VIJNAN-KARMEE

विज्ञानकर्मी

official organ of the
ASSOCIATION OF SCIENTIFIC WORKERS OF INDIA

Vol. III] JULY, 1951 [No. 7

SCIENTIFIC INSTRUMENTS & APPARATUS FOR LABORATORIES

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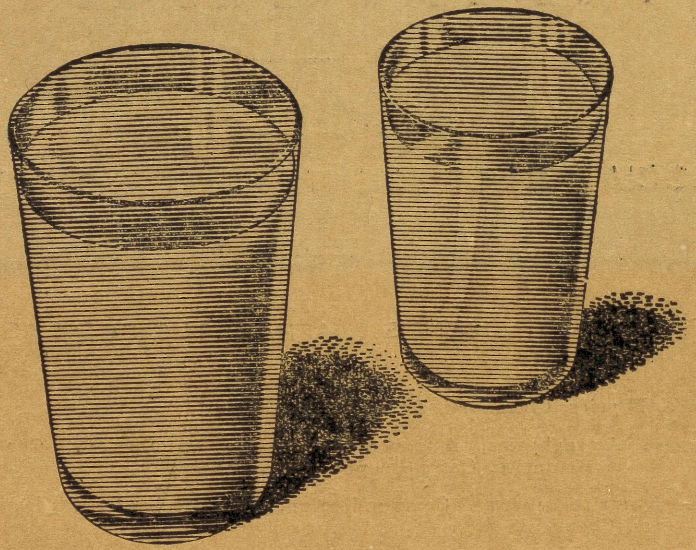

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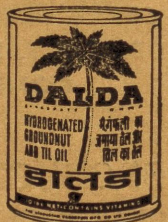

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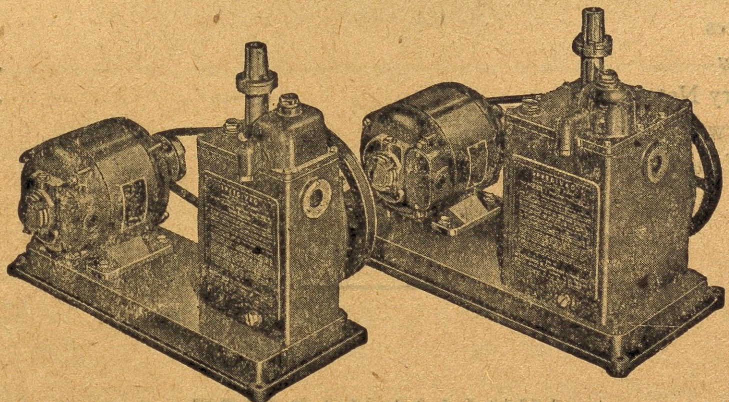

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ASSOCIATION OF SCIENTIFIC WORKERS OF INDIA

VIJNAN-KARMEE

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THE OBJECTS OF THE ASSOCIATION
ARE

To improve and safeguard the economic interests, the conditions of life and the professional and social status of all Scientific Workers in India

AND

To work for the most effective use of science and the scientific method for the uplift and welfare of the society as a whole.

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VIJNAN-KARMEE

विज्ञानकर्मी

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AGRICULTURAL EDUCATION

In spite of the fact that India at present has to import tremendously large quantities of foodgrains just to keep the population alive, it is still an agricultural country, as more than 75% of the population of this country is engaged in the agricultural profession. The importance of agricultural development has been recognised by the Government of India and a special mention of this subject has been made in the Constitution of the Country. Article 48 of the Constitution of India provides: "The State shall endeavour to develop agriculture and animal husbandry, on modern and scientific lines and shall, in particular, take steps for preserving and improving the breed, and prohibiting the slaughter of cows and calves and other draught cattle". The re-organisation and extension of the functions of the Indian Council of Agricultural Research also indicate that the Government of India do feel that sufficient has not yet been done in the field of agriculture and there is vast scope for development and that it would be only by means of application of modern scientific methods that there could be some justification for this country to think of self-sufficiency. The Indian Council of Agricultural Research have recently started a series of Extension Lectures for general information. The President, Dr. Rajendra Prasad, recently inaugurated the "Land Army" for India. The objects of this 'Land Army' are to establish a link between the researches made by the Indian Council of Agricultural Research and the cultivators.

The University Education Commission set up by the Government of India in 1948 considered that agricultural education must be recognised as a major national issue and that since in a democratic country sound agricultural policy must rest on the understanding and participation of those engaged in agriculture, the study of agriculture in primary, secondary and higher education should be given high priority in national economic planning. The Commission also recommended that the present Agricultural Colleges should be strengthened in equipment and in teaching staff and that new Agricultural Colleges, where possible, should be associated with new Rural Universities, so that agricultural education may be supported and enriched by contact with other fields and by common use of personnel and equipment. Dr. Rajendra Prasad in his speech on 28th February, 1950, at the Silver Jubilee Session of the Inter-University Board at Banaras appealed to the States and the Centre for the implementation of the recommendations of the University Commission. Recently while replying to a question in the Parliament it was made known that as most of the recommendations of the University Commission regarding agricultural education concerned the State Governments, their attention had been drawn to them with a view to implementation. So far as the Central Government was concerned the matter was still under consideration.

The Central College of Agriculture at Delhi was started as a new Agricultural College on a permanent basis in 1947 on the personal initiative of Dr. Rajendra Prasad, the then Minister for Food and Agriculture. Hardly had the College finished its third year of existence, when the Government of India decided to close down the College. The Association of Scientific Workers of India felt that in view of the importance of agricultural education in the country and the necessity for expansion of the facilities available, it was unwise to close down the College and requested the Government to reconsider their decision. The views expressed by the Association were accepted by the Government and it was decided to continue the College after integration with the Indian Agricultural Research Institute at New Pusa as was suggested by the Association. While making this suggestion the Association did not consider the possibility that the Government would give notices to the present staff employed in the Central College of Agriculture, some of the staff being recruited on a permanent basis. It was, therefore, a big surprise to the Association that notices of termination of services were served on the entire staff. The Association took up the matter with the Ministry of Food and Agriculture and the Government were pleased to reconsider the matter and it is understood that the notices have now been withdrawn in most of the cases. Some of the cases which remain still under consideration are those of professors who were specially recruited for the posts. The Association have also prepared a Memorandum requesting the Government to retain the Preparatory Class, as it would be in the interest of agricultural education of candidates recruited directly after Matriculation.

In order that the professors and the teaching staff could do justice to their work they must be assured of security of service and protection of their interests. It appears that the present conditions at the Central College of Agriculture are quite unsettled and require careful attention. The Association appreciates that some difficulties are bound to arise specially when the Central College of Agriculture had to be re-organised after giving up the original decision of closing it down and for which preparations had already been made. It is also found from the account given elsewhere in this issue that in the Dairy Research Institute at Bangalore most of the staff is still on a temporary basis. While all the attempts now being focussed on agricultural education are highly commendable, we would like to point out again that the teachers and the research workers in the agricultural sciences must be assured of security of service and other facilities conducive to the building up of a strong body of scientific workers to support and develop various schemes.

OUR INSTITUTES

*Indian Dairy Research Institute, Bangalore**

The Indian Dairy Research Institute is a central organisation for dairy research and education under the direct control of the Ministry of Food and Agriculture, Government of India. The Director of Dairy Research is the administrative head of the Institute and the scientific and technical staff under him include 5 Class I Officers, 5 Class II Officers and 23 Assistants most of whom are, however, working on a temporary basis. The Institute has four main Sections, namely, Dairy Husbandry, Dairy Bacteriology, Dairy Chemistry and Dairy Technology for carrying on its activities. The principal activities of the Institute are (i) research work on problems bearing on the dairy industry in India, (ii) development of pedigree herds of milch cattle, (iii) training of students in the science and practice of dairying and (iv) giving technical help and advice to the dairy trade.

