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# VIJNAN-KARMEE JOURNAL OF

THE ASSOCIATION OF SCIENTIFIC WORKERS OF INDIA

VCL. VII

May, 1955

No. 5

FOUNDER-PRESIDENT:

PANDIT  
JAWAHARLAL NEHRU.



EDITOR:  
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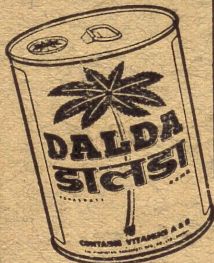
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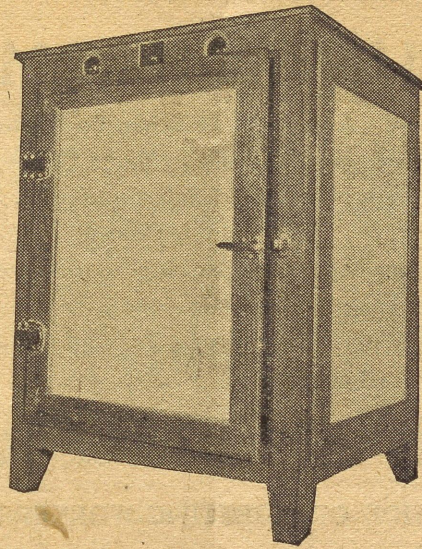
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# VIJNAN-KARMEE

Journal of the Association of Scientific Workers of India  
(Registered under the Indian Trade Union Act, 1926)  
Published monthly : Annual Subscription Rs. 3/- Post free.  
Single Copy : As. 4

1. Popular articles on scientific and technological subjects and on the social and economic problems of scientific workers are invited for publication in Vijnan-Karmee. Vijnan-Karmee offers full scope for discussion of various important issues facing the scientific workers and the society.
2. Communications should be addressed to the General Secretary, Association of Scientific Workers of India, 39 Massey Hall, Y.M.C.A. Jai Singh Road, New Delhi.

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## Pandit Nehru on ASWI

"I consider it a privilege to be associated with the Indian Association of Scientific Workers. Such an Association was urgently needed in India and the Indian Science Congress has given shape to it at the right moment. It is meant to protect these workers and to help them. It is meant also for the advancement of science and the service of the community. I hope that scientific workers all over the country will join this Association and make it an active and vital organisation."

—Jawaharlal Nehru

# विज्ञानकर्मी

## VIJNAN-KARMEE

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Vol. VII ]

May, 1955

[ No. 5

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### The Bandung Conference

The Asian-African Conference held at Bandung from the 18th to 24th April is a milestone on the March of man to better life. Twenty-nine countries participated, and it is significant though they represented different political and economic systems, yet because of their common past experience of merciless exploitation and the common destiny of a brilliant future which they can now build up, brought them to a common understanding of the path they must take. This by no means brought them to a common way of thinking about political and economic matters, but made it clear to them that they must take counsel together and cooperate on the widest possible basis among themselves and all other nations which respect the dignity of man and are agreeable to join in this good work on the basis of equality and mutual benefit.

Those who had come to scoff went away converted. The result was inevitable. All people want to live and lead a cultured life of free development and world forces make it possible today. No matter how much ingrained ways of thinking and pressure politics might have tended to hinder a common solution, the hopefulness of man, his belief in his own capacity to build his own future and the powerful world factors in his favour were bound to break through the obstructions to a common understanding of the necessity of cooperation and the need to live and let live.

The problem of the world is the poverty, misery and backwardness of the three-fourths of the people of the world inhabiting Asia, Africa and

Latin America. This not only prevents these people from making their contribution to a better world but tempts some others to exploit them for their own limited advantage to ultimate injury to themselves and the rest of the world. Today highly developed technical knowledge in industry, agriculture and medicine has been wrested from the greedy grasp of so-called private enterprise and is at the disposal of all under-developed countries for the asking, and so are untapped sources of energy lying all over the world and in the near future unlimited amounts of energy from atomic fission are going to be at the service of all people. Given these factors, very rapid development of the productive resources of all countries is possible, and people are not willing to be denied and will not be denied. Therefore people's representatives met at Bandung and were bound to take notice of the obvious obstacles in the way of the development of their countries.

What are the obstacles ? First and foremost is the question of world peace and security. Not only wars but even alarms of war, cold and near hot, are destructive of creative human effort, and perpetuate human misery and keep people apart when they should be close together in warm human fellowship to tackle the great and difficult tasks of developing productive resources for wiping off poverty and misery from the face of the earth. Asian-African Conference, naturally viewed with deep concern the present state of international tension with its danger of an atomic world war. They resolved to cooperate to bring about reduction of armaments and elimination of nuclear weapons, and settlement of disputes by negotiation.

They clearly saw that freedom and peace are interdependent and almost all wars of last 200 years have been for colonial domination in one form or another. They decried colonialism in any form whatsoever and declared that the right of self-determination must be enjoyed by all peoples and freedom and independence be granted with least possible delay to those who are still dependent peoples. Indeed all nations should have the right to choose their own political and economic systems and their own way of life. They further enjoined that free from distrust and fear and with confidence and goodwill towards each other nations should practise tolerance and live together in peace with one another as good neighbours and develop friendly cooperation on the basis of the now famous five principles, Panch Shila, somewhat enlarged to make their meaning clear.

The Conference very rightly stressed the importance of the economic, the cultural and the scientific cooperation as instruments of positive approach to the building of a better world. They all desired and laid down a number of guiding principles and tasks.

It is economic exploitation which had played havoc with the lives of the people of Asia, Africa and Latin America. This exploitation takes very many forms. Sometimes it even wears the friendly garb of economic aid but in one way or another the peoples of these countries have been kept down as producers of primary commodities for feeding the industries of Western Europe and North America. And even in this field prices of primary commodities are at the mercy of the highly organised industries of those countries which must keep the standard of living of the people low and now and then even bring starvation to them. It was obvious to the nations meeting at Bandung that they should take collective action to stabilise international prices of, and demand for, primary commodities and increasingly process them themselves before sale. They saw the necessity of developing their industrial production, sharing know-how and giving technical aid to each other and developing trade among themselves and others on the basis of equality and mutual benefit. They looked to U.N. economic organs to honestly discharge the function for which they were created, that is the "promotion of the economic and social advancement of all peoples".

The importance of cultural cooperation cannot be over stressed. It is through the arts of music, dance, painting, sculpture, handicrafts and religious thought in the broadest sense of the term that man has advanced to a civilized existence. In this regard the countries of Asia have had very close relations and developed together. Their arts have very close links. To make people aware of their close relationship in past is the surest way of bringing them together again to a warm friendship and mutual cooperation to build anew. The intended sending of cultural delegations and the production of suitable art albums to make people conscious of their common links and the greatness of their art through the ages should prove very fruitful. Even in this sphere Asia has links with Africa of great value.

Scientific and technological cooperation is of paramount importance for the development of Asian and African countries, in fact of the whole world. Science has always been a cooperative effort of all mankind and flourishes at its best only in an atmosphere of the fullest and freest cooperation. In the resolve to share knowledge, to exchange know-how and to afford facilities for training, the Conference is breaking away from deadening influence of secrecy which modern science has begun to practise under the urge to make wars. Our Association and the Associations of Scientific Workers in all Asian and African countries, can play and must play an important part in this sphere. We should organise to publish bulletins to

keep each other informed of the work being done in the different countries and should make arrangements on governmental and non-governmental basis to organise short term and long term visits of scientists and technologists to different countries and plan to put students in the laboratories and plants of different countries.

The decisions taken at Bandung however good are by no means world shaking in themselves but that the free nations of Asia and Africa met together for the first time in the history of mankind and made common resolves is world shaking. The Conference and its decisions will mould world history for the better in the future, specially as it has proposed to meet again. It is certain that these meetings will become periodic. It is also certain that in future Asian and African nations will face the Western and North American nations in a different manner. None of them will any longer feel helpless and isolated, but will have the strength of being a member of a great community of nations who have a common objective and are resolved to build a world with a new climate in which peoples will live and let live, and co-operate to help each other and wars of the western world will have become a sad memory of the past.

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### Albert Einstein

"In the death of Prof. Einstein, the world has lost a great scientist, whose discoveries, if put to proper use, would change the face of the future by assuring plenty and prosperity for all peoples. Einstein was not only a great scientist and humanist but also one who saw science as a mighty social force. He has set an undying example to the scientific community of the world in facing even social and political opprobrium in refusing to put the results of science to wrong social ends. From the time of his fight against Nazism upto his advice to scientists to go to jail instead of testifying before the McCarthy Committee, his life as a scientist was dedicated to countering the forces ranged against social progress."

S. S. Sokhey.

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*Asian Conference***Resolution of the Science Commission**

Resurgent Asia is taking the fruitful course of taking counsel together and planning the future on the basis of self help and co-existence of the various social systems. In this endeavour, the development of science and technology must play a vital role.

A history which has been similar in many ways, has caused a number of problems of national reconstruction in Asia which are distinct from those of the highly developed countries.

It is imperative, therefore, that Asian countries should co-ordinate their efforts in tackling their scientific, technical & engineering problems. Only on the basis of such collaboration and self-help can we develop our countries & make the best use of outside aid.

This co-operation can be given practical shape by collection and distribution of information regarding scientific work being done in the various countries and by arranging short and long-term exchange of the various categories of scientific workers. A Scientific Liaison Committee of representatives of Asian countries should, therefore, be set up to undertake the above mentioned task.

The possibilities of peaceful utilisation of atomic energy have further focussed world attention on this question. In this connection the forthcoming United Nation Conference in Geneva for peaceful application of atomic energy is to be heartily welcomed. It raises the hope that the leading countries will agree to release valuable information about their scientific and technical experience in this field.

To develop this field and to make use of the knowledge made available, the Asian countries shall have the special responsibility of creating an agency of their own for promoting co-operation and co-ordination in this field. By working in close co-operation and developing self-reliance our countries shall be in a position to take the fullest benefit of atomic energy developments, while retaining scientific and economic freedom

A factor of utmost importance in the development of atomic energy

*see overleaf*

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## FOOD PRESERVATION WITH SPECIAL REFERENCE TO TROPICS

V. Subrahmanyam and D. S. Bhatia

(Central Food Technological Research Institute, Mysore.)

Food is a major preoccupation of mankind. Thousands of years ago, our ancestors roamed the wild forests, hunting game and collecting fruits. Man was a food gatherer in those days, not a producer. As time passed on, man felt the necessity of storing foods and discovered that dry foods like seeds, grains and nuts could keep well. It was soon observed that extra meat could be stored after drying the slices in the sun. The art of preserving meat by salting and smoking were also chance discoveries of man.

As human civilization advanced, living became more complex. People began to live together in cities and move from one type of climate to another and the problems of food preservation became more difficult. Human ingenuity steadily overcame the difficulties and new methods of food preservation soon came into existence.

### Why Foods Spoil

The prevention of food spoilage has always been one of the major problems of human civilization. When a plant or animal dies the organic matter involved is broken

down. The common types of food spoilage are caused by changes of a biological nature. This involves changes caused by the growth of micro-organisms, by enzymes and those resulting from autooxidation. Micro-organisms (bacteria, yeasts and molds) destroy

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*continued from page 7*

is free exchange of knowledge about the subject. The existing secrecy regulations hinder the growth and application of this science which can give immense benefits to the world. This secrecy can be removed only if a climate of greater mutual confidence in this vital field is brought about by the banning of atomic and thermo-nuclear weapons.

We demand that atomic, thermo-nuclear and other weapons of mass destruction should be banned and the stocks of these weapons should be dismantled and the nuclear material should be utilised for peaceful developments. This Conference also appeals to the Governments concerned to immediately stop the experimental explosions.

Given a climate of mutual confidence and free exchange of scientific knowledge in all fields, Asian co-operation can undoubtedly lead to rapid reconstruction and development in our countries. This will be a sure guarantee of a lasting peace and of constantly improving social and cultural conditions in the world.

more food than all the other spoilage agents put together. The most active of these organisms and the most difficult to control are the bacteria. Under ordinary atmospheric conditions, the bacteria multiply very rapidly so that a whole new family may grow from a single cell and spoil foods in just a few hours. Mold spoilage is much easier to understand because one can see the velvety patches of mould without the aid of a microscope. Green or blue spots on a loaf of bread, a jar of jam or a piece of over-ripe fruit are all cases of mould spoilage. As the result of microbial action, the carbohydrates, fats and proteins in foods are broken down into simpler compounds. The decomposition of proteins is usually associated with liberation of odoriferous compounds. In addition to these breakdown changes, organisms may synthesize compounds that may alter the flavour and colour of the product. Flavour changes in milk, pigmentation in bread, milk and cheese are examples of such spoilage.

