/UGC, Railway Board, Inter-University Board, Ministry of Transport & Communication.
2. Selection of Class II Cadres for Asstt. Chemists & Metallurgists in CMT's Orgn.	Southern Rly. Chemists & Metallurgists Staff Association, Madras	Chairman Railway Board
3. Study Leave	CEC/Council of ASWI	Ministry of Home Affairs/Finance Ministry
4. Transferability of Service Benefits/facilities	—do—	Ministry of Home Affairs
5. Condonation of ETE Service rendered between Two TE Services vis-a-vis Seniority	Federation of Defence Scientific Workers	Ministry of Defence
6. Grant of additional increments to Scientific Staff in junior grades	Lucknow Branch	Ministry of Railways, AEC, Chairman, Inter-University Board, Ministry of Defence & CSIR
7. Admissibility of HRA & CCA to Scientific Staff	Bangalore Branch	CSIR

### Symposium on 'Higher Scientific and Technological Education' 1962

(Sponsored by the World Federation)

The CEC and the Indian Regional Centre of the World Federation considered the circular letters received from the World Federation regarding participation in the above

mentioned Symposium. The details pertaining to the Symposium have been published in the Vijnan Karmee during the year. The CEC appointed a small Working Committee comprising of Dr. S. Husain Zaheer, Dr. P. M. Bhargava, Mr. A. Rahman, Mr. Y. H. Rao and General Secretaries (Sri M. R. Raman

and Sri S. Ramabadrar) for carrying out this work. On behalf of India and Indian Regional Centre, a list of participants will be suggested to the Organising Committee of the World Federation where possible technical papers on the subject matter of Symposium will be presented. A detailed note on the subject pertaining to the present position in India will be forwarded to the Organisers. For further reference, the Association News column and the World Federation column in V. K. can be referred to.

#### **Symposium—ASWI**

Based on the suggestion of the President at the last Annual Meeting, the CEC considered the question of arranging Symposium on a subject relevant to Employees and Employers relationship in as much as it concerns to scientific workers. The CEC after considering various aspects decided to organise Symposium on "Scientists and their relationship vis-a-vis Scientific Development in the country and Society. A Steering Committee has been formed for the purpose provided a proper representative response is available from scientific workers and scientific institutions in the country. It has been decided to hold the Symposium in Feb.-March '62.

#### **Indian Parliamentary & Scientific Committee**

The Association was informed during the year of the proposal of the Indian Parliamentary & Scientific Committee and the ASWI was requested for participation in this matter. The invitation together with the article on working of India Parliamentary & Scientific Committee in Great Britain was given wide circulation through circular letters and also publicity in the Vijnan Karmee. The CEC decided to become member of the Committee and actively participate in the same. A note

drawn up by the Parliamentary Committee has also been published in the recent issue of the V. K. which gives a brief idea of the scope of work undertaken by this Committee.

#### **Grant-in-Aid**

An application for a grant-in-aid of Rs. 11,600/- towards the recurring expenditure of the publication activities of the Association was sent to the Govt. of India through the NISI. A sum of Rs. 2500/- has been received during the year and further instalments are anticipated before the close of the financial year.

#### **Audit Report**

The accounts of the Association for the year 1960-61 were audited by M/s. Gupta & Co. and the audited report was confirmed by the CEC and the same has also been published in the V. K. for information of all the members.

#### **Observations**

Over the course of 6 to 7 years now the Association has been passing through the doldrums. Efforts are being made by the CEC to re-vitalise the organisation. However, the efforts have been only to keep the organisation going on a care-taker basis. The major decisions viz: to convert the organisation to the Societies pattern, appeal for increase in membership and the effort for recognition, have to be pursued with vigour. The decentralised pattern has to be resorted to if the local interest of the primary members of the organisation is to be fulfilled. The major question of policies etc. have to be taken up by the Association on a mutual basis. A large number of scientific institutions viz: production, design, development and teaching institutions are springing up all over the country and the number of

scientific and technical workers are also increasing by leaps and bounds. It is possible that in this development phase the need for an organisation like ours is not being properly appreciated but the ultimate success of the scientific work in the country will depend much on an organisation like the ASWI which alone can provide the forum for their getting together and also appreciate the responsibility of the tasks that lies on the shoulders of the scientific workers. Officially sponsored bodies for this purpose may not

entirely provide the means for sorting out some of the difficulties which an average scientific worker may feel in the course of his work and such bodies cannot also fulfil the responsibilities pertaining to the aims and objectives laid down in our constitution.