The Institute maintains a dairy herd of about 450 head of cattle, including farm-bred herds of Red Sindhi, Gir and Tharparkar breeds of cows and Murrah buffaloes and also a large number of cross-bred cows, for conducting breeding and feeding experiments and for producing milk in connection with the training of students and research work. About 2,000 lb of milk are produced and handled daily and after meeting the requirements of training and research work, the surplus milk is pasteurised, bottled and distributed to hospitals and ocal customers. As a part of students' training, small quantities of butter, ghee, cheese and other products are manufactured. The Institute has some land for cultivation of fodder crops, a dairy run on semi-commercial lines, modern milking byre, paddocks for cattle, research laboratories, library, museum, hostel for students and other auxiliaries.

Brief History.—The present Institute has developed from the Imperial Institute of Animal Husbandry and Dairying, which was started in 1923, with the old Military Dairy Farm at Bangalore as its nucleus, for training candidates in scientific methods of dairy farming and for providing technical guidance to the dairy trade. The Imperial Dairy Expert, who was then attached to the Imperial Department of Agriculture, was in charge of the Institute. In the beginning, a two years' training course for the award of the Indian Diploma in Dairying was started and two other courses viz. Post-graduate course for imparting higher instruction in the science and practice of dairying and short practical courses in dairy farming for the benefit of the men in the industry were also initiated from January 1924. With the establishment of pedigree herds of Red Sindhi and Gir cows and Murrah buffaloes in 1933 the activities of the Institute were increased but there was no corresponding enlargement of facilities in regard to staff or buildings.

The year 1936 marked an important

* Through the courtesy of the Director of the Institute.

change in the history of the Institute when it was separated from the Imperial Agricultural Research Institute, New Delhi, and placed under the direct control of the Department of Education, Health and Lands (the present Ministry of Food & Agriculture) Government of India. The name of the Institute was changed to 'Imperial Dairy Institute'. At this time, Dr. N.C. Wright, Director of Hannah Dairy Research Institute, Ayr, Scotland, was invited to report on the development of cattle and dairy industries in India. One of his recommendations was the establishment of a well-equipped Dairy Research Institute at a central place situated in an intensive dairying tract. In pursuance of this recommendation the idea of establishing a central Dairy Research Institute was approved and a Director of Dairy Research was appointed in 1939 with his headquarters at New Delhi to make necessary arrangements in this connnection and also to head the Central Institute. The existing Centre at Bangalore was to function as one of its sections and accordingly the post of Imperial Dairy Expert was redesignated as Dairy Husbandry Officer and Principal. Unfortunately, due to the outbreak of the second world war the implementation of the main scheme was postponed but as an interim measure two Research Sections viz. Dairy Chemistry and Dairy Bacteriology, were started in 1941 to serve as nucleus of the new Institute. The headquarters of the Director of Dairy Research was subsequently transferred to Bangalore and the two research sections amalgamated with the Imperial Dairy Institute. With this change the Institute came to be known as Imperial Dairy Research Institute, which was further modified to 'Indian Dairy Research Institute' when the country attained independence.

The question of reorganisation of the Indian Dairy Research Institute was once again reviewed in 1944 as a part of the post-war developmental schemes and plans and estimates for the establishment of a Central Dairy Research Institute together with a Dairy Science College were drawn up. These proposals were also scrutinised and approved by Prof. H. D. Kay, Director, National Institute for Research in Dairying, Reading, England, who had been specially invited to India for this purpose but the scheme has not been implemented so far due to financial stringency. Meanwhile, as a partial fulfilment of the programme of expansion of the Institute, some additional facilities in the matter of staff, laboratory buildings and equipment and hostel buildings were provided in 1946 for increasing the pace of research and training of students. A new section of Dairy Technology was added at the time. Provision was also made for entertaining a limited number of honorary research workers desirous of carrying out post-graduate research work in dairy science. The old post graduate training course, which had been in existence since 1925, was discontinued from 1947.

Research work at the Institute :— Research work of both fundamental and applied importance on the different aspects of dairy science is carried out at the Institute. The Dairy Husbandry Section deals with the problems connected with the breeding, feeding and management of dairy cattle. As a result of the careful and selective breeding policy followed during the past 18 years, the average milk yields of the animals have increased considerably. The pedigreed animals of Red Sindhi and Gir breeds at the Institute have won Championship Prizes successively at the All India Cattle Shows in Delhi. A large number of bulls are being supplied to private breeders and State Governments for grading up local cattle. An Artificial Insemination Centre is also functioning at the Institute to grade up the local cows by using the semen of the pedigreed bulls at the farm. Experimental plots of a large number of indigenous and exotic grasses are also maintained in order to study their adaptabilities under local soil and climatic conditions. Other problems that have received attention include computation of efficient and economic feeding rations, effect of feeding various supplementary food materials on the growth of calves, possibilities of using Sindhi milking cows for draft as well as for milking and breeding purposes etc.

The Dairy Bacteriology Section has carried out a comprehensive study of the bacteriological quality of milk produced under Indian village conditions and evaluated the factors necessary for producing clean milk. The types of micro-organisms, particularly those resistant to heat, commonly occurring in milk, the efficiency of different processing techniques and the application of various bactericidal agents in dairy operations are being investigated. In regard to milk products, considerable work has been carried out to elucidate the microbiology of dahi and butter and the Section is now supplying starter cultures suitable for manufacture of dahi, fermented milk, butter and cheese of high quality. Some of the lactic acid bacteria isolated from dahi have proved to be useful as test organisms for assaying riboflavin and other growth-promoting substances in dairy products while some are being used for the production of flavour compounds. The vitamin B12 content of milk from various mammals has been determined by microbiological procedures. In connection with the standardisation of bacteriological tests for application in the quality control of market milk under Indian conditions, several investigations have been carried out. The possible standards for grading Indian milk by the methylene blue and resazurin reduction tests, the influence of various factors on the results and the fundamental principles governing the reduction of these dyes in cow's and buffalo's milk are under investigation.

The Dairy Chemistry Section deals with the chemical analysis of milk, butter, ghee and other milk products. The results obtained by this Section on thousands of samples have provided valuable data for the formulation of standards of purity of these products and also for the detcction of adulteration of these materials particularly with the application of the Freezing Point Test. Extensive research work has been carried out on the keeping quality of ghee which is an important dairy product in this country and it has been found that the high acidity in bazaar ghee can be easily neutralized and the flavour of the product improved if a small amount of quick-lime is mixed with the melted ghee and the temperature raised to about 108°C. The ghee can then be cooled and while still fluid, filtered through cloth. This process has found useful application in the ghee trade. Other important investigatihns which have been carried out in this Section are the study of the nutritive value of milk and indigenous milk products like dahi, khoa and chhana, when fed as supplement to the usually poor South Indian vegetarian rice diet, the nutritive value of ghee as compared to that of vegetable oils and hydrogenated vegetable fats and the composition of milk and butter-fat of cow, buffalo, goat and sheep. A co-ordinated programme of investigation into the important standard methods for the analysis of milk and milk products is being carried out simultaneously at this Institute and other important research centres in different parts of the country.

The Dairy Technology Section has devoted considerable attention to the problem of collection, processing and distribution of village milk to urban areas and has devised a suitable technique of milk collection-cum-processing for its transport over fairly long distances. The processing method is based on the principles of intermittent heat-treatment for the destruction of highly heat resistant organisms and the chilling of milk to control bacterial multiplication. It has also been successful in designing a tamper—proof milk can to meet with the problem of milk distribution. Other important problems on which intensive work is proceeding is the standardisation of the conditions for the large scale production of ghee of good quality, the production of khoa and chhana which are important indigenous milk products in this country and the utilisation of skim milk for the manufacture of casein lactose, and othe products. Till recently the Institute was maintaining a sub-station at Anand (Gujerat, Bombay State), where a semi-commercial plant for the production of dry milk by the Roller Process was installed and a scheme for standardising the conditions of manufacture of milk powder and building up technical data for the guidance of the industrialists has just been completed. This unit has now been temporarily transferred to the Anand Agricultural Institute.