*Changes caused by enzymes:* Enzymes are complex chemical substances existing in all plants and animals which have the power to change the living matter without being affected themselves. When the conditions are favourable, enzymes bring about extensive changes in the colour, flavour and texture of foods. In dehydrated foods wherein the moisture is too low to support microbial growth, enzymes can bring about marked changes in flavour and colour. Fortunately, most of the enzymes are destroyed by heat and can be easily controlled.

*Oxidative changes:* Rancidification of fats, flavour changes in milk, undesirable changes in the dehydrated vegetables and meats are examples of changes brought about by direct oxidation.

### Methods of food preservation.

*I. Dehydration of foods:* Dehydration denotes drying under controlled conditions of temperature and humidity to a specific end point in a given time. The reduced moisture in dehydrated foods does not

support microbial growth. The removal of water can be effected either by using solar energy or in mechanical driers. Sun drying is the cheapest and the most ancient method of drying foods. Sun drying is followed in the production of dried fish, apricots, peaches, pears, figs, raisins and some prunes.

There are several types of driers used for dehydrated foods, the type employed depending to a large extent on the nature of the product to be dried. Among the driers used, mention may be made of i) tunnel drier (continuous operation), ii) cabinet drier (atmospheric or vacuum batch operation), iii) drum drier (single or double-drum, atmospheric or vacuum type) and iv) spray drier.

In order to obtain a dried product of superior quality, the raw products must also be of good quality. Foods to be dried are in most cases subjected to some type of pre-treatment. Vegetables are washed, trimmed, sliced and blanched. Fruits are dipped or sulphured, milk is preheated, meats are cooked and fish is salted or smoked. Sulphur dioxide, which is frequently used for fruit products, helps to maintain an attractive colour, to prevent spoilage and to preserve the nutritive quality.

Well prepared dried foods should be palatable and have a pleasing texture and appearance. The dried product should rehydrate into a product similar in properties to the fresh food.

Several types of storage deterioration may take place in dried foods. Insect infestation is the most common type of dried food spoilage and can be controlled by sanitation and frequent use of fumigants. Colour and flavour changes also take place during storage. Dehydrated foods are often hygroscopic and should be so packaged as to protect them from moisture. Gas packing improves the keeping quality considerably by preventing oxidative changes.

*II. Food Preservation by temperature control* : The activity of the principal spoilage agents, namely the micro-organisms, enzymes and chemical reactions is retarded at low temperatures. If foods are refrigerated at temperatures below 10°F, spoilage by micro-organisms is entirely prevented. Refrigeration at the temperature of commercial cold storage does not stop the deterioration of perishable foods but markedly retards it. As a rule, the lower the temperature, the slower the deterioration.

*Meat* : Refrigeration is necessary at every stage of commercial meat packing. The freshly killed carcasses are taken to the chill room to remove the animal heat after which the meats are held at a temperature of 32-34°F for marketing. Preserved meats such as ham, bacon, smoked meat should be held under refrigeration if they are to be kept for longer than a few days.

*Fish* : Fresh fish should be held at 32-35°F during storage prior to sale. The length of time for which iced fish can be stored without actual spoilage depends on the species of the fish and the condition of fish at the time of icing. Various germicidal substances are incorporated in ice to prolong the life of fresh fish.

*Fruits and Vegetables* : The best temperature for the storage of most fruits and vegetables is 32°F ; the lower the temperature the less the physiological activity of the product. Certain fruits and vegetables namely, bananas, lemons, cucumber, tomato, squash, melon, potato and pineapple do not tolerate temperatures near the freezing point. The fruits and vegetables contain a high percentage of water and hence a relatively high humidity should be maintained in the storage room to prevent loss of water. A relative humidity of 85-90% is generally considered optimum for most fruits and vegetables.

*Gas storage* : It has been found that apples, pears and some other fruits keep much better under refrigeration if held in an atmosphere containing carbon dioxide.

Gas storage increases the storage life of the fruit by reducing the physiological activity or respiration rate of the product.

*Freezing preservation of foods* : Storage of perishable foods at temperatures above freezing is ordinarily employed to keep them for relatively short periods. Frozen foods can be kept satisfactorily at 0°F for at least a year. Freezing preserves the fresh colour, flavour and palatability of foods better than any other method of preservation known to date. Various types of sharp and quick freezers are now available for freezing foods. Fish, meats, dairy products, eggs, fruits and vegetables, fruit juices etc. are among the foods which are available in the frozen condition. Frozen foods must be stored at 0°F or below till the point of consumption. Specially insulated and refrigerated cars and trucks have to be used for transportation. At retail stores, mechanically refrigerated cabinets maintained at a temperature below 5°F should be employed for storage and display.

*III. Preservation of foods in hermetically sealed containers* : The preservation of foods in hermetically sealed containers through the agency of heat sterilization is called canning. Nicholas Appert, a French confectioner and baker, was the first to employ heat and hermetic sealing in the preservation of foods (1804 A.D). Scientific research has now made possible the production of quality canned foods at a reasonable cost. The U.S.A. is the most important food canning country in the world. At the present time, two thirds of the total supply of canned foods is packed in the U.S.A. and more than 300 different types of foods are being canned.

Next to refrigeration, sterilization is the most common method of preservation. It is important to heat the product to a temperature high enough to kill all organisms that can grow in hermetically sealed product. The processing i.e. the time and temperature of heat treatment vary with the product and the size and shape of the

containers. Tin can and glass bottles are the two satisfactory containers for heat processed foods.

Changes in nutrients at the various stages of preparation, processing and storage of canned foods have been studied. These studies have shown that the canned foods are equal, if not superior, in nutritive value to the same foods cooked in any other way.

Hermetic sealing without the aid of heat processing is also done to prevent food spoilage resulting from oxidation. Packing of fatty foods, coffee, dried meats etc. are examples of this method of preservation.

*IV. Food Preservation by the use of micro-organisms:* Lactic fermentation plays an active part in the preservation of many foods. The organic acids produced during fermentation coupled with the preservative action of salt are responsible for the preservation of pickles. The spices and condiments used in pickles also exert their preservative effect. Salt suppresses the proteolytic and pectolytic bacteria and permits certain of lactic bacteria to grow.

Preservation of vegetables by pickling, preparation of cheese and fermented milk products, manufacture of fish sauces, soya sauce etc, are some of the examples of preservation by the use of micro-organisms.

*V. Preservation by use of chemicals:* Long ago man learned to preserve his food by the use of various chemicals. The use of chemicals enables the commercial processor to handle foods in a much more careless manner than would be possible without the use of such chemicals. It is not generally recognised that the use of preservatives will not improve upon the quality of inferior foods.

Preservatives are defined as substances which have antiseptic properties and serve to retard or mask undesirable changes in foods. Many substances such as sugar, salt, nitrates, vinegar, organic fruit acids,

wood smoke and alcohol have become so common in food preservation, that they are not generally regarded as chemical preservatives in the strict sense of the word.

Many chemicals have lately become available to the food processor. Some of these chemicals have been thoroughly tested for their toxicity while others are still under experimentation. Unrestricted and indiscriminate use of chemicals may therefore prove harmful. Some of the important preservatives which are permissible for food preservation are described below.

*Benzoates:* Benzoic acid is the active agent, since sodium and ammonium benzoate must be used in acid medium to be effective. Benzoates are generally used at 0.1% level. Benzoates are more effective against yeasts than against molds.

*Sodium and calcium propionates:* These chemicals are used as mold inhibitors. A number proprietary mixtures containing propionate as the active ingredient are now available. Propionates are finding use in bread, cakes, malt extract, cheese, fruits and vegetables.

*Sulphur dioxide and sulphites:* Sulphur dioxide and sulphites are used principally for the preservation of acid fruits and vegetables. These substances are more effective against molds than yeasts. Sodium sulphite and potassium metabisulphite are the two commonly used salts.

*Antioxidants:* Development of oxidative rancidity in fats and fatty foods can be controlled by incorporating in foods chemicals called antioxidants. Tocopherols, phospholipids, gum guaiac, gallates, butylated hydroxyanisole (B.H.A.) nordihydroguaiaric acid (N. D. C. A.) are some of the important antioxidants being used in fatty foods.

For fruits and vegetables, ascorbic acid and citric acid are used to prevent browning of unprocessed cut fruits and vegetables.

#### Food Preservation in Tropics

High temperature, high humidity of the air and abundance of micro-organisms and insects are factors commonly found in tropics.

pical countries, which make spoilage a more serious problem than in cold climates. Simple methods of food preservation such as drying, salting, pickling and smoking have been practised in tropical countries for a long time. But they are generally less effective than would be in temperate areas. Foods preserved by these methods cannot be regarded as imperishable products and require careful handling and storage. Otherwise, the shelf life of the products will be very unsatisfactory. Most of the methods described earlier, with the exception of freezing, could be employed in tropics. Freezing preservation will be impracticable because the frozen foods have to be transported and distributed under refrigerated conditions and this will be quite an expensive proposition in tropics. If one studies the progress of food preservation in some of the the tropical countries, one finds that more and more interest is being shown in processed foods and the most common methods employed are the canning and dehydration. In the underdeveloped areas where economic levels are generally low, the processed food products are generally considered too expensive. The cost of the container is particularly prohibitive. A careful and scientific study should be made of old and simple methods of food preservation such as drying, salting pickling, etc. Apart from the use of solar energy, mechanical driers can also be fabricated at a relatively low cost for the dehydration of foods. Through scientific research, it should be possible to improve upon the existing methods and the present quality of preserved foods. As

mentioned earlier, dehydrated foods require air-tight and moisture-proof packaging and the problem of finding cheap packaging materials will also have to be studied.

Some interesting methods of fish preservation in tropical countries especially S. E. Asia, have originated from the empirical findings of local population. Though drying or salting are the least expensive and simple methods of preserving fish, dried fish products do not stand well storage in hot and damp tropical climate. People in these areas have, therefore, evolved alternative methods of fish preservation and fish sauces and pastes are two of the important preserved fish products. A number of such products have become popular in S.E. Asia as these products go very well with rice dishes. Sometimes, roasted cereals, glutinous rice, flour and bran are also incorporated in the fish pastes. Fish sauces and pastes afford good means of preservation in regions where rainy weather does not permit sun drying and where sufficient fuel cannot be found for dehydration.

Enzymatic and microbiological processes play important role in the preparation of sauces and pastes and certain bacteria produce typical flavours to which people have become accustomed.

Lately, a lot of interest has been shown in fish flour which is obtained by drying the fish and then powdering it. This powder serves as a cheap protein food and should be a welcome addition to the dietary of the people especially in those countries where the normal diet is generally deficient in protein.

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## THE EFFECTS OF HIGH-YIELD NUCLEAR EXPLOSIONS\*

U.S.A. has carried out a number of tests of nuclear and thermonuclear explosions since the second world war. A curtain of secrecy has been maintained over their effects. From whatever little is known it can be said without hesitation that no protection, save a timely evacuation, could be afforded against the devastating effects of the nuclear bombs.

A nuclear detonation produces four major characteristics, viz. blast, heat, immediate nuclear radiation, and residual radio-activity. Of these, the first three are instantaneous, while the fourth has a more protracted effect. The phenomena of blast, heat and nuclear radiation, in general, remain the same whether it is an atom bomb with 20,000 tons TNT equivalent, one which was detonated on Hiroshima and Nagasaki, or one with many times that power. The intensity and area of blast, heat and nuclear radiation increases in proportion to the increase in the energy yield of the explosion.

From the tests on thermonuclear explosions in Pacific in March 1954 it is known that the fall-out of radioactivity, under certain conditions, may settle over wide areas. 'Fall-out' are particles with residual radioactivity produced on detonation of a nuclear explosion.

### Blast and Heat Effects.

Blast and heat from a nuclear explosion have, relatively, a localised effect. An A-Bomb, of the type exploded on Hiroshima, equivalent to 20,000 Tons of TNT, would produce a blast sufficient to destroy or damage several residences within a radius of more than a mile from the point of burst. Residences within a radius of a mile and a half would be so damaged as to be unusable without repairs. Falling and flying debris and fires due to such causes as broken gas and electric fittings or overturned stoves would form the main hazard. Hence the

effect of blast to human beings would be about the same as the area of damage to the structures.

Heat and burn effects are influenced by the prevailing atmospheric conditions. The time element is also a prime factor. A given quantity of heat from a high yield weapon, delivered over a longer period of time, will produce less severe burns than the same quantity of heat from a nominal detonation.