The CEC taking this opportunity of thanking all the office-bearers and particularly the President Professor M. S. Thacker, for carrying the responsibilities of the organisation on their shoulders and for keeping the organisation alive during the year.

**M. R. RAMAN**

*General Secretary (Org.)*

## ANNUAL REPORT OF THE GENERAL SECRETARY (PUBLICATION) 1961

During the year 1960 changes have been brought about in the format of the Vijnan Karmee. The dissemination of topics of interest to Science and Scientific Workers had been rationalised under group headings viz: Science News, Articles of topics interest, Workers Forum, Scientific Institutions, Science and Industry, Scientific Personnel, Association News, WFSW News as also Editorial and Editorial News. A new column has been introduced during the year viz: "Students Column". Every effort was made during the year to keep these columns going. There have been instances where the format could not be strictly adhered to. During the year under review, only 10 issues of the Journal were brought out. There have been some difficulties of the Printers due to which the regularity was hampered to some extent. However, efforts made towards the close of the year have brought back the publication to the schedule.

The financial position of the journal does require a mention. Though we have been able to clear the major portion of the debts of the previous years, the financial condition has not come to the positive side as yet. It is, however, worth noting that the journal is in a position now to maintain itself by the advertisement revenue and the Government grants. Roughly speaking, the order of expenditure is about Rs. 10,000/- in a year for the publication purposes of which about Rs. 4,000/- comes in the form of advertisement and Rs. 6,000/- in the form of grant-in-aid. Efforts during the year to increase the advertisement revenue have not been

very successful though we have been able to sustain the advertisement revenue on the same order as in the last two years,

The get-up of the Journal has been slightly improved. The design and material for the cover page has been changed, centre binding has been resorted to and number of pages has been roughly standardised as 44 to 48 on an average.

Though the efforts in the recent years have been successful to the maintenance of the regularity in the publication of Journal, and the material for dissemination has been centralised, yet there is a dearth in flow of articles for the various columns published in the Vijnan Karmee. While the Editorial office can maintain the publication and attend to some of the financial aspects of the matter, feeding the various columns in the Journal should be decentralised if the Journal is to maintain its get-up in the rationalised format. It goes without saying that laying down aims and objectives on the constitution is one aspect of the matter and trying to translate it in practice is another. It is regrettable to note that as scientific workers on an organised forum like the ASWI, we have not been able to fulfil this aspect of responsibility.

The CEC takes this opportunity of thanking the office-bearers of the Publication Division, the Members of the Advisory and Editorial Board for the valuable help and co-operation. The special mention is made to the Hyderabad Branch for the valuable co-operation in the procurement of advertisements.

**S. RAMABADRAN**  
*General Secretary (Pub.)*

## ANNUAL REPORT OF THE TREASURER 1961

Factual report pertaining to the accounts of the Association is given in the enclosures. Enclosure '1' refers to the audited statement of accounts for the financial year 1960-61 together with the Auditor's observations. The income and expenditure accounts for the period 1-4-61 to 25-12-61 are given in enclosure '1'. This enclosure also gives the present position of the liabilities and assets as on 25-12-61. The estimates for the period 26-12-61 to 31-3-62 are given in Enclosure '2'. The Budget Estimates for the year 1962 are given in Enclosure '3'.

### INCOME

The income from the membership fees during the year has again been very meagre. As pointed out by me during the last three years, this situation requires a careful attention by all of us and who are interested in the organisation. The income from the advertisement for the 9 months (from 1-4-61 to 25-12-61) has not been very satisfactory. The outstanding bills are mounting up and we hope we may be in a position to recover the arrears before the close of the financial year.

During the year we have received a grant-in aid of Rs. 2,500/- from the Govt. of India, Ministry of Scientific Research & Cultural Affairs towards publication of our Journal, which has kept us going. The promised grant-in-aid from the NISI has not been received so far. We hope to finalise this question also before the close of the financial year.

### ORGANISATION

In view of the stringent financial condition at the Central Office, Organisation expenses has been kept to the minimum. The publication expenses have also come

down to the norm, consequent to our clearing the outstanding bills of the previous years. In this context, it would be observed that a sum of Rs. 2867.76 has gone towards clearing outstanding liabilities of the last year. It would be worth observing here that the outstanding liabilities during the years 1960 & 1961 were of the much higher order i. e. about Rs. 8,000 & 7,000 respectively.