Dairy Education

The Institute now offers three types of instructional courses namely, (1) the Indian Dairy Diploma, (2) Short course in Dairying and (3) training of Honorary Research Workers in research methods in Dairy Science. The Indian Dairy Diploma course is intended for young students of the matriculation standard, who are likely to join industrial dairy concerns as technicians or start their own dairy farms. The course is for a period of two years commencing from November each year and includes both theoretical and practical training in different branches of dairying. The Short Course in Dairying is intended for men who are already in the trade or are engaged in dairy farming and lasts for three months. The Honorary Research Workers course is intended for candidates possessing either M. Sc., or B. Sc., Honours degree who are given opportunities to carry out post-graduate research work in any branch of dairy science for obtaining higher research degree but the number of workers to be admitted is limited to 8 in a year.

During the past 27 years (1923-1950) since its foundation the Institute has trained a total number of 887 candidates including 373 for the Indian Diploma in Dairying, 162 Post-graduate studentss, 340 Short Course students and 12 Honorary Research Workers. They include persons from all over India representing the industry as well as the different State

Governments and some 55 candidates deputed from Ceylon, Burma and Malaya.

Other activities ,—In addition to the research and training activities, the Director and his staff have to do a large amount of advisory work viz. preparation of blue prints and estimates for new dairies to be started by private individuals or cooperative organisation, offering technical advice on questions relating to the standardisation, marketing and economic disposal of milk and milk products, etc.

The Institute has sponsored the organisation of an Indian Dairy Science Association which carries a membership of about 200 dairy scientists from all over India. The Association aims at the advancement of dairy science in India by dissemination of knowledge, encouragement and co-ordination of research and by other means. It is publishing a scientific quarterly entitled 'Indian Journal of Dairy Science' for the last three years and has also started, in co-operation with the Bangalore Dairy Cattle Society, a non-technical monthly called 'Indian Dairyman' for the benefit of the people engaged in dairying.

BOOK REVIEW

SIN AND SCIENCE, BY DYSON CARTER, WITH A FOREWORD BY PROF. D. D. KOSAMBI,

(*2nd Ind. Ed., 1951, 181 pp., Current Book House, Hornby Road, Bombay 1., Price : Rs. 2/8/-*)

Since many centuries, the problems of vice, prostitution, white slavery, venereal disease, abortion, illegitimate birth, divorce, juvenile delinquency and liquor traffic have been a puzzle and a challenge to philosophers, statesmen, social reformers, medical men and every other well-wisher of society but their attempts to meet the challenge within the framework of bourgeois society were inevitably doomed to failure. This failure led even sincere men to fall a prey to strange 'philosophies' like hiding sin behind an iron curtain, attributing sin to an inherent defect in man or in his origin, or even glorifying sin into this principle or that. It was Soviet Russia in the nineteen twenties which practically demonstrated how these evils could be rationally, democratically and rapidly planned out of existence from human society. For the first time in the history of human civilization, an entire country, with a robust optimism and faith in its people, converted the sincere preaching of reformists into successful revolutionary accomplishment.

It is this unique story which Mr. Carter relates in the fascinating book under review, basing his conclusions on true and amazing facts from unimpeachable official and unofficial sources. Mr. Carter deserves the praise and thanks of all humanity, and particularly the unfortunate victims of these vices, for focussing the searchlight of publicity on this incredible story which has been hushed up too long by the capitalists and their press.

Mr. Carter starts his book with an account of the extent and depth of prostitution and venereal disease in America, Canada, Great Britain and Czarist Russia. Particularly during and after World War II, in the Western democracies, these evils increased enormously and especially affected teen-age girls to an incredible extent. In Philadelphia alone, the proportion of these so-called Victory Girls to professional prostitutes was estimated to be four to one. In Czarist Russia, prostitution was organized and supported by the State which led to unmentionable cruelty and corruption. The Yellow Card, which distinguished the prostitute from 'respectable' women, was a passport to sin and a woman with it had no rights of any kind, not even the right to reform herself and was considered to be lower than the lowest among mankind. Her status is paralleled by that of the Negro and Red Indian populations of modern America, among whom syphilis and tuberculosis is ten times more prevalent than among the whites-a basic social and economic fact which has been deliberately suppressed by a mass of 'white' theories of 'black' immorality but which is the inevitable result of capitalist exploitation and capitalist science. The vicious circle of poverty and sin has been recognised by ancient Indian intellectuals who said :

पुनरेव दरिद्र: पुनरेव पापी ।

After the successful Revolution in 1917, Soviet Russia fell into utter chaos for nearly four years due to the confusion and immaturity of young workers who had just attained power. This was sternly put an end to by Lenin and Gorky who gave a new orientation to the conception of free love in keeping with the ideals of the new society which were expressed in the motto :

"We are not only rebuilding human society on an economic basis ; we are mending the human race on scientific principles".

With this principle always in view, Soviet scientists made immorality understandable and took the mystery out of sin.

Mr. Carter then relates how Soviet scientists analysed from historical facts that love as we understand it today represents one of the great progressive revolutionary developments in human civilization. They proved that the right of women to a marriage based on love made its appearance in the world only after the establishment of capitalist society and its conception of individual freedom. However, in practice, the biological superiority of women was recognised only by greater curbs on motherhood and the development of capitalist society turned the apparent freedom of women into more intense exploitation. The economic inequality of women has been glorified by our own reactionaries through the Nazi slogan, "For a woman give children, the cookstove and the Church".

Recognising these historical facts, Soviet statesmen based their plans on an extensive questionnaire among all classes of women throughout the country. The object of this sensational questionnaire was to discover the actual reason for the widespread immorality. Similar statistics, on a smaller scale, were available in many countries but psychiatrists, psycho-analysts, physicians and other 'experts' over-looked

looked the real truth and instead spread various fantastic theories to explain away the data. This was because, the fundamental social fact, if exposed, would cut at the very roots of the capitalist system in which every vice is a multibillion dollar industry used to intensify the exploitation of the working class.

Soviet scientists, on the other hand, recognised that prostitution and white slavery had their origin in poverty and in the necessity of the capitalists to exploit that poverty. Thus the Soviet fight against vice in all its forms became part of the famous Five-Year Plans in which all organs of Soviet power, including the legislature, the Peoples' Militia, the press and the Peoples' Courts were fully mobilised.

In America, sincere workers in the Church and the medical profession were severely handicapped because all organs of power served only capitalist interests. Official figures showed that venereal disease increased enormously in the United States in spite of an amazing and undoubted increase in scientific knowledge in the production of wonder drugs such as Penicillin, Sulpha drugs, etc. In early 1945, eight million men in the American Army were using fifty million individual prophylactics per month.

Next, Mr. Carter deals with abortion. Abortion is essentially due to either poverty which cannot afford the luxury of a child or due to an understandable desire to escape from the social stigma attached both to the parents and to the child born out of wedlock. The Soviet Government characteristically gave full citizenship rights to every child that was born within the borders of the Soviet Union regardless of whether its parents were married or not.

The success that attended the Soviet efforts is almost incredible considering that.

"Organized religion was smashed by the Revolution, most former restraints removed, the prostitute no longer punished as a criminal. divorce made almost effortless and cheap liquor provided by the Government".