The effect of blast and heat can be approximately estimated by means of a scaling law, namely the distance at which a given blast intensity is produced varies as the cube root of the yields of the explosions. As is generally known, the shelter afforded by ordinary city buildings would not suffice within a central area, surrounding the point of burst of a large nuclear weapon.

### Effects of Fall-out Radiation.

The immediate nuclear radiation i.e. the neutrons and the gamma rays released instantaneously, does not present a hazard beyond the area where heat and blast are of great concern. All nuclear detonations produce radioactive materials, but the nature and extent of radioactive fallout depends on the condition under which the bomb is fired. In an in-the-air explosion, where the fire ball does not touch the ground, the radioactivity produced in the bomb condenses only on the solid particles of the bomb casing itself and the dust particles which happen to be in the air. These minute substances may settle on the surface over a wide area-probably spreading

\*Adapted from 'A Report By the U.S. Atomic Energy Commission on the Effects of High-yield Nuclear Explosions'.

around the world-over a period of days or even months. However, their descent to the surface of the earth is extremely slow, with the result that by the time they reach the earth, the major portion of their radioactivity is lost harmlessly to the atmosphere, and the residual contamination is widely dispersed.

If the weapon detonates on or close to the surface so that fire ball touches the surface, then large amount of material will be drawn up into the bomb cloud. Many of the drawn particles are heavy enough to descend to the surface before the radioactivity is sufficiently dissipated. The result is a comparatively localised area of extreme radioactive contamination and a much larger area of some hazard. The area of hazard from the fall out is much larger than the areas seriously affected by the heat or blast of the explosion.

The large radioactive cloud of a thermonuclear explosion rises to the highest levels of atmosphere and spreads over hundreds of square miles in the first-hours. The pattern of fallout during this period depends on the velocity and direction of winds including those upto 80,000 feet and above.

#### **Bikini Test.**

The nature of the surface of the earth on which the bomb is detonated must be taken into consideration. Because of these variables it is impossible to apply a single fallout pattern to all thermonuclear detonations. In general, the region of severe fallout contamination can be described as an elongated, cigar-shaped or elliptical area extending down-wind from the point of burst. During a test at Bikini Atoll on 1st March 1954 on a coral island, radioactive fallout was observed in the form of fine particle of slaked lime, which looked like snow, eight hours after the detonation at a distance of about 160 (statute) miles down wind from the point of burst. It continued for several hours thereafter.

The test explosion, at ground surface, contaminated an elliptical shaped area ex-

tending approximately 220 statute miles down wind and varying in width upto 40 miles. In addition there was a contaminated area up wind and cross-wind extending possibly 20 miles from the point of detonation. Some distances further from the point of detonation, at about 160 miles down wind and along the axis of the ellipse, the amount of radio activity would have seriously threatened the lives of about one half of the persons who failed to take protective measures. Near the outer edge of the cigar shaped area, or approximately 190 miles down-wind it is estimated that the level of radioactivity would have been sufficient to have seriously endangered the lives of 5 to 10% of any persons who remained exposed out of doors for the first 36 hours. Thus, about 7000 square miles of territory down-wind from the point of burst was so contaminated that survival might have depended upon prompt evacuation of the area upon taking shelter and other protective measures. It is unlikely that any deaths could have occurred from radioactivity at a distance of 220 miles down wind even if no protective measures were taken for 48 hours.

The above cited facts relate to deaths when no precautionary measures are observed. If the persons in a heavy fallout area heeded warning or notification of an attack and evacuated the area or availed themselves of adequate protective measures the percentage of fatalities would have been greatly reduced, even in the zone of heaviest fall out.

#### **Internal Radiation effect.**

Since the beginning of life on earth, living things have been constantly exposed to radiation from natural radiation e.g. cosmic rays from space etc.

One of the most biologically important radioactive substance in a fallout is strontium-90 which has a life of 30 years. Radio strontium is chemically similar to calcium and hence gets deposited in bones by either inhaling or swallowing. Fallout material deposited directly on edible parts

*see page 20*

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**REPORTS FROM BRANCHES****BANGALORE.**

The Branch continued work on all the incomplete projects of the previous year. The activities of the year under review were mainly confined to the popularisation of science and improvement of scientific research in India.

**AMIE. Classes:** These classes are going on satisfactorily. At present nine persons are attending the classes. All of them have been registered as student members. Three of them would be appearing for the examination in May 1955. Practically all the syllabus has been covered. All this work has been possible due to the active co-operation of seven members of the staff of the Indian Institute of Science.

**Improvement of Scientific Research in India:** Discussion on this subject has been going on for the last three years, and it has been agreed by all that an improvement of this type is urgently required. A note embodying the main points of discussion and also the suggestion for improvement was prepared and sent to the Centre for circulation among the various Branches and Units of the ASWI for a still more detailed examination.

**Popularisation of Science:** One of the major aims of the Association is the popularisation of Science among the masses. The Centre felt that the whole question should be examined afresh. For this, they asked us to prepare a note containing (1) the past efforts of the ASWI to popularise Science, and (2) the future lines of work, and also the forms which this activity can take. For this purpose, a meeting of eminent members and non-members was called by the Branch Executive Committee (B.E.C). The proceedings of this meeting helped us greatly in preparing the required note.

The B.E.C. had also decided to undertake the popularisation of Science by showing scientific films and giving scientific

talks in the villages around Bangalore. A sub-committee was appointed to consider the feasibility of this undertaking. This sub-committee contacted some organisations which were already doing some village uplift work in order to understand the needs of the villages, and also the difficulties one has to face during such work. In view of the busy life of our members, and also the various unavoidable difficulties this work could not be undertaken by us.

The Branch has all along felt that the question of the popularisation of Science is intimately connected with the literacy of our masses. So in our limited sphere and with our limited time and efforts we have started regular night classes for the illiterate employees of the Institute. These classes are being attended by about 23 persons and have been going on quite smoothly for the last two months.

The Branch has received requests from the mechanics, carpenters and workshop people of the Institute for conducting classes to teach them English, Mathematics, Elements of Mechanics etc. The new Executive Committee would consider the feasibility of this project and take concrete steps in this direction.

**Survey on the living conditions of the University Teachers in Bangalore:** During the last two years, the Branch carried out this survey. The analysis of the data collected showed that a University teacher is awfully underpaid and over-worked. The main results of this survey are being released to the press now. A comprehensive report on this survey would be published in Vijnan Karmee very shortly.

**The Branch Newsletter and the Friday meeting :** The Branch continued publishing the Branch Newsletter. However, due to unavoidable circumstances, it was irregular, and now it has stopped completely

because the members who were in charge of it have left Bangalore. The B. E. C. also started informal meetings on every Friday so that members can discuss Association matters. These meetings have been a success.

**Annual Session of the ASWI at Baroda:** Messrs. C.L. Amba Rao and S.M. Ramachandra represented our Branch at the last Annual session of the ASWI at Baroda. These members acquainted the General Body of the Association with the views of our Branch.

**The Questionnaire of the WFSW:** Our Branch co-operated through the Centre with the W.F.S.W. in conducting a survey on the living conditions of Scientific Workers. We got 25 questionnaire of W.F.S.W. filled up by our members belonging to various cadres.

**Popular lectures:** Several popular lectures were held. Thus, Prof. Richard P. Mckeon addressed the members on "Science and Philosophy", Prof. J.D. Bernal on "Recent Advances in Crystallography", Prof. L. Pauling on "Haemoglobin in relation to disease", Prof. T. Watanabe on the "Geological survey of the damage done by the atom bombs on Hiroshima and Nagasaki", and Mr. Radomir Senich on "Science and Scientific Workers of Yugoslavia". These lectures were well attended and greatly appreciated.

**Registration with the Mysore Government:** There was quite a lot of correspondence with the Mysore Government Labour Commissioner. His final reply regarding the registration is awaited now.

**B.E.C. Meeting:** The B.E.C. met seven times during the year. There were a couple of occasions when the B.E.C. meeting had to be postponed for want of quorum. There were some changes in its composition also.

**Membership:** We started with a membership of 87 at the beginning of the year. Ten members left the Branch as they got jobs or scholarships and left Bangalore. Thirteen

new members were admitted. The total membership now is 90.

### NEW EXECUTIVE

The Annual General Body meeting of the Bangalore Branch of the Association of Scientific Workers of India was held on 31st March 1955 with Dr. M.V. Bhatt in the Chair. The following were elected to the various offices:-

President :

Dr. B.V. Raghavendra Rao

Vice-President :

Dr. B.S. Ramakrishna

Dr. R.V. G. Sundara Rao

Secretary :

Dr. A. Bhati

Joint-Secretary :

Dr. S. Dhawan

Treasurer:

Mr. P.S. Gopinathachar

### Members of the Executive Committee :

1. Prof. K.R. Krishnaswami
2. Dr. N.R. Srinivasan
3. Dr. M. Sirsi
4. Dr. A.R. Vasudeva Murthy
5. Dr. M.V. Bhatt
6. Mr. S. Sampath
7. Mr. M.A. Thirunarayana
8. Mr. A.V. Sreenath
9. Mr. S.M. Ramachandra
10. Mr. P. Narasimha Muthy
11. Mr. R.P. Subrahmanyam
12. Mr. B.S. Sathyanarayana
13. Miss. P.V. Padmavathi

## BOMBAY

Much greater activity and better response was shown in the last few months than in the earlier period. The membership which stood at about 60 for the last several years has increased to 90 for 1955.

**Popular Lectures :** On 22-11-54 we had amongst us Prof. N W. Pirie, F. R. S., the well known British Biochemist, and a founder member of the Association of Scientific Workers in England. He spoke on "Responsibility of Scientists in the present day world". In his speech he said that it is the duty of scientists to work for peace and advancement of human comforts. The Indian Scientists have a great role to play in the development of their national resources and the Government should make use of this potential strength.

A month later we had amongst us Prof. J.D.B ernal, F.R.S., another founder-member of the Association of Scientific Workers in England. He was entertained at a tea party by us when our members discussed with him conditions under which the scientists work in England and the status of the Association there. In his speech and in answer to several questions put to him, he pointed out that after several years of patient and determined work, the scientific workers' association in England now enjoys the exclusive right of speaking on behalf of the scientists and it was successful in getting better deals for scientific workers from the Government as well as from private Industries. One important suggestion came from Prof. Bernal, that membership of our Association should be kept open for our future scientists, who are undergraduate students today. Students members have played a great part in making the Association strong in England.

Gen. Sokhey, the President of our Association, gave a talk on his impressions of his recent China tour, on 17.1.55. We gave a reception to the Chinese delegation to the Indian Science Congress held at Baroda. We also gave a tea party to Prof. & Mrs. Pauling on 22.1.55, and in the last month we had an interesting scientific film show 'They see again'; together with a cartoon 'Crimson flower'.

**Baroda Session :** We had sent a dele-

gation to the Annual session held at Baroda. Our members participated actively in all the proceedings of the session. Their work was well appreciated by the General Secretary. Though the above account would mean increased activity we must confess that much remains still to be done. A determined effort is needed to impress upon our fellow workers the value of joint discussions of our common problems and the urgent need for combined efforts for a better deal to Scientific Workers. The members should help actively to popularise science and train people for scientific outlook through our Association.

**Finances :** We have noticed that often the collection of membership subscription is delayed because the unit secretaries do not contact the members in time. It must be remembered that our Association is running a Journal of its own and the centre is finding it very difficult to meet these expenses. We should not, therefore, keep our arrears for long.

In the annual session of our Association an appeal was made for contribution towards V. K. funds and our Branch has promised to collect at least Rs. 100/-. We have already collected Rs. 36/- from the members of the Executive Committee.

**Executive Committee for 1955.**

*President :* Dr. A. R. Gopal-Ayyangar  
*Vice-Presidents :* Dr. R. G. Chitre  
 Dr. G. B. Ramsarma  
*Secretary :* Dr. (Miss) B. M. Branganza  
*Joint-Secretary :* Shri R. M. Adhikari  
*Treasurer :* Shri P. G. Tikekar

The following 13 members were elected as the members of the Committee:—

1. Dr. K. S. Korgaonkar
2. Dr. D. D. Desai
3. Dr. P. V. Chandratreya
4. Dr. D. K. Dastoor
5. Miss Shanta Kelkar
6. Shri L. P. Borkar
7. Shri K. R. Juvale
8. Shri M. K. Habbu
9. Shri R. A. Bellary
10. Shri N. K. Verma
11. Shri A. K. Deb
12. Msis Laul
13. Miss J. S. Kumana,

## Association of Scientific Workers Ordnance Establishments

### KIRKEE

The Association has completed eighth year in its life, a period of considerable importance. Keen activity of the Association during the above period was due to the constant enthusiasm and co-operation of members.