### FINANCIAL POSITION

Over a period of 4 years now, we have been in a position to clear off the arrears towards publications and maintenance of Central Office. From bills, which were outstanding to the tune of about Rs. 8,000/- we have come down to about Rs. 3,000/- and we hope that the advertisement position improving, the financial condition will come to a normal one. However, the Organisation office expenditure comes to about Rs. 1,000/- in a year. The Central Office has to resort to strict economic measures for even normal expenditure for maintenance of office; this amount should be forthcoming from the Branches/Units/Affiliated Organisations failing which the Central Office cannot be run. The publication activities however, have reached an equilibrium and the financial condition can be considered to be satisfactory if the same tempo is kept up for running the journal.

I would like to place on record my thanks for the interest evinced by all of you during my tenure as Treasurer of the Association. I have been in harness for a period of 5 years now and I regret that due to certain unavoidable circumstances, I am unable to continue for the year to come. However, I wish my successor and the Association all Success.

J. N. MISRA  
Treasurer







## 1962 SYMPOSIUM—W. F. S. W.

A Symposium on 'Higher Scientific & Technological Education' has to be held sometimes in September, 1962 under the auspicious of the World Federation of Scientific Workers. This Symposium is being jointly convened by State University of Moscow, World Federation of Scientific Workers and Bomaun Institute of Higher Technology in Moscow. In India, Association of Scientific Workers of India is an affiliated Organization and also have the Indian Regional Centre of the World Federation. As such, we will have to take steps towards participation of India in the above Symposium. This aspect of the matter was considered at the last CEC Meeting of the ASWI held on 22 July 1961 at Delhi. At the suggestion of the President, Professor M. S. Thacker, it was decided that a Committee comprising of Dr. S. Husain Zaheer. Mr. A. Rahman, Dr. P. M. Bhargava, Sri Y. H. Rao, Sri M. R. Raman and Sri S. Ramabadrnan be formed who will take the necessary steps for contribution to Symposium from India.

The Symposium is likely to be held in Moscow sometimes between July & Sept. 1962. The duration is likely to be about 4 to 5 days. It is expected that the contents of the Symposium will be grouped under the headings 'Purpose', 'Organisation' and 'Content' and that there will be about 12 half hour papers, followed by full discussions, in plenary session or in separate commissions. Tentatively some suggestions have been sent by the Organising Committee for the titles of papers which are given below :—

Proposed subject matter of the 1962 Symposium on "Higher Scientific and Technological Education"

### Purpose

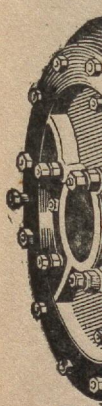
1. The place of science and technology in the world of the future.
2. The conditions necessary for training good scientists and technologists.
3. Scientific education and international relations.
4. The aims of higher scientific education in newly developing countries.

### Organisation

1. The actual, desirable and possible extent of higher scientific education.
2. Supplementary methods of training including correspondence courses and part-time education.
3. The further training of qualified scientists necessitated by cultural and technical advances.
4. International exchanges in scientific and technological education.

### Content

1. Specialisation in science before entering into institutions of higher education.
2. Specialisation at institutes of higher education.
3. The relation of practical and theoretical training and the place of research in teaching.



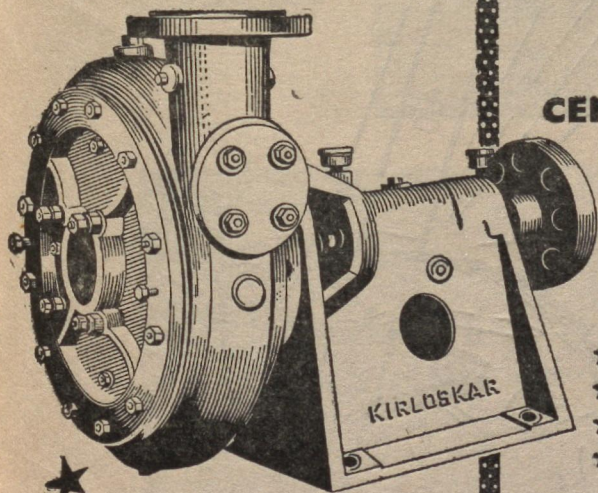
★  
Ask for  
Sluice  
Ploughs

4. The cultural and linguistic education of students of science and technology.

Members of the A. S. W. I. and other readers are requested to send their comments on any of the 12 listed subjects to the National Preparatory Committee (ASWI, 8/60 Aryanagar, Kanpur). If the members could come forward to write up about 1000 or 1500 words report on one or more different aspects of the "Main Problems Relating to Higher Scientific and Technological Education in India", it will be

very helpful for the Preparatory Committee. For this purpose, the Subject may be subdivided into (a) the problems relating to Higher Education to Basic Sciences, (b) Problems relating to Higher Education in Technology, (c) Problems of Advanced Fundamental Research and (d) Problems of Advanced Applied Research, (e) the status and problems of university teachers and (f) the status and problems of research workers.