In addition, there were

"the misery of intervention following the Revolution and the constantly increasing rate of production"

Yet the Soviet people succeeded because of the intensely practical application of revolutionary scientific method to the field of human society instead of piecemeal reforms. Soviet success can be gauged from the facts that Russian medical colleges are finding it increasingly difficult to obtain venereal cases for demonstration purposes and that a group of full-fledged technicians from the Soviet Union saw a prostitute for the first time in their lives only in the streets of New York and Toronto. The Soviet Government and people are thus building up a society in which, as Engels predicted,

"A new generation will grow up: a generation of men who never in their lives have known what it is to buy a woman's surrender with money or any other social instrument of power; a generation of women who have never known what it is to give themselves to a man for any other consideration than real love",

It is well-known how our State Governments are toying with the idea of prohibition without bearing in mind the basic truth that "more people drink because they are miserable than are made miserable because they drink". This fact was quickly grasped by the Soviet Government who were able to successfully apply it in practice by constantly and rapidly increasing the workers' standard of living. Thus the problem of drunkenness in the USSR has decreased amazingly.

In similar way, the Soviet Government tackled the problem of juvenile delinquency. In America, as a recent film puts it, "Knock on any door and you will find a Nick Romano". In Russia, the problem was solved with the same thoroughness and scientific objectivity with which they solved the other problems with the result that it has now reached a very low level throughout the length and breadth of the country.

In a fitting Foreword to this book, Prof. Kosambi of the Tata Institute of Fundamental Research, concludes with the words:

"We face the same problems in India and are now trying the American system, including prohibition. However, any profiteer is free to shorten the lives of his countrymen by denying them the essentials of life and he does this as a member of a highly respected class. The police protect him and his gains against the victims. The scientist ignores the effects of starvation, filthy lodging, lack of education upon those who made the profits possible, and rushes to help the capitalist with technical advice, medical aid, or even gratuitous praise; for who but the rich can pay well, who but those have made heavy profits endow research? As for religion, it merely proclaims that the oppressed will get their due in some other life, or still more comfortingly that they must have misbehaved, in a previous birth to suffer so now; that is, they may be ignored altogether or squeezed more painfully. The reformer, with the best of intentions, attempts to gain the benefits of a revolution without the revolution itself".

Cheap, attractive and well-printed, in refreshing contrast to many Indian publications, and written in a racy, readable style, the book is a "must" for all scientific workers. For those who wish to study the problem more deeply, a short bibliography is given mainly from American sources.

A. R. V. Murthy and N. N. N. Rao,
Bangalore.

Parliamentary Notes

Agricultural Education

Hon'ble Mr. Kidwai told Mr. S. N. Das on 19th May, 1951 that most of the recommendations of the University Commission regarding Agricultural Education concerned the State Governments and their attention had been drawn to them with a view to implementation. So far as the Central Government was concerned the matter was still under consideration.

Ayurvedic Colleges

Hon'ble Mr. Kidwai told the Parliament on 19th May, 1951 that the Government of India had not yet formulated any policy regarding the recommendation of the Health Ministers' Conference in regard to recognition of Ayurvedic Institutions and Colleges. The Government had referred the matter to the Medical Council of India and their views were still awaited.

Paniwala Maharaj

Hon'ble Mr. Munshi, Minister for Food and Agriculture, stated in the Parliament on 22nd May, 1951 that some people wanted to know whether the merits of water divining by Paniwala Maharaj who had been employed as a member of the Rajasthan Water Board had been questioned by Geological experts. Mr. Munshi said that in spite of Geological experts water was found whereever Paniwala Maharaj divined it, and the Geological experts had expressed the opinion that since the procedure adopted by the water diviner was not open to scientific investigation and proof, it could not be accepted by people who were trained in scientific methods.

Hon'ble Mr. Thirumal Rao, Deputy Minister for Food and Agriculture, informed the Parliament on June 8, 1951 that an agreement had been finalised with an American firm to carry out a survey in various States of ground water resources. The survey was estimated on cost Rs. 2 lakhs.

Defence Ministry Factory at Ambarnath

Major General Himmat Singhji, Deputy Defence Minister, told Parliament on 23rd May, 1951 in reply to a question by Mr. Amolak Chand that the factory, set up at Ambarnath solely for the use of the defence services, would commence production at the end of the year or early in 1952. He added that so far about Rs. 3 crores had been spent over the factory. It would be remembered that Sardar Bal dev Singh, the Defence Minister, had told the Parliament on 13th February, 1951 that a separate machine tool factory was to be established at Ambarnath for the manufacture of specialized tools required for all Ordnance Factories of the Ministry of Defence.

Locust Control

Hon'ble Mr. Thirumal Rao, Deputy Minister for Food and Agriculture, told the House on 25th May, 1951 that the Government of India were maintaining a Central Anti-Locust Organization since 1939. He described the measures taken to meet the locust threat. The desert breeding areas were being continuously surveyed by the Central Anti-Locust staff and the information collected was transmitted to the Central as well as the State authorities. To speed up the collection and transmission of locust intelligence arrangements were being made to set up a net work of wireless transmitters in the desert breeding areas of Rajasthan.

Pre-fabricated Housing Factory

Hon'ble Mr. Jawaharlal Nehru, the Prime Minister, stated in the Parliament on 26th May, 1951 that though some mistakes had been made in the initial stages of construction work there was not considerable loss to the Government. The mistakes had now been corrected and he had no doubt that the factory would be of considerable use and of a profitable nature. The Prime Minister referred to the help given by the National Physical Laboratory, New Delhi to the Expert Committee appointed some time back to report on what best use the factory oould be put to.

Replying to a question of Mr. R. K. Sidhwa, Hon'ble Mr. Nehru informed the House on 7th June, 1951 that the report of the Expert Committee was received by the Government on 1st June, 1951 and that the Government hoped to arrive at an early decision in regard to the recommendations of the Committee. The recommendations of the Committee were that the equipment and building in the factory were useful assets and could be profitably employed for purposes of manufacturing pre-fabricated material for houses, foam concrete products and other materials such as roofing slabs.

The Two New Labour Bills

It is understood that the Planning Commission has advised the Government of India not to proceed further with the two new Labour Bills as the Planning Commission propose to have joint deliberations with the Industry and Labour. The Bills were not discussed during the last session of Parliament. It remains to the seen if they are taken up during the next session.

Sugarcane Research

Hon'ble Mr. Thirumal Rao stated in the Parliament on 5th June, 1951 that more than 600 new improved varieties of sugarcane have been bred at the Sugarcane Breeding Institute, Coimbatore. As a result the percentage of sugar recovery had risen from 8.5 in indigenous canes to 10 in the canes grown from improved Coimbatore varieties.

The last session of Parliament ended on 9th June, 1951.

SITUATION VACANT

The services of a Radio Officer are required by a leading Airways firm. Candidates having the following qualifications should send their applications immediately to the General Secretary, Association of Scientific Workers of India, 22, Havelock Square, New Delhi :

1. **II Class Certificate of Competency, issued by P and T of INDIA or its equivalent.**
2. **R. T. O. Licence issued by the D. G. C. A. in India.**
3. **Technical Diploma or Certificate in Radio Communication equivalent to II Grade City and Guilds.**
4. **Minimum Flying Experience of 1000 Hours.**

NEWS AND VIEWS

Dr. Sukhatme elected as a fellow of the American Statistical Association

Dr. P. V. Sukhatme, Statistical Adviser in the Indian Council of Agriculture Research, New Delhi has been elected as a Fellow of the American Statistical Association. Dr. Sukhatme is the first Indian scientist to have received this high honour. The Association of Scientific Workers of India has reason to be proud of this honour as Dr. Sukhatme is one of the past presidents of the Delhi Branch of the Association and has recently been requested by the Association to be one of the Trustees.