#### Executive Committee:-

The following members of the Executive Committee were elected in the Seventh Annual General Body meeting held on 25-4-54.

Dr. Virkar V. V.	President
Shri Kale V. A.	Vice-President
„ Nagarkar P. P.	Treasurer
„ Murthi H.S N.	Secretary
„ Aswarthanarayana N.H.	Member
„ Mukerjee N.C.	Member
„ Sunduram T. N.	Member
„ Tekade P. V.	Member
„ Deshmukh V.R.H.	Member

#### Two Honorary Auditors:-

Shri L. G. Rairikar  
Shri A. S. Deshpande

The following members were co-opted on the Executive Committee:

Shri S. B. Bhagali,  
„ A.K. Joshi  
„ Narayanan R.  
„ N. B. Ingalkaonkar  
„ R. R. Jeppu

During the year Shri V. P. Pundlik and Shri T. R. Chadda were coopted to fill in the vacancies caused by the resignations of Shri R. R. Jeppu and Shri V.R.H. Deshmukh.

Membership during 1954-55 from the four Establishments is 273.

Considerable effort was made to collect arrears of subscription from members, but much remains to be done to keep the membership falling out in arrears,

#### Working Committee of the T.D.E. (M.E.), Kirkee:

Shri T. R. Chadda and Shri S.B. Bhagali candidates of the Association were elected to the 2 seats in the 'Scientific Staff' Constituency of the Works Committee of the Establishment. Shri T. R. Chadda was further elected unanimously as Vice-Chairman of the Works Committee. Local problems are being dealt with by the Works Committee.

The following Sub-Committees were appointed by the Executive Committee during the year.

(1) *Bulletin Sub-Committee:-* With Shri H. S. N. Murthi as the Editor, two regular issues of the Bulletin were published in the first half of the year. In the latter half of the year, some how it was not possible to issue any bulletin. Bulletin mainly contained the activities of the Association and news about the sister trade unions.

(2) *Sub-Committee on the unemployment of scientific and technical personnel:-* The Sub-Committee was appointed to survey the conditions of unemployment and underemployment of Scientific and Technical personnel, employment of foreign technicians in the four Ordnance Establishments at Kirkee and unemployment of the same personnel in general in the Poona District. The report was submitted by the Executive to the Convention of the Calcutta Branch of the Association of Scientific Workers of India on the same subject held at Calcutta on the 18th and 19th December 1954.

(3) *Economic Survey Sub-Committee:-* The Sub-Committee appointed on 2-10-53 could not function early. The main task of the Sub-Committee is to get the Questionnaire of the World Federation of Scientific Workers on the living and working conditions of Scientific Workers filled in by members and others,

### Baroda Session of the A. S. W. I.

Shri H.S.N. Murthi attended the Council and General Body meeting of the A.S.W.I in the first week of Jan., 1955. Two delegates from the Kanpur Scientific Workers' Association, Sarvashri M. R. Raman and Varma, were also present, but there was no delegate from the Khamaria A.S.W. Ordnance Establishments.

The 'Ordnance Section' on the Central Executive Committee of the A.S.W.I. has been formed and Shri M.R. Raman from the SWA, Kanpur, would represent the three Ordnance Scientific Workers at Kirkee, Kanpur and Khamaria in 1955. On matters of importance the Secretary of the Khamaria and Kirkee Association would be invited to attend the CEC meeting of the ASWI in order that there should be no difference of opinion in the proposal put forward by the three Associations on problems of general interest.

The Agenda for the deputation to the Defence Minister, was finalised with the co-operation of the delegates from the Kanpur Association. Some points of difference in the representations of the Kikree and Kanpur Associations were discussed and decisions agreeable to both the Associations were arrived at.

### Collective Bargaining :

The life-blood of the Association is in its function as a Trade Union. Collective bargaining has been emphasised. Several representations were put up and recommendations on the existing policies of the Government were sent to the Government Authorities. Replies from the local authorities were fairly quick; while with the Directorates and the Ministry of Defence, considerable delay used to occur.

A 14 point memorandum on the working and living conditions of Scientific workers in the Ordnance Establishments was submitted to the Ministry of Defence. Subjects on which representations were made in-

clude, among others, working hours in the T.D.Es., cases of supersessions, promotions and confirmation of Scientific workers, Provident Fund and All India Liability allowance to employees. Many of the representations are still being pursued while some have been totally rejected and some others accepted. The Association while appreciating certain actions of the Government in respect of their demands and recommendations generally feels that the Government should give prompt consideration and careful thought to their representations.

The following representations are pending with the Association of Scientific Workers of India. The ASWI is trying to take necessary action as suggested by the Ordnance Scientific Workers Associations.

- (1) The Confidential Reports system in the Defence Ministry
- (2) Provision for Observers of the Association on the Department Promotion Committees under the Ministry.

These two points are being taken up by the Central Executive Committee of the A.S.W.I. to approach the Ministry of Home Affairs since the systems mentioned exist in all the Ministries of the Government of India.

In addition, the Executive of the Association has approached the Government at all levels in the Defence Department, to obtain clarification of rules/procedures affecting the working and living conditions of Scientific Workers.

### Deputation to the Defence Minister :

A deputation to the Defence Minister headed by Major General Sokhey will try to impress upon the Government the reasonableness of some of our demands which have not been favourably considered. It is believed that the Government will appreciate our approach to solve our problems in the most reasonable manner in the Deputation.

### IZATNAGAR

The Izatnagar Unit of the Association was founded on 1st February 1952 with a skeleton strength of ten members. This Unit has now completed about three years of existence.

During the course of the year, Shri Tandon resigned from the Treasurership and was replaced by Shri Brahm Dutt.

During the year under report talks were organised on following subjects:-

1. Preparation of silages,
2. Modern Pharmaceutical Processes,
3. Bee keeping,
4. Growth of the Science of Nutrition.

A sub-committee consisting of Drs. Sawhney, Mathur and Gajjan Singh with Dr. Sawhney as convener was formed for sending reports etc, for publication in the Vijnan-Karmee.

Drs. Kehar and Sawhney were nominated

by this unit for filling the vacancies on the Central Executive Committee for the year 1955.

The meetings as usual at almost monthly intervals were held at the residence of its members by rotation.

The number of the members at the close of the year was twenty six.

The following office-bearers were elected at the Annual Meeting held on 22nd April 1955.

Dr. N.D.Kehar	President
Dr. K.Sahai	Vice-President
Shri Brahm Dutt	Secretary
Dr. P.C. Sawhney	Joint-Secretary
Shri P.N.Johri	Treasurer
Dr. V.N.Murty	Auditor

At the Annual Meeting the Secretary and the Treasurer presented the reports for the year 1954.

### KANPUR

The following have been elected as office bearers of the Association of Scientific Workers (Indian Ordnance Service) Kanpur at the 8th Annual General Body Meeting held on 6th March 1955:-

1. Shri H.R. Ghai      President
2. Shri M.R. Raman    Vice-President
3. Shri S.M. Dandekar    General Secretary
4. Shri B.L. Aggarwal    Treasurer

### KIREEE

The following have been elected as office bearers of the Association of Scientific Workers (Ordnance Establishments) KIR-KEE for the year 1955-56 :-

Shri B.W Sohoni	President
Shri S.Shankar Rao	Vice-President
Shri D.R. Thakoor	Treasurer
Shri H.S.N. Murthi	Secretary

*continued from page 14*

of plants may be eaten along with the plants. Washing the plants before they are eaten, however, would remove most of this radioactive material. Radio strontium can also reach the body through the plants which incorporated it in their tissues through the soil on which radio strontium has fallen along with rains. The results of careful measurements of the distribution of radio strontium over the earth's surface in any form, show that its amount, now present in the soil as a result of nuclear explosions to date, would have to be increased many thousand times before any effect on life is noticed.

The next important fission product, biologically, is radio iodine-131 with an average life of 11.5 days. Scientists of the U. S. Atomic Energy Commission have estimated that the danger from exposure to radio iodine in the fallout from all tests in spring 1954 is negligible.

#### Genetic Effects.

The total amount of radiation from all nuclear detonations to date received in U.S.A, is about 1/100 of average radiation exposure received from natural causes by a person during his or her reproductive life time. It is about the same as received in one chest exposure for the X-Ray.

## ROUND THE STATES

## THE BANGALORE DIARY

In the sudden death of Albert Einstein, the world of science and humanity has lost a great philosopher-scientist, who commanded world-wide love, and affection and unique fame and honour. The loss is truly irreparable. The Bangalore branch of the Association of Scientific Workers of India immediately arranged two condolence meetings one at the Indian Institute of Science and the other at the Raman Research Institute. In the first meeting Professor M.S. Thacker, Director, Indian Institute of Science spoke about the great human qualities which made Einstein's name a byword. He described how Einstein's heart beat for the suffering humanity. In the other lecture Dr. C. V. Raman dealt principally on the scientific work and everlasting contributions of Albert Einstein to the advancement of knowledge. Dr. Raman related the amazing fact as to how the earlier life of Einstein when he was an Examiner of Patents in Bern between 1902 and 1909, was the most productive from the point of view of his scientific contributions. In these years Einstein discovered mass-energy relationship, relativity principle and other significant things. He described these years as "Annus mirabilis" or the wonderful years, when his best work was done in a humble capacity amidst poverty and adversity totally unfavourable to achievement. Never has there been such a remarkable flowering of human genius directed to such constructive achievement. Indeed he was also a great humanist and the world is all the poorer for his loss; it may perhaps be another millennium before another man can rise in space to the stature of Einstein whose spiritual form shall ever shine across the mist of time. The Association sent a condolence message to the nearest of kith to Albert Einstein. May his soul rest in peace. May his name ever remain before scientists as an inspiration for constructive and concrete human endeavour.

The famous Australian nuclear scientist

Dr. Marcus Oliphant whose expected visit to Bangalore was mentioned in the last newsletter, delivered one of the Rutherford memorial lectures in Bangalore. To an eager audience at the Town Hall, Dr. Oliphant, in an extempore and elegant exposition, immaculate and flowery in language, described the life and times of Lord Rutherford. Dr. Oliphant is one of the distinguished disciples of Rutherford. Rutherford by his pioneering work on the structure of the atom can be rightly called the father of the modern atomic age. Dr. Oliphant gave several anecdotes regarding Rutherford's experimental skill, intuitive ability and mastery of his grasp of the atomic world. On the personal side he narrated several incidents also. Dr. Oliphant also gave a technical lecture on the design and construction of accelerating machines which was of a thought provoking nature.

Among interesting technical meetings held during the month, first mention should go to the Symposium on Vitamins organised by the Society of Biological Chemists, India in conjunction with sister scientific organizations in South India. The society had been conducting regular annual symposia and is to be complimented on its businesslike conduct and the efficient discharge of its duties. The symposium on vitamins in which several delegates from different parts of India participated and where over 50 papers were read focussed attention on recent advances in vitamin research in India with special reference to nutrition, biology and medicine. There was a general lecture on aspects of vitamins and also screening of some films. Though the Association of Scientific Workers was not concerned directly with it, it was interesting to note that some members of the association had come for the meeting from distant parts of North India evinced a keen interest in trying to meet their counterparts in this

part of the country. Incidentally this writer used the opportunity of this symposium to bring home to the delegates the objectives of the association and its achievements specially in down South. In this connection the Bangalore branch had conducted a survey of the economic and other conditions of teachers in the University of Mysore. The details are to be published in these columns very shortly but a short summary was released to the press in the south. It is learnt on good authority that this press note has already reached the Vice-Chancellor's table which is sufficient proof for the

sanctity with which this pronouncement has been looked upon by the authorities in Mysore. There was much talk about the betterment of the scales of pay of the scientific staff in scientific and technical institutions at the annual meeting of the Association of Principals of Technical Institutions of India held here. The meeting discussed various other things as well. Lastly there was also a meeting of the Institute of Business Management which falls within the scope of employers and not of employees.  
Bangalore 2 } N. R. SRINIVASAN  
April 28, 1955 }

### LUCKNOW DIARY

*Radioactive dust over Allahabad:* Sensational news was created by the press announcement of the detection of radio activity in the atmospheric dust over Allahabad. At question time in the State Assembly there was an excited discussion on this. Official denial by the Chief Minister has put the lid on this news item.