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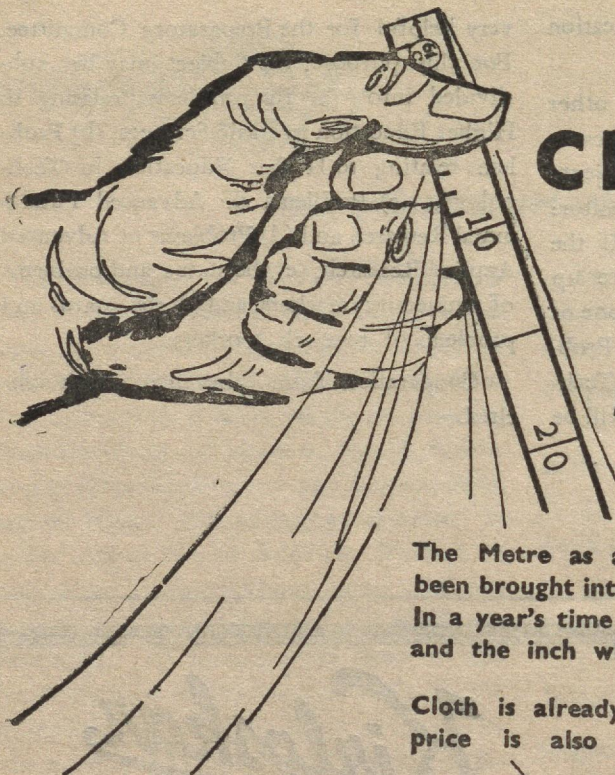
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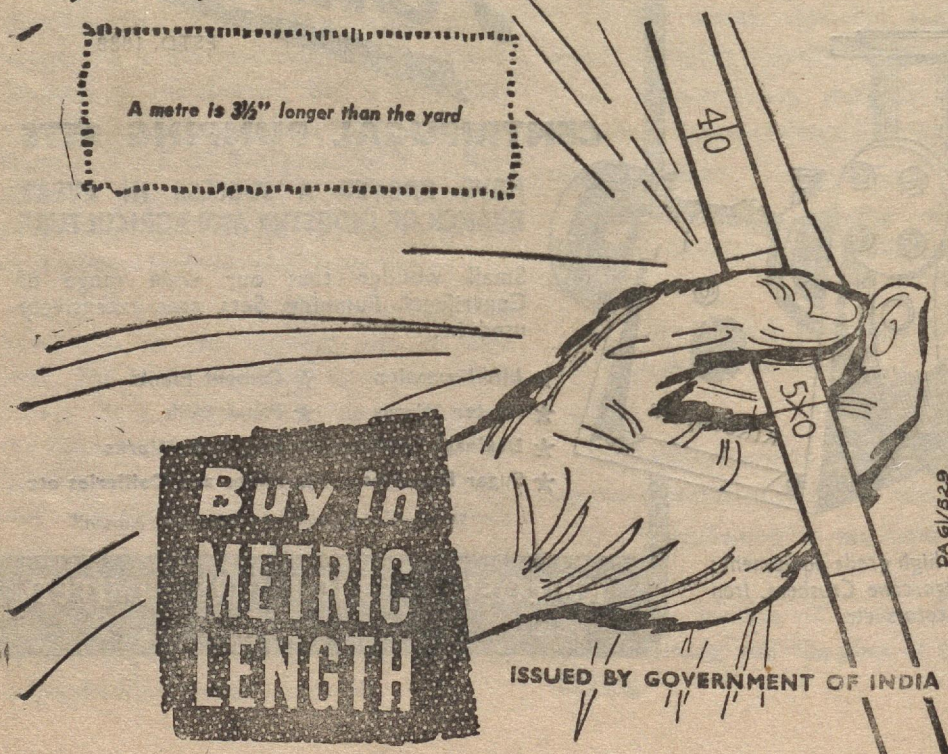


# CHANGE TO METRE

The Metre as a length measure has been brought into use since October 1. In a year's time the yard and the foot and the inch will cease to be legal.