The American Statistical Association is a scientific and educational organization founded in 1839. Its membership is over 5,000 drawn from different parts of the world. It runs a journal called the "Journal of the American Statistical Association" and has already published 250 numbers of the same.

From the current year the Association has announced the policy of electing as its Fellows foreign statisticians who have made outstanding contributions to the statistical science. The Association has accordingly announced the election as Fellows of the following 7 foreign statisticians. Their names together with description of their work as announced by the Association are given below :—

1. R. G. D. Allen, United Kingdom, who combines with rare balance a knowledge of mathematics and statistical theory, a critical judgment of economic data, and a capacity to analyze and interpret them for purposes of public policy.
2. Harold Cramer, Sweden, distinguished contributor to the theory of probability, mathematical statistics, and acturial science.
3. Maurice G. Kendall, United Kingdom, for his outstanding contributions in many branches of mathematical statistics.
4. P. V. Sukhatme, India, for his contributions and pioneering work in the theory of sampling and design of experiment.
5. L. G. C. Tippett, United Kingdom, for his contributions to the theory and practice of sampling, the design of experiment, the statistical control of quality, and the improvement of industrial practices by the aid of statistical theory.
6. John Wishart, United Kingdom, for his contributions, varied and famous, in the analysis of variance and the design of experiment.
7. H. C. Wold, Sweden, for extensive contributions to time series analysis, econometrics, biological statistics and acturial science.

Land Army to help food production

The President, Dr. Rajendra Prasad, inaugurated the Land Army of India on 6th June, 1951 at Sahibabad about ten miles from Delhi. Hon'ble Mr. Munshi, Minister for Food and Agriculture, explained that the object of the Land Army was to infuse a new vigour in the rural life of the country. The idea of a land army of this type was not new. Mr. Munshi stated that such auxiliary service for the agriculturists was in existence in the U. S. A. and several countries of Europe.

The Land Army was intended to establish a link between the researches made by the Indian Council of Agricultural Research and the cultivators. The members of the Land Army would maintain continuous contact with the extension agencies and assist in the extension work. The President in his speech said that in this country 70 per cent of the people worked on the land and it was incongruous, therefore, that India should suffer from shortage of food grains. He stressed that the members of the Land Army should bear in mind that the rural people were not ignorant of agricultural methods. They were only to be furnished with information about the latest developments in the field and this should be done in a spirit of co-operation and helpfullness. The educated persons were cut off from the rural life. It was a great step forward to get University students to join the Land Army.

In order to make the researches of the Indian Council of Agricultural Research and the general development in the agricultural sciences known to the general masses, the Indian Council of Agricultural Research have started a series of Extension Lectures. It is hoped that the public would make full use of these lectures.

Civilian Boy Apprentices Scheme

It is understood that with a view to meet the heavy demand for skilled workers in factories and workshops of the Defence Establishments, the Ministry of Defence has approved a scheme for training civilian boy apprentices in special trades. The scheme is for boys who have passed the Matriculation or an equivalent examination. The apprenticeship will be of four years duration and will be given in selected army workshops. On completion of the training the boys will be required to serve the Government as civilian trades-men for a period of ten years. The scheme is a commendable one but the Ministry of Defence would be well-advised to see that the future career of the boys selected as apprentices is well-ensured as there has been bitter experience in the case of some of the previous schemes of similar nature. Some of the young men who joined such type of training in great enthusiasm leaving their University education had nothing but grief and disappointment to their credit.

Penicillin Factory for India

In the April, 1951 issue of the Vijnan-Karmee a reference was made to the assurance given by the Minister for Works, Production and Supply that the Government would not hand over control of the Penicillin Factory to any outside agency. The Government of India have now set up a committee of management for the penicillin bottling plant located at Bombay. This plant is a part of the Government of India scheme for the establishment of a factory for the manufacture of penicillin. Plans for this factory may soon be finalised when a group of Directors and Experts of W. H. O. and the U. N. I. C. E. F. would visit India. The U. N. I. C. E. F. is expected to contribute 850,000 dollars on the condition that penicillin worth this amount must be set aside for free distribution to children and pregnant and nursing mothers for about 5 years. The W. H. O. would contribute 350,000 dollars in technical assistance for three years.

It is understood that the Government of India have also under consideration the establishment of a State—owned D.D.T. Factory either in Delhi or Bombay with the assistance of the above two organizations.

Paracillin

While a penicillin bottling plant has just started working in India and talks are going on about the proposals of setting up a penicillin factory in this country, the German Medical Association have come out with the news that German scientists have discovered a substance which in many ways is superior to penicillin. It is called paracillin. The German Association points out that the new drug, particularly because of its keeping properties, can be sold ready for use as a liquid and need not be made up either by a doctor or by a chemist on a doctor's prescription. It can be kept in liquid form for a year while penicillin only keeps for a few days in solution form.

German Institute to be shifted to India

It is understood that the Government of India have received a proposal from the Institute for Industrial Psychology and Work Technique to shift the Institute from Berlin to India. The Institute was founded in 1918 by the Federation of German Manufacturers. The Director of the Institute is Dr. Walter Moede. The functions of the Institute are to conduct research on structural laws of human work in industry, trade, traffic and administration and to apply such knowledge to practical problems in the rationalisation of work. The proposal has been sent to differerent trade interests for eliciting their opinion whether they would be interested to avail of the services of such an Institute.

Research in Railway Engineering

The Railway Stores Enquiry Committee appointed in September 1950 under the chairmanship of Mr. A. D. Shroff, has now handed over the report to the Government and a summary of the Committee's findings and recommendations was released on 18.6.51. The Committee has made important suggestions regarding standardisation of stores and expansion of research facilities. The Committee appreciated that there was progress towards standardisation of the major components of rolling stock and has urged greater attention being paid to standardisation of the large numbers of stores and equipments in general use on railway. With a view to giving impetus to indigenous manufacturers on a very increasing scale, the Committee has recommended substantial expansion of research facilities on railways by making available to potential manufacturers results of their research and also by providing tests and laboratory facilities which cannot be normally provided by individual manufacturers. In selecting alternatives for purchases, the Committee has stressed that considerations of utility, usage and lasting quality of different brands must be taken into account. The Committee has also recommended a technical examination of the existing workshop capacity with a view to increasing the range of manufacture to include stores and spare parts at present imported from abroad.

39th Session of the Indian Science Congress Association

The next Session of the Indian Science Congress Association to be held in Calcutta in the first week of January 1952 promises to be a very important one. Everybody would be glad to know that the Indian Science Congress Association has decided to invite Prof. Albert Einstein to attend the Calcutta Session. Another important scientist is Prof. Niels Bohr. Prof. Bohr was expected to attend the Science Congress Session last year but it was not possible for him to do so. It is hoped that both Professors Einstein and Bohr would be able to attend the Calcutta Session. They are sure to receive the warmest reception from members of the Indian Science Congress and the Indian people. Some of the other invitees are :—

Prof. Openheimer (U.S.A.), Dr. J. C. Warner (U.S.A.), Prof. L. Pauling (U.S.A.), Prof. G. T. Seaborg (U.S.A.), Prof. J. B. S. Halden (U.K.), Dr. B. A. Houssay (Argentina), Prof. P. K. Apitza (U.S.S.R.), Prof. J. Frenkel (U.S.S.R.), Prof. P. B. Polynov (U.S.S.R.), and Prof. Arthur Stoll (Switzerland).

The Indian Science Congress Association has discussed the question of reciprocal exchange of scientists with other countries. The British Association for the Advancement of Science expects to send Sir Edward Salisbury and Prof. A. R. Todd as their representatives to the Calcultta Session. It may be recalled that Prof. Mahalanobis, one of the past Presidents of the Indian Science Congress Association, is at present visiting U.S.S.R. and it is reported that Dr. S. S. Bhatnagar, Secretary to the Ministry of Natural Resources and Scientific Research is also visiting that country during this month.