*Identification Experts Conference:* Lucknow was the venue of the third Identification Experts Conference towards the last week of March. Representatives from various state Governments and Scientists in charge of State Forensic Laboratories attended the three day conference and discussed methods of incorporating modern scientific methods for quick and efficient crime detection. The U.P. State C.I.D. Laboratory had put up a very interesting exhibition in connection with the Conference. The exhibits included the use of photoelectric colorimetry and paper chromatography for identification of inks used for forgery etc. About 30 resolutions were passed by the conference which included the recommendation of the creation of a post-graduate course in Criminology in

some Universities and the creation of a Central Forensic Laboratory.

*Foreign experts and foreign influence on research:* The controversy on the methodology of social research adopted by various American sponsored agencies in the State has assumed an added significance with the release of a statement by Dr. D.P. Mukerji who has condemned in no unequivocal terms certain Indian research workers for their readiness to compromise their integrity and also the national prestige by accepting lucrative offers from foreign agencies.

*The Atoms for peace exhibit:* This exhibit sponsored by the U.S.I.S. was open to the public of Lucknow for three day and attracted a fairly good sized crowd.

*Activities of the Branch:* The branch members have been quite busy collecting donation for the V.K.Fund and also enrolment of fresh members. The position upto-date was reviewed in a meeting of the Branch Executive held on the 22nd April. It was decided to hold the Annual meeting on the 10th May.

## MADRAS DIARY

On 20th April, the Indian mathematical world lost one of its most brilliant gems in the death of Dr. T. VIJAYARAGHAVAN, former Director of the Ramanujam Institute of Mathematics. He will be long remembered not only for his permanent contributions to the Analytical theory of Numbers but also for his warm and friendly personality, his erudition and scholarship in Sanskrit and Tamil, his cultural manners. Scientific workers of Madras paid fitting tributes to his memory at a special condolence meeting.

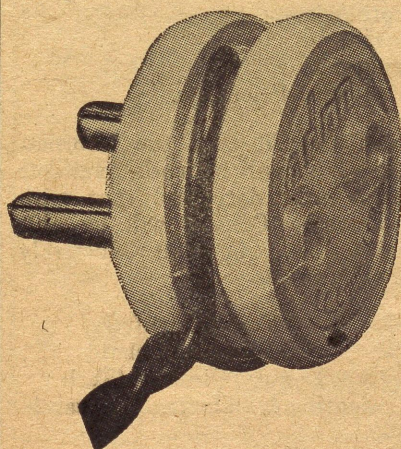
The public of Madras were treated to two technical exhibitions in the course of this month, that were both informative and interesting. One was organised on Air Force Day, 1st April, by the I.A.F. Apart from the usual air display, the public were also allowed to see airplanes and airplane mechanisms at close quarters. Members of the Indian Air Force are to be congratulated on the manner in which the display was conducted. Another exhibition was organised between the 6th and 17th by the Phillips Electrical Company in celebration of the 25th anniversary of their establishment in

India. There were many interesting items relating to the fields of electricity, radio and illumination but the star attraction was undoubtedly the television transmitter and receiver which were on display. This was the first time that closed-circuit television was exhibited in India and the long queues outside the exhibition attested to the great interest and science-mindedness of the public of Madras.

On 28th March, Madras played host to Railway Engineers from all over India when they came here to attend the Annual General Meeting of the Institution of Locomotive Engineers (Indian and Eastern Centre). Presided over by Mr. T.A. Joseph, General Manager of the Southern Railway, the Conference was marked by dignity and earnestness. The presence of engineers from the Telco and Chittaranjan factories underlined the progress being made in the production of Indian-made locomotives. For the ensuing year, Mr. A.G.L. Peyton, Chief Mechanical Engineer, Western Railway was elected President and Mr. C.H. De Souza, Engineering Consultant, Bombay as Honorary Secretary.

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## National Register of Scientific & Technical Personnel.

We are reproducing below copy of a letter received by us from the CSIR regarding the compilation of a National Register of Scientific and Technical Personnel in India. Those who have not already sent in their details may ask for the printed questionnaire direct from CSIR and return it to them duly filled in.

Dear Sir,

You are perhaps aware that in pursuance of the recommendations of the Scientific Manpower Committee, the Council of Scientific & Industrial Research has been entrusted with the task of compiling a National Register of Scientific and Technical Personnel in India. The object of this undertaking is to assess the existing scientific manpower in the context of the requirements of the country.

Ever since this assignment was made, the stock-taking of qualified personnel has been in progress by establishing contacts with various scientific & technical institutes, organisations, as also individuals. On the basis of data collected so far, three volumes in several parts consisting of engineers, medical personnel and scientists & technologists have been published. Nevertheless, the data being of a fluid and progressively changing nature, this 'Register' has its own limitations in presenting a complete and up-to-date survey of available scientific and technical capital of the country at all times.

The Prime Minister has further desired that steps should also be taken to keep full records of Indian Scientists trained abroad or in India, particularly those who are unemployed or are working outside India. In order to attain this objective the Council has initiated a follow-up programme with a view to keeping in touch with trained persons specially who are out of employment. In the first instance, it is proposed to collect information about such scientific men as possess the minimum of a Master's degree or its equivalent in pure or applied sciences and Bachelor's degree in engineering, medicine and technolo-

gy; the scope may be extended later to include wider generalisations. Your co-operation is, therefore, requested in (i) assisting this office by providing lists, including present and permanent addresses of your members, and (2) giving this appeal wide publicity through the publications of your organization.

Since an additional part of Volume III (Scientists and Technologists) is now under compilation, it is requested that necessary information from such scientists and technologists, as have not furnished the required information earlier be kindly made available. This part also, like the previous two parts, may cover the following categories.

1. Chemists and Chemical Technologists.
2. Pharmacists.
3. Physicists and Applied Physicists.
4. Mathematicians and Statisticians.
5. Botanists.
6. Zoologists.
7. Biologists.
8. Meteorologists.
9. Geologists
10. Metallurgists
- and 11. Agricultural Scientists.

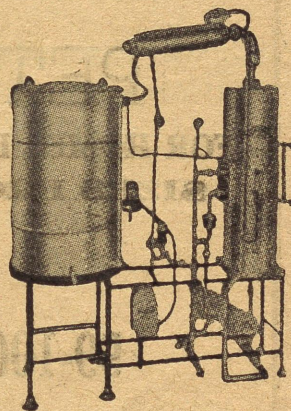
It is earnestly hoped that the information requested above will be made available to this office at early date and that with your collaboration the Council will be able to proceed with this assignment effectively in the national interests.

Yours faithfully,  
(D. Padmanabhan)  
Deputy Director (Tech.)  
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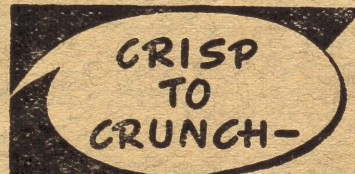
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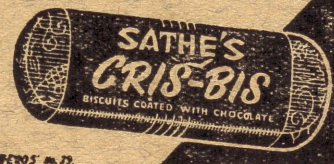
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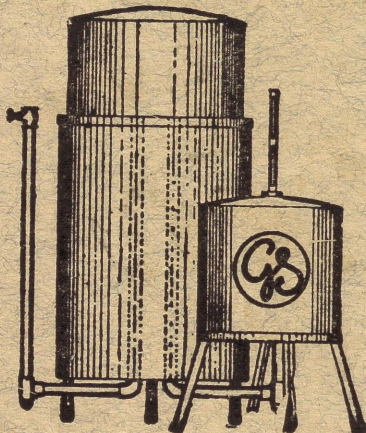
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JOURNAL

OF

THE ASSOCIATION OF SCIENTIFIC WORKERS OF INDIA

VOL. VIII

June. 1955

No. 6

*Founder-President*

Jawahar Lal Nehru



*Editor*

Narendra Singh

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Survey of living conditions of University Teachers in Bangalore

Development of Water Resources and the Contribution by C. W. & P. C.

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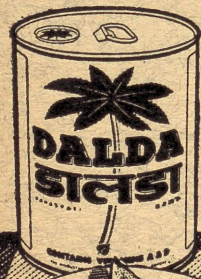
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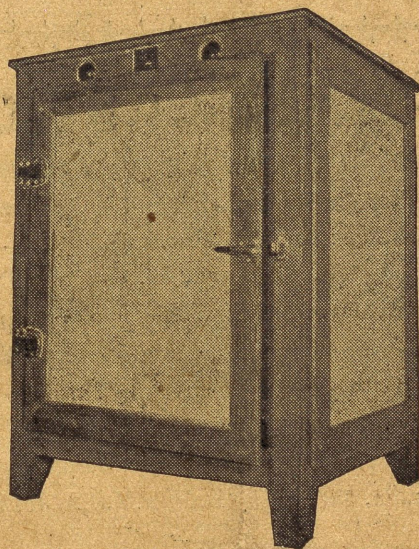


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### Pandit Nehru on ASWI

"I consider it a privilege to be associated with the Indian Association of Scientific Workers. Such an Association was urgently needed in India and the Indian Science Congress has given shape to it at the right moment. It is meant to protect these workers and to help them. It is meant also for the advancement of science and the service of the community. I hope that scientific workers all over the country will join this Association and make it an active and vital organisation."

—Jawaharlal Nehru

# विज्ञानकर्मी

## VIJNAN-KARMEE

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Vol. VIII ]

June, 1955

[ No. 6

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### The Plan Frame

The draft plan frame for the Second Five year Plan is currently being discussed at different levels throughout the country. Enough material is now to hand regarding the provisional pattern of the Second Plan, made available by the Memorandum submitted by the Panel of Economists to the Planning Commission, draft recommendations of Prof. Mahalonobis on the formulation of the Second Plan and the tentative frame work prepared by the Economic divisions of the Planning Commission and Ministry of Finance in collaboration with CSO and ISI.

All the three papers are in general agreement in so far as the broad objectives of the Second Plan are concerned viz a sizeable increase in national income, rapid industrialisation, fuller employment and social justice. These documents place the aim of the Second Plan at a 5 percent annual increase in national income and progressive increase in employment for at least 9 to 10 millions. They emphasize greater industrialisation in the Second Plan period and ask for the extension of the activities in Public Sector in conformity with the 1948 Industrial Policy resolution in order to achieve the declared objective of a socialistic pattern of society within the democratic framework. The net investment proposed is of the order of Rs. 5,600 crores—Rs. 3,400 crores in the public Sector and Rs. 2,200 crores in the private Sector. The National Development Council has given its provisional approval for the general approach and the objectives subject to a fuller discussion at a later stage.

While discussing the question relating to the Second Plan it is necessary and desirable to review the targets laid down in First Plan and the progress made so far. The targets in the First Plan were deliberately kept low because of the dislocated condition of the economy at that time due to war, partition and inflationary pressure. Even these modest targets have not been fully achieved on account of enormous delay in the preparation of the projects, lack of integrated approach to the problem, inflexible nature of the plan, ineffective administrative machinery insufficient training facilities for the technical personnel to man the projects and last but not the least, lack of enthusiasm in the people to participate in the implementation of the Plan. In spite of these factors operating in the execution of the plan, the progress has not been quite unsatisfactory and in certain fields we have surpassed even the targets especially in agricultural production. However, there are certain disturbing factors evident in the present day economy. Strangely enough, in the field in which we surpassed the targets viz agriculture, it is disturbing to note that the prices are continually declining. The additional achievement in the field could not be built into the economy and the commodity surpluses are accumulating leading to enormous fall in the prices in agriculture. The Plan could not produce the employment potential to the extent anticipated by the Planners. This has been recognised by the Planning Commission itself and it had to expand the net investment in the First Plan period by about 175 crores in the Third year of the Plan. Unemployment especially in urban areas is mounting day by day. Every year about 1.8 million persons are joining the unemployed labour force. Further, chronic under-employment exists in the rural areas. There is huge idle man power and the nation has large resources of unutilised water for hydro electric power, irrigation, ironore, coal, forests and fertile land.

In these circumstances we are now embarking on a Second Plan. We have accepted that the economic development of the country should be on a socialistic pattern. For achieving this objective the available resources in the country should be fully utilised and the plan should be 'bold', bold in the sense not only of size but of the scope and the function of the public sector. Development of heavy and basic industries should be the primary objective if we want to be economically independent. The future development will rest on the heavy industries like production of coal, electricity, steel etc. which will lead to quicker capital formation. At the same time, attention should be paid to the increase in the production of consumer goods through household and hand industries which will provide employment for our rural masses. Factory production of consumers goods should also be planned as a supplement to hand made goods.