Cloth is already marked in metres; price is also quoted per metre.

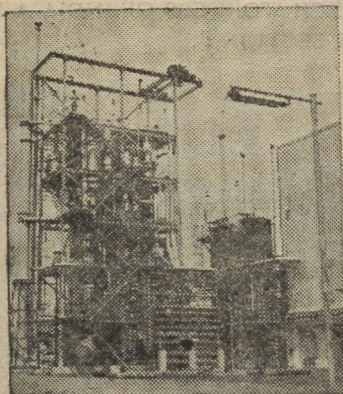
A metre is  $3\frac{1}{2}$ " longer than the yard



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In recent years I.C.I. (India) has been associated with a series of manufacturing schemes of great significance to the nation's economy. In November 1958, the President of India opened the Indian Explosives Ltd. plant at Gomia, Bihar—the country's first commercial blasting explosives factory. I.E.L. is a joint undertaking of I.C.I. and the Government of India.

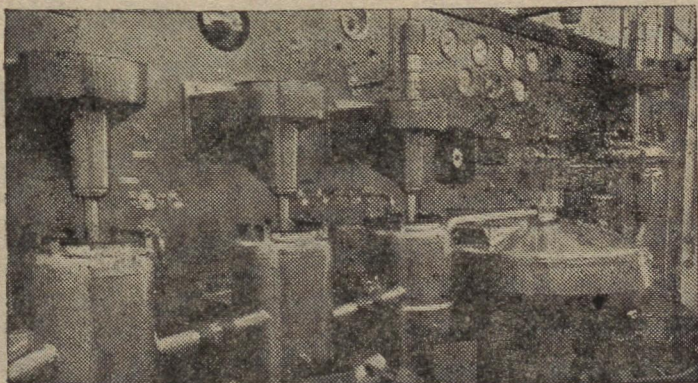
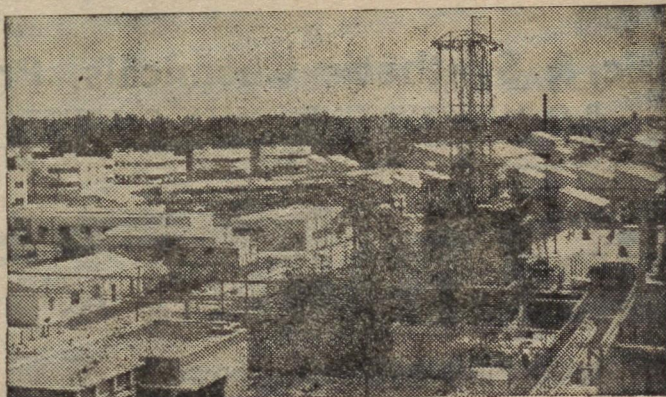
In April 1959, Atic Industries Private Ltd., in which I.C.I. is in partnership with Atul Products Ltd., inaugurated a major extension to their vat dyestuffs factory at Bulsar, Bombay.

A third plant, opened in May 1959, is India's first polythene plant, built at Rishra, West Bengal, by the I.C.I. subsidiary, the Alkali & Chemical Corporation of India Ltd. It cost Rs. 4 crores and will save the country Rs. 1.5 crores every year in foreign exchange.

I.C.I. and its subsidiary, the Alkali & Chemical Corporation of India Ltd. have started erection work on their Rs. 2 crore Rubber Chemical Plant at Rishra, West Bengal, which will save the country Rs. 1 crore foreign exchange annually.

And now, a new I.C.I. Company—Chemicals and Fibres of India Ltd.—has been formed to launch more manufacturing projects. Situated near Bombay, the new Company will manufacture a wide variety of products.