Truely Indian

The Parliament has recently adopted Clause 60 of rhe Electoral Bill which makes provision for the marking of the thumb or any other finger of electors with indelible ink. Mr. Shiv Charan Lal, a Member from the Uttar Pradesh, felt annoyed at this Clause as he thought that we were going back to the uncivilized state. Many persons have been rather disappointed that even after such a long period after attaining independence we were still clinging to standard time, dress etc. Even the sitting arrangement in the House of the People has been modernised instead of resorting to 'Gaddi and Takya'. These persons should now be jubiliant that at least the Parliament has adopted something which is truely Indian. It is not known why Mr. Shiv Charan Lal should get annoyed. After all, do we not have a red pigment of the 'Pan' after a reception to show that we have enjoyed the refreshments at the party and are at the end of our labours ? Do not the worshippers of "Hanuman" apply the red lead mark on the forehead to pronounce their visit to the temple? Do not some people keep their coloured clothes on their bodies to vouch for their having played 'Holi'? Does not a Brahmin get branded by a 'Tilak' mark on his forehead just before he begins to take his food at a marriage party? Do not the Indian ladies use vermillion on their foreheads and 'Hina' for colouring their hands and feet on special occassions? The mark of the indelible ink would show that an elector has done his duty towards the country. It is taken for granted that the colour of the indelible ink would be a distinguishable from all the usual colours, otherwise some persons are likely to get their thumb or fingers coloured by themselves without going to vote in order to evade the advances of the competiting candidates in the election. It is presumed that the ink, though indelible, would disappear in the course of a few days after the election on account of wear and tear of the human hands. It is considered that the elections in this country would not be too frequent otherwise the ink impression at one election might not have disappeared by the time the next election took place.

ACTIVITIES OF THE BRANCHES

Abdullapur Branch

The Annual Meeting of the Branch was held on 7th May, 1951 at 6.30 P.M. in Thapar Industries Club of Paper Mills with Dr. J. C. Aggarwal in the Chair. Lala Harbhagwan, a patron of the Branch, was also present.

The Annual Report was read out by the Secretary which was followed by the announcement of the names of prize winners for the best paper of the year, Shri Amrit Lal and Shri H. S. Bawa.

The following Office Bearers were elected for the next year :—

Dr. J. C. Aggarwal	President.
Shri P. K. Nanda	Vice-President.
Shri Sansar Chand	Vice-President.
Shri P. S. Bhatia	Secretary.
Shri Ajit Singh	Joint Secretary.
Shri N. L. Jalota	Treasurer.
Shri Brij Bhushan	Members.
Shri O. L. Duggal	
Shri P. P. Joshan	
Shri Sadhu Ram Sood	
Shri V. P. Chadda	
Shri Yog Raj	
Shri Sukh Dayal	

The Meeting adjourned with thanks to the Chair and the retiring Office Bearers.

A meeting of the Executive was held on 23-5-51 at Dr. J. C. Aggarwal's Bungalow where the programme for the next year was discussed.

A general meeting of the Branch was held on 29-5-51 in United Mills Club of Paper Mills where a paper on 'Hobbies in Schools, was, read by Shri Sukh Dayal, of Government High School, Jagadhri. The paper was very interesting and instructive and was highly appreciated by the audience. It was illustrated by practical demonstration of various School Hobbies actually adopted by the students in that school under the guidance of the able teacher. In addition to the members some guests including ladies, some of them educationists, were also present.

Calcutta Branch

The following members have been elected to the Executive Committee of the Mathematical Instruments Unit of the Calcutta Branch of the Associotion :—

President	Shri K. M. Chatterjee
Vice-President	Shri N. R. Das Gupta
Treasurer	Shri S. N. Basu
Secretary	Shri H. N. Mukherjee
Jt. Secretary	Shri P. K. Ghosh
Members :—	Shri J. Sanyal
	Shri H. K. Das
	Shri A. K. Nair
	Shri S. N. Mitra
	Shri S. C. Ghosh
	Shri S. C. Chakravarty
	Shri R. R. Chakravarty
	Shri J. K. Adhya
	Shri D. K. Ghosh
	Shri A. Mitter.

Delhi Branch

The Delhi Branch has submitted the following Memorandum on the Central College of Agriculture to be integrated with the Indian Agricultural Research Institute to the Ministry of Food and Agriculture, Government of India for consideration :—

"The Association views with concern the decision of the Government to abolish the Preparatory (Pre-University) Class at the College, and to raise the standard of admission to the Higher Secondary. The Association feels that this step will create serious difficulties in the College, and is very likely to defeat the purpose for which the Collegc was established. In this respect the Association wishes to point out the following :—

1. The College was established to cater to the needs of Centrally-Administered Areas and States which have no Agricultural Colleges of their own, and among these the Higher Secondary Examination obtains only in Delhi State.
2. In the past, when such Higher Secondary Students were admitted to the First Year Class in the College, there were very few applicants seeking to benefit from this facility.
3. Matriculates from other States who wish to take advantage of this College will have to join first a College affiliated to the Delhi University and then to pass the Qualifying Examination to become eligible for admission to this College. This is an obstacle in the way of students (specially stipendaries) from these areas as after passing the Qualifying Examination they will have again to apply for admission to this College, and there is no guarantee that any of them will be admitted.
4. Following from the above if the standard of admission be raised, the only applicants from States other than Delhi will be those having I.Sc. qualifications. Students of comparatively poor calibre will be forthcoming for admission to this College, as students of ability with the I.Sc. qualification will seek other careers such as Medicine, Engineering, etc. Only those rejected by Medical and Engineering Colleges will come here with a sense of frustration, regarding this College as a last resort, and will offer psychically poor material for agricultural training.
5. The I.Sc. with Biology course, having no provision for Agricultural Training in the syllabus, will mean five years in the college with only three years training in Agriculture. On the other hand, if Matriculates be admitted, there will be full training in Agriculture with only a four years stay in the College and therefore, the students will have stronger bias for Agriculture. Besides Matriculates, being younger, will be psychically better material for imparting Agricultural Education.
6. The College will not attract village students (who are the most to be desired, if our agricultural training is to yield practical results) as (i) a five years college course will be more expensive than a four years one ; (ii) joining Agriculture College after Matriculation looks attractive to the villagers, but the stepping in of the I.Sc. or F.Sc., may take away this attraction.
7. Following from (ii) above, the villagers will not come to the College and the alumni of the College will comprise mostly of job-hunters with a marked bias for urban life.

Already too large a number of students of Agricultural Colleges are drawn from the upper strata of Indian Society and interested only in desk-work.

"The above difficulties could be overcome by retaining the Preparatory Class, as the necessary facilities and staff already exist, and no extra expenditure is involved. On the other hand, it will be a source of additional revenue to the College. Thus while no economy will be achieved by the abolition of the Preparatory Class it will considerably reduce the number of applicants from the rural areas.

"It may be relevant to mention here that the University Education Commission has advocated introduction of the study of Agriculture even at earlier stages of the education system, as seen from their recommendation quoted below :—

"Since in a democratic country sound agricultural policy must rest on the understanding and participation of those engaged in agriculture, the study of agriculture in primary, secondary and higher education be given high priority in national economic planning."

"The Association earnestly hopes that the Government will give the fullest consideration to the various points raised in this Memorandum".

Hyderabad Branch

A General Body Meeting of the Hyderabad Branch was held on 28th April, 1951 under the presidentship of Mr. Syed Mehdi Ali at Nizam College, Hyderabad.