The increase in the production of these goods should naturally have adequate market for further growth. Hence, they look towards agriculture which provides employment for about 70% of the population in the country. To accelerate a balanced development of the economy and make it 'Self propelling', agriculture and industry should go hand in hand each contributing for the development of the other. The increase in purchasing power of the rural people should be the objective for developing an adequate market for the goods that flow from the industries envisaged in the Second Plan. Hence the need for increasing the protectivity in agriculture, speeding up agrarian reforms accompanied by equitable distribution of land to cultivators which stimulates agricultural production and increases the purchasing power in the rural hands.

A bold plan will require an increasing technical and scientific personnel to prepare and implement the projects. Training facilities should be expanded to produce more and more technical workers. Scientific research should be undertaken in our national laboratories, Universities and Scientific institutes in accordance with the immediate national needs. Fundamental research has also to be encouraged to provide skill and knowledge for our heavy industries. Lack of administrative machinery was the principal factor responsible for the slow progress in the first plan and greater attention should be paid for this requirement in the second plan.

The A S W I which is fortunate in having Scientists, Engineers, Technologists, Economists and Statisticians in its fold, has got to play an important role in the planned development of the country not only in educating and making people plan minded but by actively participating at every stage of the Plan viz formulation, preparation, examination, implementation and evaluation of the Plan. In this connection, we welcome the suggestion of Prof Mahalanobis for "the establishment of technical organisation (consisting of economists, satisfactions, scientists, Engineers, technologists and administrators) within the Planning Commission for the preparation and continuing examination of the national plan and for working out the various balances relating to it" We feel strongly that this is an essential requirement for Scientific planning.

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## SURVEY OF LIVING CONDITIONS OF UNIVERSITY TEACHERS IN BANGALORE

### Introduction

A substantial proportion of our Scientific workers is derived from the Universities. Universities also absorb a considerable number of Scientific workers as teachers and research personnel. Thus, the conditions of living and work of University Teachers are of direct interest to the Association of Scientific Workers of India, since this organisation works for the effective utilization of Science and Scientific manpower for the progress of our country. In furtherance of this general aim, the Bangalore Branch undertook a survey of the economic conditions of the Mysore University Teachers in Bangalore. In October 1953, a questionnaire was prepared by the Branch and distributed among the teaching staff of five local colleges. Some 150 teachers were covered by the survey. Out of the five colleges, two were Government Institutions and three privately owned. A more comprehensive coverage would have been desirable but the resources of the Branch did not permit this. However, the seventy-five completed forms which were received back showed a remarkable similarity on practically all the major questions. Thus, the findings of the survey presented here appear to be quite representative of the status of the University Teacher in Bangalore.

### Method of Survey and Analysis :

The questionnaire consisted of twenty-three main questions with sub-sections broadly covering the economic, professional and recreational aspects of a Teacher's life. The forms were distributed to Professors, Assistant Professors and Lecturers in the various colleges. The 75 completed forms received back were from one Professor, four Assistant Professors and seventy lecturers. Thus, the results of this survey may be

taken to apply in the main to Lecturers who form the bulk of the teachers in the University. In the analysis of the economic data the chief interest was centered on the monthly income and expenses of the average teacher. In the expense account for his family (or dependents) the distribution of the expenditure on various items would show the proportion of his salary spent on the necessities of life. The monthly surplus or deficit with consequent savings or debts would afford an idea of the general financial position of the Teacher. This has a bearing on his sense of security and social position. Since many lecturers live under a joint family system, the joint family was treated as a unit. The income was thus computed from the contribution of the earning members and the expenses spread over the whole family. This procedure had to be modified to allow for certain peculiar cases. For example, a lecturer might contribute his salary of Rs. 200/- p.m. to the joint family expenses. The total income of the unit may, however, come to Rs. 1,500/- if some of the other earning members were extraordinarily well placed in life. In such a case, neither the total income nor the total expenses would be a true reflection of the lecturer's economic condition. In the present survey, such abnormal cases were few, being only four out of the twenty two persons with a surplus monthly balance and six out of fifty three with deficit budgets. In arriving at the average figures, no weightage has been given to these anomalous cases.

### General Data on Teachers :

Table I gives some general information about the 75 Teachers who answered the survey questionnaire. It shows that the cross-section covered is broadly representative as regards age groups, marital status, teaching experience and salary bracket. Table I also shows that the average lecturer

is married, has four dependents, is fairly young and has a teaching experience of 5-1/2 years.

### Economic Conditions :

The monthly expense account of an average lecturer and his family of four

dependents is shown in Table II. It will be immediately noticed that Table II shows a monthly deficit of Rs. 38/-. Answers to the questionnaire showed that actually 70% of the lecturers had deficit budgets, the average deficit for these 70% being Rs. 54-6-0. The remaining 30% of the

### Table I

AGE	Teachers above 30 years Max.=(59)	...	24	} Average =29 years
	Teachers below 30 years (Min.=22)	...	51	
MARITALS	Married Teachers	...	55	}
STATES	Unmarried ,,	...	20	
ACADEMIC QUALIFICATIONS	B. Sc. (Hons.) or B.A. (Hons.)	...	35	}
	M.Sc. or M.A.	...	39	
	DSc.	...	1	
TEACHING EXPERIENCE	Above 10 years	...	12	} Average 5½ years
	Between 5—10 years	...	24	
	„ 2—5 years	...	24	
	Below 2 years	...	15	
SALARY INCLUSIVE OF ALL ALLOWANCES	Number between Rs. 100-Rs. 150	...	32	} Average Rs.192/
	„ „ Rs. 150-Rs. 200	...	23	
	„ „ Rs. 200-Rs. 250	...	14	
	„ „ Rs. 250-Rs. 300	...	2	
	„ „ Rs. 300-Rs. 350	...	3	
	Above Rs. 350.	...	1	
No. OF DEPENDENTS	Number who have 4 or more (Max.9)	...	33	} Average 4 dependents.
	No. who have between 1-4	...	37	
	No. who have no dependents	...	5	



lecturers had a small average surplus of Rs. 18/- giving an average deficit of Rs. 38/- for all the 75. That a lecturer is most likely to have a deficit at the end of the month is substantiated by the fact that only 50% of the lecturers had the extra income from examinerships indicated in Table II. This income is uncertain even for the 50% who have it. The expense account shows further that over 73% of the average lecturer's income goes for the two items of food and rent. If food, rent, clothes and shoes, medical care and education of children be taken as the bare necessities of life, then these items account for more than 93% of the income. In this the largest single item is food, accounting for 55% of the total monthly expenditure. Even then, the diet of the lecturer and his family is inadequate. The calorific value of the items listed in Table II works out to be a little over 1900 calories per person per

day. This computation is based on the food prices prevailing at the time of the survey and as per the International Food Composition Tables prepared by the United Nations. The scientifically prescribed diet for a sedentary worker should not be less 2500 calories per day. Other items to be noted in Table II are the extremely small amounts which a lecturer can afford to spend on books and newspapers and the fact that repayment of loans is a regular feature of his budget. The cost of a daily newspaper is at least Rs. 2/- per month so that only Rs. 2-8-0 are left for the lecturer to invest on new books and journals, lack of which has a direct bearing on the professional efficiency and knowledge of a well-informed Teacher. The unsatisfactory economic position is brought out in further relief by other details of the accumulated debts contained in Table III.

Table III

No. with accumulated debts	...	...	...	...	60%
"    "    between Rs. 100—Rs. 500	...	...	...	...	53%
"    "    over Rs. 500	...	...	...	...	22%
No. who do not subscribe to Provident Fund or Insurance	...	...	...	...	30%

We notice that a considerable proportion of the lecturers had accumulated debts which they are unable to clear. The economic distress is really acute since a fairly large number cannot even afford to provide for their old age. The demoralising psychological effects of such a state on the teacher are obvious.

#### Living and working conditions :

The gloomy picture painted by the low income of the lecturer is further deepened by other handicaps under which he suffers.

Every lecturer has to teach for a minimum of 18-20 hours per week. In addition, he has to conduct tutorials, class tests and correct papers. The answers to the questionnaire show that for every hour of teaching the lecturer has to spend, on the average, one hour of preparation and study. For this most lecturers have no place where they can work without disturbance. Table IV gives some information regarding the accommodation an average Teacher has at home and the facilities he is provided at his college.

Table IV

Average No. of Rooms in a lecturer's house	...	...	3
Number who have a study room at home	...	...	45%
"                    "    at College	...	...	10%
No. who do not have a study room at home or college	...	...	45%

**Leave and Vacation :**

Conditions of leave and vacation for the lecturer also have much to be desired. Table V shows that a great majority of the Teachers work during their vacations. Theoretically they are entitled to compensation leave by this duty. But as Table V shows it is usually impossible for the lecturer to avail of this. Even the privilege

and casual leave has not been availed of by many. The conclusion is inescapable that most lecturers cannot afford even a short holiday. The majority of them spend their vacations in performing extra duties such as stock-checking and invigilation or a number of other odd jobs. Such extra work is quite onerous and is definitely a hindrance to research and study, besides depriving the teachers of any rest or recreation :

Table V

No. of teachers who had accumulated compensation leave by virtue of Vacation Duty	...	82%
No. of Teachers who had utilised their compensation leave	...	3%
"                    "            privilege leave during 1952-53	...	8%
"                    "            fully their casual leave during 1952-53	...	11%
"                    "            a part of their Casual leave during 1952-53	...	82%
"                    "            no Casual leave during 1952-53	...	18%

**Conclusion :**

This survey shows that the Mysore University Teachers are grossly underpaid for the quantity and especially the quality of work demanded from them. Their inadequate salary enforces on them a standard of living which borders on the subsistence level. Without the means or the leisure for him to engage in creative activity so essential for a teacher, Mysore University Lecturer is to be commended for his patience

and courage in carrying on. One must however, protest at the injustice meted out to one who is entrusted with the vital task of educating and preparing the citizens of to-morrow. The Government and the University authorities must face this situation squarely and act at once to ameliorate the hopeless conditions of University Teachers; otherwise, they must accept responsibility for impairing progress in this essential sphere of national regeneration.

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## DEVELOPMENT OF WATER RESOURCES AND THE CONTRIBUTION BY THE CENTRAL WATER & POWER COMMISSION

by

**Kanwar Sain, ISE, MIE.,**

*Chairman*

**Central Water & Power Commission**

From times immemorial, the people of India worship land and water because these two, in conjunction with manpower constitute the basic wealth of a country. The deification of rain, river, and the cow is symbolic of the fact that India is essentially an agricultural country. Nearly eighty per cent of the population of India live in rural areas, and depend mainly on agriculture. Agricultural prosperity therefore is more or less an index of the economic progress of this country.

India presents a picture of great diversity in the distribution of its regional water wealth, one of the essential requirements of agriculture, conditioned by the diversity in the distribution of rainfall, temperature and topographical features. But the country's overall water resources are enormous. No systematic survey of the available water resources was made in the past, although water was being utilised for purposes of irrigation to a large extent. Numerous scriptural and classical allusions and a host of other evidence through light on the importance attached to the utilisation of water for irrigation even in the earliest civilisation in India. There are instances in the Mahabharata as well as Ramayana about the herculean efforts made for tapping the water resources.

The engineering talent appears to have continued its bold concepts over centuries, a later manifestation being the construction of the Grand Anicut across the Cauvery in 2nd century A.D., a feat, unrivalled till then in the world. Tank irrigation became more prevalent in the south whereas irrigation by inundation from swollen rivers came more

into practice in the North. Side by side utilisation of ground waters from wells and springs in regions where rainfall was inadequate, came into vogue. Even at present well irrigation plays a very important part in Indian agriculture, as nearly a quarter of the total irrigated area is under wells.

Today India leads the world in the domain of irrigation. The area irrigated is almost twice that in U.S.A. But there is no denying the fact that the development achieved in the past was in a way hap-hazard. Some rulers during the Moghul period tapped the waters of Jamuna mainly to meet their personal interests, which resulted also in some irrigation facilities. There were cases, however, where irrigation was developed by enthusiastic rulers for the welfare of their subjects. During the British period, the development of irrigation was given a fillip and several works, big and small were executed. But on the whole the development which took place was the result of the local call and urgency, and was not in the interests of the economic prosperity of the entire country. With the introduction of Provincial autonomy in 1935, irrigation became a Provincial subject. This led to independent development of water resources by the Provincial Governments. Naturally local needs were paid more attention without any consideration for the rights of the neighbouring States, with consequent disputes amongst them. Much real progress along scientific lines could not therefore be achieved to develop the water resources in the overall national interest.

**The Central Water & Power Commission :**

It was at this juncture that the Central

Water-ways Irrigation & Navigation Commission (now Central Water & Power Commission) came into existence in 1945. It was charged with the responsibility of co-ordinating, and furthering, in consultation with the State Governments schemes for control, conservation and utilisation of the water resources in the larger interests of the country.