*The Converter  
of the  
Polythene Plant  
with other  
ACCI Plants and  
housing estates  
in the background*



*The Biazzi Plant Panel at IEL, Gomia*



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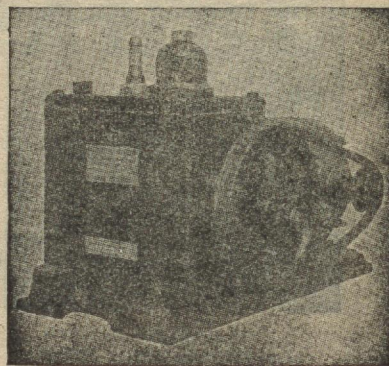
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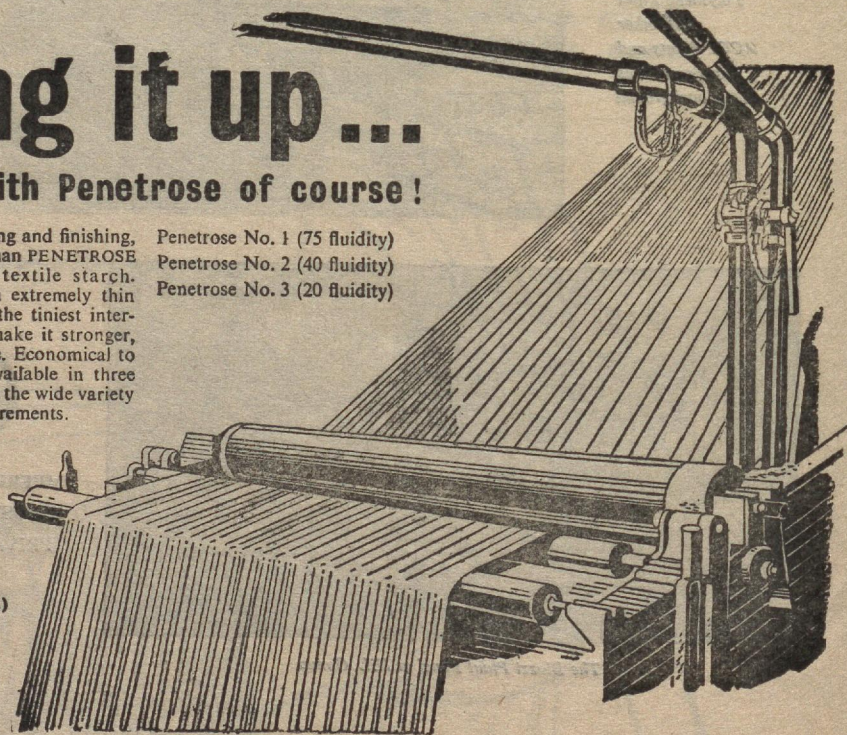
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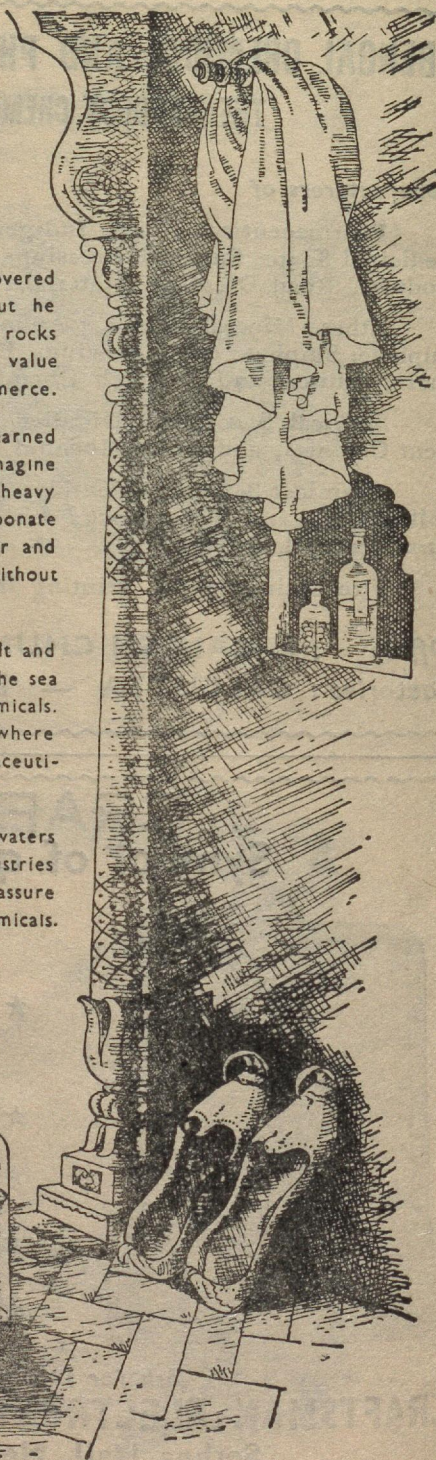
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