The Annual Accounts of the Branch were adopted. The Secretary in his report mentioned that the Branch had undertaken to organise symposia, lectures and debates on 'Food and People'. Further on, he stated that the general programme of 'Popularisation of science' by organisation of scientific film shows, popular lectures and study circles would be initiated in the month of June and it was expected that all the scientific workers in the State would cooperate with the Association to make this programme useful to the general public. He thanked the various Government and other Institutions who had extended the help to the Association in this regard. He appealed to all the Scientific Workers in the State to join the Association and specially to the members present, to propagate the aims and objects of the Association. The Secretary announced that very soon a questionaire would be issued by the Association to collect data from all the scientific workers with regard to their employment, conditions of service etc. so that means to better them may be thought out and pursued.

The following resolution was unanimously adopted.

"The Hyderabad Branch of the Association of Scientific Workers of India views with grave concern the singularly inopportune drastic cuts introduced by the Government of Hyderabad in the pay scales of their employees in general and scientific workers in particular and points out that this goes against the often avowed policy of the Government of India and the Government of Hyderabad regarding the promotion of scientific education, research and development.

"This reduction in salaries in the face of the rising cost of living is bound to have an adverse effect on the quality of output of work of the scientific and technical personnel of the State whose emoluments were low enough previous to these cuts.'

"The Hyderabad Branch of the Association of Scientific Workers of India considers that in the light of qualifications of scientific workers, their special responsibilities and almost non-existent chances of promotion, the same scale of pay in I. G. currency may be retained for all the scientific personnel.

"The Hyderabad Branch, A. S. W. I. therefore, urges upon the Government to reconsider the fixation of the salaries of the scientific personnel and accept its recommendations. It further urges upon the University and other employers to consider this resolution while fixing the scales of pay of the scientific personnel in their employ."

Naihati Branch

The Annual General Meeting of the Naihati Branch held on 24-4-1951 in the premises of Messrs. India Paper Pulp Company Ltd. with Mr. S. Chatterjee in the Chair. The Annual Report for the year 1950-51 was read by the Secretary. The meeting decided to suggest to the Central Office of the Association to maintain a register of dismissed scientific workers with details.

In his report the Secretary mentioned the fact that the membership of the Branch had fallen very low, considerably lower than the minimum of 50 required according to the Rules of the Association. It was with special permission of the Central Executive Committee that they were allowed to function as a Branch. The Secretary referred to the case of one of the members of the Branch, Mr. M. L. Bose, an employee of India Paper Pulp Co. Ltd., where the Association was not able to give any direct help to the member and the Secretary asked for solidarity among the members of the Association and increased strength. Mr. M. L. Bose joined the Company in 1940 and after seven years of service continued to be in the employment of the company on an agreement for three years which was due to expire at the end of December, 1950. Three months before this date Mr. Bose got an intimation from the management that he was found to be surplus and the management could not offer him a fresh agreement. The plea given by the management was that there was re-organisation in the Paper Mill. The re-organisation simply meant a re-organisation of the departments and staff. This appeared to be only a lame excuse for driving out an employee even after ten years of creditable and loyal service. Such actions should be fought out by the Association and the Central Executive Committee should give their serious consideration. The Secretary referred to some questions asked by various members and non-members. One of the usual questions was what the Association had done for the good of the members. The Secretary said that his answer was that they could ask themselves what they had done for the good of the common members. The Association was not isolated from the members. The Association was not an individual. The Association was a joint effort of individual members and the strength of the Association, therefore, depended on the strength of the individual members.

As the number of the members had decreased it was decided to decrease the number of the members of the Executive

Committee to nine and the following members were elected to the Executive Committee for the year 1951-52.

President	Shri N. K. Gupta
Vice-President	Shri S. K. Mazumdar
Secretary	Shri S. K. Sen Gupta
Joint Secretary	Shri S. K. Mitra
Treasurer	Shri D. C. Tapader
Members	Shri A. K Bannerjee
	Shri J. M. Sen
	Shri D. B. Das Gupta
	Shri B. N. Mukherjee

Poona Branch

The Executive Committee of the Association of Scientific Workers, Ordinance Establishment, Kirkee affiliated to the Association of Scientific Workers of India has been constituted as follows:—

President	Shri K. B. Ghosh
Vice-President	Shri B. K. Sen
Secretary	Shri K. M. Saraph
Treasurer	Shri A. K. Joshi
Members:	Shri N. C. Ghose
	Shri N. S. Sant
	Shri Manohar
	Shri G. G. Wagle.

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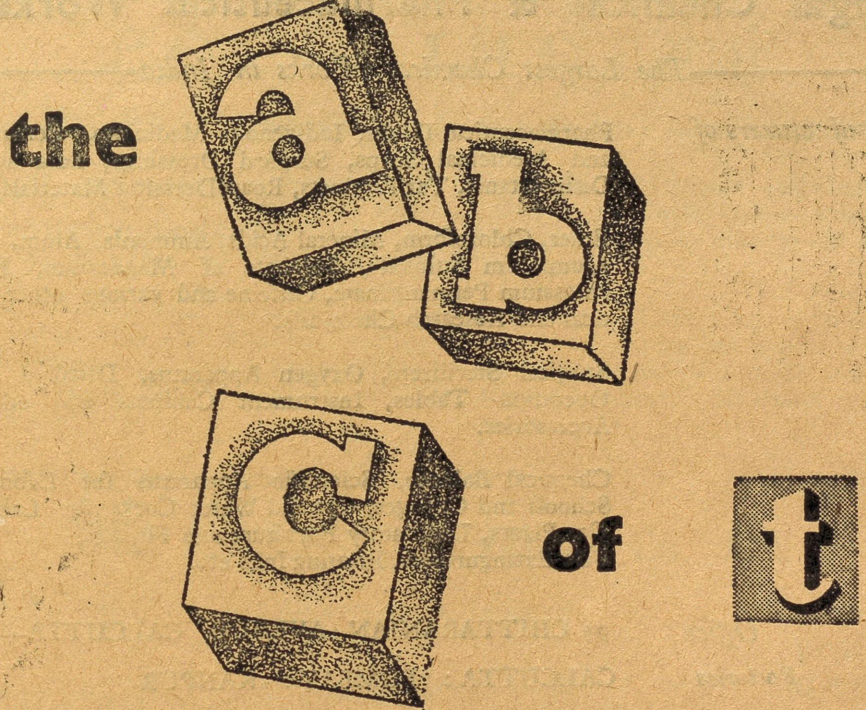

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VIJNAN-KARMEE

विज्ञानकर्मी

official organ of the
ASSOCIATION OF SCIENTIFIC WORKERS OF INDIA

Vol III] SEPTEMBER, 1951 [No 9

SCIENTIFIC INSTRUMENTS & APPARATUS FOR LABORATORIES

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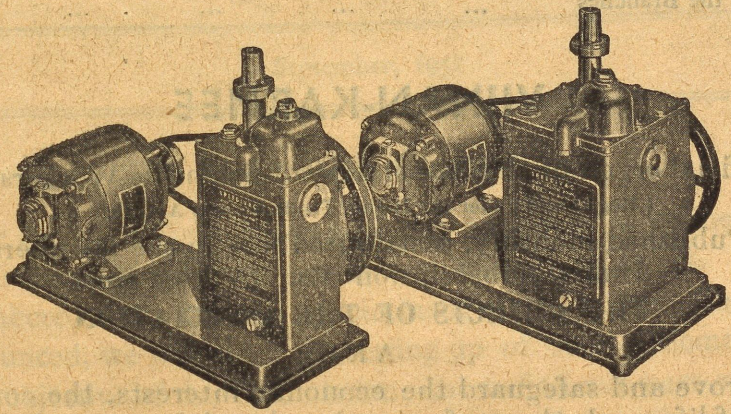

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To improve and safeguard the economic interests, the conditions of life and the professional and social status of all Scientific Workers in India

AND

To work for the most effective use of science and the scientific method for the uplift and welfare of the society as a whole.