With the attainment of independence, an all out drive for the country's self-sufficiency in food became urgent. Rural economy had to be set right, agricultural practices had to be improved, and regional exploitation of water resources had to be balanced to raise the standard of living of the people. The necessity of a scientific approach and a comprehensive plan for the utilisation of the water potential was keenly felt. For a phased development of the river valley projects, this Commission made out a Seven-Year Plan and this provided the material for the formation of the proposals as included in the First Five-Year Plan.

The functions of the Commission enlarged with the amalgamation of the Central Technical Power Board and the Central Electricity Commission with it. At present it is the Central technical authority on water engineering in all its aspects. For a planned and scientific approach to an all-round exploitation of the country's water resources, this Commission has to deal with problems relating to Irrigation, Waterways and Navigation, Hydrology, Designs of Dams and Canals, Hydro-Electricity and Thermal Power, and applied Research. For this purpose it has separate Directorates with staff specialised in the particular fields.

While framing the first Five-Year Plan, difficulties were experienced in fixing priorities for the various irrigation and power schemes on account of the lack of a comprehensive picture of the developments possible and those necessary in the different regions. To remedy these conditions in the formation of future plans, a proper

assessment of basin-wise irrigation and power potential of the country has been started. Sufficient advance has been made in collecting and analysing the data pertaining to Crops and Crop pattern, Intensity of irrigation and water requirement of crops. This will help to arrive at the optimum utilisation of water and land resources.

During the short period that the Commission has functioned, it has successfully investigated numerous river valley projects including the Hirakud, Kakrapar, Kosi, Ganga Barrage, Sabarmati and a number of projects in Madhya Pradesh, Coorg, Assam etc. In the interests of the integrated development of river valleys that cut through consecutive units of the Union the Commission has settled many disputes amongst the neighbouring States in connection with the distribution of river supplies. The differences between Hyderabad and Madras; Mysore and Madras; Mysore and Coorg; Punjab, Pepsu and Rajasthan; and Rajasthan and Madhya Bharat, are notable examples. In addition, it has averted a number of possible disputes between the States by rendering timely advice for the co-ordinated use of the river supplies.

For sound planning, designing and economic execution of river valley projects, it is necessary to have specialists in each field of engineering. It is impossible for any single engineer to be proficient in all fields, nor is it possible for each State to have a huge organisation equipped with a large number of experts. The Commission fills up this necessity by providing a Central Organisation which could be drawn upon by every State for help, consultation or advice on all these matters. At the request of the Orissa Government, the Commission is conducting detailed surveys for establishing a deep sea port at Paradip at the mouth of Mahanadi. A Water Transport Pilot Project for the Upper Ganga river is being launched based on the investigations done by the Commission. It also assists the Planning Commission in the

formation of the Five-Year Plans. Whenever required it prepares detailed designs for river valley projects. Mention may be made of Hirakud Project, Kakrapar Weir and Canals, and Kosi Barrage. On the execution side, the Commission keeps up-to-date information about the progress made by the projects in the field in order to render timely assistance to those lagging behind the schedule.

The role of Hydrology in planning, designs and maintenance of engineering works is now well recognised. The Commission was the first to make a preliminary scientific assessment of the water potential of the country based on rainfall and temperature records. It was found that 1356 Maft of water flows down the rivers annually out of which only about 6% was being utilised for purposes of irrigation. The contribution of the glaciers to the Himalayan rivers was scientifically surveyed and a number of expeditions were sent to high altitudes for this purpose. The hydro-meteorological and hydrological data such as intensity of rainfall, evaporation, river discharges, temperature and silt etc., are being collected and published. Hydrological problems pertaining to Arid regions are specially dealt with to make the maximum possible use of the little water supply that is available.

In modern engineering practice, model experimentation, both hydraulic and structural, has been recognised as indispensable. India leads the world in irrigation engineering research. The Central Water and Power Research Stations are tackling problems pertaining to subjects such as river and canal hydraulics, navigation, soil and soil mechanics, concrete and materials for construction. The Station with its trained specialists and accumulated experience constitutes a valuable asset to the Nation. This is borne out by the mere fact that several crores of rupees have been directly saved in construction through model tests, in addition to averting many grave failures of structures.

The Power Wing is responsible for the pattern and extent of utilisation of power, transmission and distribution facilities, load surveys, preparation of project reports and estimates for the electrification of various States, drawing up specifications for hydro-electric stations in the different regions. Mention may be made of the part played by the Commission in the unified development of the Damodar Valley, the Bokaro Thermal Station, Hirakud, Bhakra-Nangal and the Chambal Projects.

Obviously water is the main source of cheap power. Over 80% of the population in India live in rural areas and depend largely on agricultural economy. The Government of India in appreciation of the importance and necessity of rural electrification are anxious to adopt every means to make cheap power available to as many villages as possible. The Commission is specially charged with the responsibility to do all such work as will promote the spread and use of electricity throughout the country, in particular to semi-urban and rural areas, and is now engaged on detailed studies to that end.

The year 1954 saw incalculable damage done in the Northern India on account of unprecedented floods experienced in the sub-Himalayan States. The total area inundated by the floods of the Ganga-Brahmaputra systems exceeded 25,000 sq. miles and affected nearly 94 lakh of people. The damage to crops was enormous. Several towns were threatened by inundation. The economy of the regions was shattered. To avoid recurrence of such miseries in the future, the Commission is engaged in making detailed studies of the necessary flood control measures. A scientific approach to the solution of these problems is the main motive of the Flood Control Wing recently added to this Organisation.

The age old Kashmir Flood problem has been tackled and a simple but effective scheme has been drawn up to save the

Valley from frequent flooding and the city of Srinagar from the threat of inundation.

In order to keep abreast of the International Developments in the field of engineering, the Commission is closely associated with most of the International Organisation like the International Commission on Large Dams, the World Power Conference, the International Commission on Irrigation and Drainage, International Association for Hydraulic Research.

#### **Conclusion :**

In the programme of the scientific development of the water resources, some projects are partially complete and benefits

have already begun to accrue. The urgent problem of providing the first and foremost requisite i.e. food and clothing to every Indian has already been solved. Cheap power is being made available for the development of industries as well as for commercial and domestic uses. The growth of raw materials necessary for the industries has been facilitated with irrigation. Inland Navigation is being improved and new ports are being investigated. The problem of floods is being scientifically tackled. The country, is no doubt, heading towards economic prosperity and stability, and the Central Water and Power Commission is making a very substantial contribution towards it.

### **A CORRECTION**

The following communication has been received from Prof. N. W. Pirie, F. R. S. in respect of the report of his talk at Bangalore published in the Jan.-Feb. issue of Vijnan-Karmee.

"I wonder if it would not be good, both for my sake and that of the younger scientists in India, to publish a correction of a remark attributed to me on page 29 of the January-February issue. I cannot believe that I actually said "Such a selection is invariably the best and brings satisfaction to all concerned". It is neither my idiom nor my sentiment. What I hope I said is ".....to be offered. The replies to an advertisement seldom bring forward candidates any more qualified than those the selectors already know so that this method of selection, though it looks bad in principle, works out fairly well in practice. The advertisement is only expected to take account etc". That, I think you will agree, is a significantly different sentiment".

### **A. Sc. W Council**

Since 1941, when the A Sc W was first welcomed into the TUC, our Council agendas have steadily advanced in professional competence and public spirit. Each aspects figures prominently this year. There is little sign that our branches have been inhibited by the specious philosophy of wage restraint and social service cuts. Our members still want higher salaries (and quicker !) and greater expenditure in socially

valuable directions of the 78 motions received, 24 deal with salaries, negotiations, pension rights etc., 7 directly with science matters and 16 with science-related public questions such as technical education, atmospheric pollution, atomic energy etc., 12 with other topics of national interest and 16 with internal union affairs.

[ From the A. Sc. W. Journal May '55 ]

## REPORTS FROM BRANCHES

### HYDERABAD

#### Hyderabad Assembly and Scientific Committee

Perhaps the most significant step the Association has taken this year in the organisation of its activities, is the formation of Science Committee in the Assembly. This is the first Committee of its kind in the country. It consists of well-known scientists of Hyderabad and representatives of all parties in the Assembly. The common aim, that has brought the 20 members of diverse political opinions, with different backgrounds, training and tradition, is the promotion of science and the spread of scientific method.

In the context of the present technological and scientific trends and planning in India such a Committee is a vital necessity and that the Association of Scientific workers of India has taken the initiative to form such a Committee goes to show the vital role the Association can play in the spread of science and technology in India.

#### *Aims And Objects :*

The aims and objects of the Committee may be as follows :—

1. To provide members of the Assembly with scientific and technical information from time to time in connection with debates.
2. To bring to the notice of the members of the Assembly and Government departments the results of scientific research and technical development (which bear upon questions of current public interest)
3. To arrange for suitable action through Assembly channels whenever necessary to ensure that proper regard is had for the scientific point of view.
4. To examine all legislation likely to

affect the above and take such action as may be suitable.

5. To watch the financing of scientific education and research.
6. To provide its members and other approved subscribers a regular summary of scientific matters dealt with in the Assembly.

The scientists and legislators met in the Assembly in the 14th of April 1955 and constituted themselves formally into the Committee. A Sub-Committee was formed to chalk out a detailed programme of work during the next session of the Assembly.

The following are members of the Committee :—

1. Dr. G. S. Melkote, Minister for P. W. D., & Labour.
2. Dr. M. Chenna Reddy, Minister for Agriculture & Planning.
3. Shri Devi Singh Chauhan, M.L.A.
4. Shri S. L. Niwasekar, M.L.A.
5. Shri M. S. Rajalingam, M.L.A.
6. Shri V. D. Despande, Leader of Opposition.
7. Shri Akhtar Husain.
8. Shri Sharan Gowda.
9. Shri Anna Rao Gavane.
10. Shri K. V. Narayan Reddy.
11. Dr. K. R. Pai.
12. Dr. N. V. Subba Rao.
13. Dr. K. P. Karanth.
14. Shri M. S. Pawar, President, A. S. W. I., Hyderabad.
15. Dr. M. G. Krishna.
16. Shri R. M. Patri.
17. Shri D. S. Datar.
18. Shri K. Vedanthachari.
19. Dr. A. M. Khusro.
20. Shri Baldev Singh, Secretary, A. S. W. I. Hyderabad.

## LUCKNOW

### Annual Report for '54-'55

We started the year with a membership of 76. Seven members left Lucknow either on transfer or for studies abroad and one member died. 22 members were enrolled in the current year. The present membership thus stands at 90.

The Branch Executive met seven times during the year. The first meeting was in connection with drawing up a programme of activities for the year. Two meetings were devoted entirely for discussion of the action to be taken by the Association on the representation made by certain members of the staff of the Lucknow Medical College on their retrenchment from service. A special meeting was held during the visit of Gen S. S. Sokhey.

The following lectures were delivered under the auspices of the Association :

1. Dialectical Materialism and Logical Positivism by Shri Jagjit Singh of the Eastern Railways.
2. Scope for Industrial and scientific training in the Soviet Union by Maj Gen S. S. Sokhey.
3. Experimental Peptic Ulcer by Dr. N. C. Nasset, Fulbright Visiting Professor of Physiology.
4. Insects in Nutritional Research by Dr. G. F. Fraenkel.
5. Dropping Mercury Electrode and its biological applications by Dr. G. B. Doss.
6. Leaf proteins by N. W. Pirie.  
Besides these there was one film show on "Muscle Relaxants".

#### Trade Union Activities :

The retrenchment in staff of the Lucknow Medical College consequent on the abolition of the B.M.B.S. course was taken up by the Association and a deputation consisting of Dr. V. S. Mangalik, Dr. R. D.

Misra, Shri S. L. Kumar, Dr. D. L. Shrivastava and Dr. Nityanand waited upon the Vice Chancellor of the Lucknow University and presented a memorandum setting out the stand of the Association on this vital question. In this connection Gen Sokhey met the authorities concerned during his visit to Lucknow. It is indeed gratifying to report that partly out of the efforts made by the Association, the Lucknow University has appointed a Tribunal consisting of a nominee of the employee, a representative of the University and a nominee of the Chancellor to go into the question and give their decision. This Tribunal has not met so far.

The Central Drug Research Unit of the Branch held two meetings to discuss a draft memorandum to be presented to the Director, C. S. I. R. on the revision of salary scales in the National Laboratories. Certain concrete proposals have been put forward towards the rationalization of the salary scales and the Director, Central Drug Research Institute, has assured the members that he would submit these proposals to the D. S. I. R.

Members of the Branch have informally discussed ways and means of bringing the longstanding need for the creation of scientific service to the notice of our government. It is hoped that these discussions will take concrete shape in the coming year and that this Branch will spearhead the movement for the creation of the Indian Science Service.

#### Other Activities :

The Branch Executive had constituted a small sub-committee to collect news items and other matters for publication in the Vijnan Karmee and also to devise ways and means of improving the quality and get up of the journal. This committee held peri-

odical meetings and thanks to the efforts of Dr. B. M. Gupta, we have been able to open a new column entitled "Lucknow Dairy" in the Journal. We are glad to find that consequent on our starting this column other branches have come out with similar reports. There are yet many more things to be done to improve the Vijnan Karmee and make it a really first class journal. The Editorial Board has often expressed the view that paucity of articles is one of the main difficulties encountered by them in improving the journal. It is hoped that an effort will be made to help them in this.

At the beginning of the year a committee was appointed to implement the Social Survey programme of scientific workers in Lucknow. This Committee met only once and no effective steps have been taken so far.

#### **Publication of the Scientific Directory :**

This piece of constructive work for which all the initiative was taken by our predecessors bore fruit only this year. We had thus the pleasant duty of selling the Directory of Journals to various agencies in Lucknow and outside and the venture has been successful and self-supporting.

#### **Conclusion :**

Looking back on the achievements of the year one cannot but conclude that the Branch has not functioned in full swing during the period. It has not been possible to extend the popular lecture scheme which was initiated two years ago with a view to focussing the attention of the educated public on the value of science. Another regretful feature has been the thin attendance at meetings and lectures. The units in the Medical College and the University have not functioned as effectively as in previous years. No attempt has been made so far to extend the scope of the activities of the Association to other centres in Lucknow.

#### **The new Executive Committee**

Shri S. L. Kumar, Director, Railway Research and Testing Centre, Alambagh, Lucknow. *President.*

Dr. (Miss) D. Kutty, Reader in Gyneecology and Obstetrics, Queen Mary's Hospital, Lucknow. *Vice-President.*

Shri D. C. Chaturvedi, P.W.D. Research Centre, Mahatma Ghandi Marg, Lucknow. *Vice-President.*

Shri N. M. Berry, Deputy Director, Railway Research and Testing Centre, Alambagh Lucknow. *Secretary.*

Dr. N.M. Khanna, Division of Chemistry, Central Drug Research Institute, Lucknow. *Joint-Secretary.*

Dr. G. N. Vyas, Division of Chemistry, Central Drug Research Institute, Lucknow. *Hony. Treasurer.*

#### **Members.**

Dr. V. S. Manglik, Head of the Department of Pathology, K. G. Medical College, Lucknow.

Dr. B. Mukerji, Director, Central Drug Research Institute, Lucknow.

Shri M. V. Kamani, Railway Research and Testing Centre, Alambagh, Lucknow.

Dr. R. C. Misra, Department of Geology, Lucknow University, Lucknow.

Shri Prem Singh, Birbal Sahni Institute of Palaeobotany, University Road, Lucknow.

Dr. N. P. Gupta, Reader, Department of Pathology, K. G. Medical College, Lucknow.

Dr. S. K. Gupta, Division of Microbiology, Central Durg Research Institute Lucknow.

## KHAMARIA

### Annual Report for '54-'55

#### Basis of work

The following resolutions which formed the guiding principles of the working of Executive Committee were ratified by the General Body Meeting and the E. C. was empowered to elaborate these and submit to the Centre for consideration at the Annual Conference at Baroda.

I. (i) That the various designations of members of staff be rationalised in such a manner so that the designations correctly depict the nature of the work being carried out by the individual.

(ii) That the facilities granted shall have direct bearing on the scales of pay and not the designations viz. persons drawing pay in equivalent scales of pay shall be granted similar facilities.

II. That the confidential reports be renamed Assessment/Rating Reports which may finally be put up for arbitration if desired by the individual concerned.

III. That for each post minimum basic qualifications be stipulated and the present incumbents not fulfilling the qualifications be informed accordingly.

IV. That recruitment shall be restricted only to the lowest grade of staff in the trade and clearly be categorised into, Technical, Non-Technical and Administrative posts. Higher educational qualification above the minimum required be suitably given weightage by grant of advance increments in the lowest grade only.

V. Number of working hours of staff employed on similar jobs all over should be same and not different on account of being connected to different works or establishments.

VI. The recognised Trade Unions be fully recognised by the respective heads of establishments and every letter and petition must be fully acknowledged and replied

within a period of three months, failing which the next higher authority can be contacted direct.

VII. That while selecting personnel for overseas training or deputation, basically qualified persons be given preference over others—as this association is of the opinion that the main objective of overseas training is to gain further knowledge and not only experience; for gaining knowledge basic qualifications are essential.

VIII. Scientific Workers whose advice and service can suitably be utilised for the national interest such as the conference organised by the National Laboratories, the symposiums arranged by the Indian standard Institute and National Laboratories and are not either given permission to participate or to give opinion on any subject should be granted such permission on request.

The Government of India has replied to the various issues raised by the Association such as Substantiative promotion to Non-Gazetted Grades, higher start for higher qualifications on the same grade, Revision of pay scales and Representation on the Departmental Promotion Committees. Some of the representations are still under consideration while others have been rejected outright.

#### Trade Union Activities

A sub-committee was appointed to represent Khamaria Branch to meet the administration improvement Committee formed by the D. T. D. This branch represented that the number of pyramids in the TDEs be reduced to a minimum possible; the confidential reports be renamed as Assessment/Rating Report and right of appeal in case of adverse report be granted to the employees; Confirmations be made on the basis of seniority with the elimination of the unfit; minimum educational qualifica-

tions stipulated for the promotions from non-gazetted to the gazetted ranks in TDE (ME) be relaxed in view of the experience a candidate has gained by virtue of his services in the lower rank.

#### Baroda Session

Due to the paucity of Funds, no delegate could be sent to the Baroda session of the ASWI.

The Association has supported the resolutions forwarded by the Kanpur and Kirkee Branches on Security of Tenure, Working Hours, formation of the ordinance section of the ASWI and confidential reports.

#### Other Activities

A Committee was constituted to arrange technical shows and Technical Films were shown to the members which were widely appreciated. In all 13 films dealing with various topics of interest were shown.

#### Membership

We represent nearly 50% of the Technical qualified staff of the Ordnance Factory and Allied Establishments at Khamaria. In addition we have one member from I.A.F.

and one from O.F.K. Hospital. There are 100 members on the Rolls.

Recently the strength of the association has diminished due to some members having lapsed their membership for non-payment of subscription and others having resigned the membership.

During the year no new members were enrolled as it was decided to consolidate ourselves and clear the arrears of subscription as far as practicable.

#### New Executive Committee

Shri H. C. Pathak ...	President
Shri C. K. Sreedharan ...	Vice-President
Shri A. Rajagopalan ...	Secretary
Shri S. K. Chowdhury ...	Treasurer

#### Members

Shri S. C. Chowdhury
Shri M. C. Jain
Shri M. C. Puri
Shri V. Subramaniam
Shri N. M. Patwardhan
Shri B. N. Roy Chowdhury

#### Auditors

Shri S. S. Rao
Shri G. P. Pandey

## BANGALORE

The following is the summary of the talk given by Prof. Vincent C. Rideout under the auspices of the ASWI (Bangalore Branch) at the Indian Institute of Science, Bangalore on the cooperation between Industry and Engineering colleges.

In America, the industrialists are quite conscious of the role Science plays in the development of Industry. The increasing competition in Industry has made them feel the necessity of scientific co-operation. Besides having their own laboratories and research staff, they are sponsoring scientific projects to be worked out in the various colleges and universities to which they provide adequate research funds, and offer scholarships and assistantships to students. They keep the concerned research professors informed about the most recent developments in industry, invite them to visit their factories, request them to work during

summer vacation and help research in their laboratories. For this, the professors are paid a handsome honorarium and all the other expenses of their visit are borne by the industry. They also organise symposia and seminars to which research workers from colleges and research Institutions are invited. The Universities, on the other hand, also co-operate with the Industry. They arrange summer courses for people from Industry. For example, at the Wisconsin University, there are 'Extension Departments' which arrange for the training of such people from Industry. These people can work for degrees also. The Wisconsin University has a body known as the 'Engineering Experimental Station'. Its main function is to advise the Industry on their problems, to undertake Industrial projects. It also helps in recruiting personnel for the Industry. As a result of such co-operation,

the industry gets the required help cheaper than private consultation.

The speaker suggested that a forward step for India at this time might be for Institutions like the Indian Institute of Science, Bangalore, to start Extension schemes of instruction and laboratory work for the benefit of those working in technical undertakings in the neighbourhood such as the Hindustan Aircraft Ltd. and the Indian Telephone Industries.

### CALCUTTA

#### Scientific Co-operation between China and India :

*The following Resolutions were adopted by the National Conference of India-China Friendship Association held in Calcutta on 21st-23rd April, 1955 under the presidency of Sardar K. M. Panikkar. The resolutions were moved by Dr. B. C. Guha.*

(1) This Conference requests the Government of India to send a delegation of Indian Scientific Workers to China to get into direct contact with Scientific Workers in China both in the Universities and in the institutions of Academia Sinica.

(2) This Conference recommends the institution of exchange of research scholars in science between China and India on a permanent basis ; it requests the establishment of 50 such research fellowships, in the first instance, by co-operation between the Governments of the two countries

(3) This conference requests the Government of India to encourage the translation of the best Chinese scientific works and papers into major Indian languages.

(4) This Conference requests the Government of India to subsidise the teaching of the Chinese language in all the Universities of India and give special encouragement for the purpose, e.g. by paying the teachers, granting special scholarships and prizes to students, etc.

### DELHI

In the annual general body meeting of the Delhi Branch held in January 1955 the

following office-bearers were elected :—

Dr. K. N. Mathur	<i>President</i>
Dr. P. N. Bahaduri	<i>Vice-President</i>
Dr. R. Prasad	<i>Secretary</i>
Dr. R. K. Mehta	<i>Treasurer</i>
Vacant	<i>Joint-Secretary</i>

#### Members of the Branch Executive Committee

Dr. B. Vishwanath
Dr. J. J. Chinoy
Mr. N. Singh.
Mr. K. V. Krisbna Murthy
Mr. S. D. Gera
Mr. Nirmal Nath
Mr. Sirohi

A meeting was held in February 1955 at the I. A. R. I. when Dr. B. Vishwanath spoke on "our attainments of agricultural targets". The meeting was presided over by Dr. K. N. Mathur and largely attended. During March 1955 another meeting was held in the National Physical Laboratory when Dr. K. L. Rao, Chief Engineer of CWPC spoke on "Flood Control in India."

### KANPUR

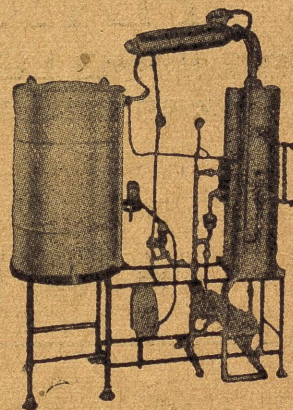
The Central Executive of Scientific Workers' Association at its first Extraordinary meeting held on 6th May, 1955 passed the following resolution in connection with the general strike in textile mills at Kanpur.

The Scientific Workers Association (IOS) Kanpur views with great concern the situation arising out of the general strike in the textile industry at Kanpur. This Association strongly believes that there is always a scope for a negotiated settlement and frevently hopes that the parties concerned will make a sincere effort to reach an amicable settlement. This Association suggests that an impartial committee be immediately appointed by the Government to go into the entire question of dispute in order to resolve the deadlock in the interests of all concerned. Pending the decision of this committee, this Association feels that conditions as they existed before the strike should be maintained."

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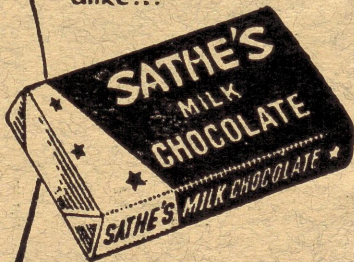
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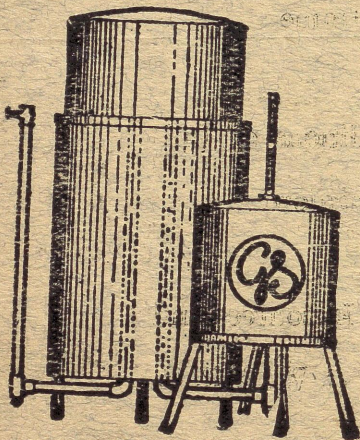
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