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VIJNAN-KARMEE

विज्ञानकर्मी

VOL. III] September, 1951 [No. 9

THE PLANNING COMMISSION

The Planning Commission which was appointed by the Government of India in March 1950 has now submitted its report. It would be remembered that when the appointment of the Planning Commission was announced, we welcomed the setting up of such a Commission as the main objective of the Commission was to find out ways and means to promote a rapid rise in the standards of the living of the people by efficient exploitation of the resources of the country, increasing production and offering opportunities to all for employment in the service of the community. The Commission was to formulate a plan for the most effective and balanced utilisation of the country's resources materials, capital and human—including technical personnel and to investigate the possibility of augmenting the resources where necessary. In our April, 1950 editorial we stated that the absence of a scientist on the Commission would be a disappointment to many scientific workers but we made a plea for extending our full co-operation to the Commission. In our opinion the first and most important function of the Commission was to increase the funds for national development and to prepare a Master Over-all Plan for the whole of the country.

Some of our members considered that the Planning Commission, composed as it was, would not lead to any betterment of the economic condition of the country and we published 'Letters to the Editors' on this subject in our June, and September, 1950 issues. We also again wrote in June, 1950 issue about the work of the Planning Commission stressing the point that it would be far better to try to keep the Planning Commission on the right path than merely to take a negative attitude to it. The Planning Commission appeared to have felt the necessity of technical advice and it decided to set up an Advisory Board consisting for the greater part of persons connected with commerce, industry and labour and other associations in the technological and socio-economic field. The Commission also set up Panels for different subjects with a view to securing the association of officials and non-officials who had special knowledge and experience in their respective fields.

The Commission was required to put an Interim Six Years Plan for the development of the country for consideration by the Commonwealth Conference which was held at Colombo last year and which has come to be known as the Colombo Plan. The Planning Commission has now submitted a draft Five Year Programme which was published on 9th July, 1951. The draft is placed before the public and the Planning Commission expect to receive criticisms on the draft plan so that the final plan could be evolved after taking into consideration the improvements which might be received from different quarters. The Planning Commission has stated that the draft report now published is intended to be a document for the widest possible discussion and would not be finalised before the Commission has been able to study public re-actions to the proposals contained in the report.

We have published elsewhere in this issue a "Letter to the Editors" criticising the report of the Planning Commission. We feel that the scientific workers would have a lot to say about the recommendations made by the Planning Commission as regards development in the various sectors and we feel sure that the scientific workers would study the draft carefully and make useful criticism and we shall be glad to publish in the Vijnan-Karmee any notes on the subject received by us.

(The Editors regret that on account of some unavoidable reasons it was not possible to publish the August, 1951 issue of the Vijnan-Karmee.)

OUR INSTITUTES

Nutrition Research Laboratories, Coonoor.

The history of nutrition research in India is indissolubly bound with that of the Nutrition Research Laboratories, Coonoor. Sporadic attempts on isolated nutritional problems were undoubtedly made even in the first decade of this century but they did not continue. The science of nutrition was comparatively new and in India conditions then were not favourable for the pursuit of knowledge in nutrition. There were other pressing problems. Diseases like malaria, plague, cholera, kala azar etc., rampant in the country, cried for effctive methods of control, cure or prevention and the governmental efforts were chiefly directed in the study of thesediseases. The fact that malnutrition could be contributory factor in general ill health and in determining susceptibility to disease had yet to be proved. It is no wonder then that the work of McCay begun at Calcutta failed to take root. It was the emergence in 1911 of the Indian Research Fund Association as a non-official organisation for the initiation and promotion of medical research in India that for the first time provided conditions for the undertaking of long range research problems. Fortunately for the country McCarrison, then a young officer of the Indian Medical Service, was already deeply interested in the problem of diet and disease. It is no exaggeration to say that it was the genius and sustained efforts of McCarrison as also the foresight and generosity of the Indian Research Fund Association which sponsored McCarrison's researches that resulted in the formation of a unit for nutrition research which gradually developed into a full fledged institution, now known as the Nutrition Research Laboratories.

McCarrison started work in 1918 with one Assistant in one room on the first floor of the Pasteur Institute of Southern India, Coonoor. His objective at that time was limited as is shown by the title chosen by him for the investigation which was called 'Beri Beri Inquiry'. Early in 1920 he had to leave for England on account of ill health. He returned two years later and recommenced work at Coonoor. This attempt was also destined to be shortlived, for in 1923 the Inquiry was 'axed' on recommendation of the Inchcape Committee appointed by the Government of India to suggest ways and means to effect economies in Government expenditure. Fortunately, however, better counsels prevailed and in 1925 McCarrison was able to resume his work at Coonoor with a more comprehensive title 'Deficiency Diseases Inquiry'. The above attempts were made possible by the generous support of the late Indian Research Fund Association now named as the Indian Council of Medical Research, which was and even now is the one and the only organisation in India responsible for the promotion of research in medical and allied sciences.

McCarrison had already accumulated plenty of experience as a research worker right from the beginning of his career in India which began in 1901. Thus when he first came to Coonoor in 1918 he had made a mark as an original thinker. His further work in nutritional diseases spread his fame in India and abroad as a research worker of eminence. The great value and importance of his researches in helping to solve the nutrition problem in India was recognised by the Indian Government. This realisation came at a time when the Government was engaged in reviewing the agricultural practice and policy in the country with the help of a Royal Commission on Agriculture. Knowing that there was a very intimate connection between agriculture and nutrition of the people, the Royal Commission paid a visit to Coonoor to study at first hand the work on nutrition in progress then and to benefit from the views of McCarrison. The Commission was very much impressed with both and made definite recommendations regarding the pursuit of nutrition researches in India and the desirability of establishing at least one central institution in India devoted to human nutrition research. The Commission also recommended that institutions interested in animal nutrition and human nutrition should be situated in close proximity and should work in co-operation. The Commission further envisaged an expansion of both types of work under Provincial Governments as well. It is true that these recommendations were never fully implemented, but they certainly did help in ensuring the continuity of the work of the Coonoor Unit under McCarrison.

McCarrison was not slow to take advantage of the situation in order to expand the activities and the usefulness of the organisation under him. In 1927, while forwarding his budget for the year 1927-28 to the Governing Body of the Indian Research Fund Association McCarrison wrote as follows :—

"The work of the Deficiency Diseases Inquiry can, I feel, no longer be considered as anything else than an organisation for the study of Nutrition, both systematic and applied. The Inquiry has by degrees reached the status of a 'Centre of Nutritional Research'. Its work embraces :—

(a) The investigation of the Fundamental Science of Nutrition and of Applied Nutrition.
(b) The study of the Agricultural aspects of Nutrition.
(c) The determination of the food values of various food materials in general use in India.
(d) Investigations designed to make good the deficiencies of vegetable oils when these are used as substitutes for butter.
(e) The study of the effects of faulty foods, in their infinite variety of combination, on the animal organism as a whole and on certain organs and tissues of the body in particular.
(f) The experimental production, and the determination of the cause of specific diseases, pernicious anaemia, dropsy, scurvy-oedema, beri-beri, new growths in the stomach, gastro-intestinal diseases, stone-in-the bladder and its sequelae."

"In addition to these activities the Deficiency Diseases Inquiry is now regarded by many official and private bodies, and by the public, as a Central Information Bureau to which they are entitled to apply when need be".

"It is suggested that the 'Deficiency Diseases Inquiry' shall in future be designated simply as 'Nutritional Researches', and that my status shall become that of Director of Nutritional Researches (I. R. F. A.)"

The Governing Body agreed to the proposals made by McCarrison and from the year 1929 the 'Deficiency Diseases Inquiry' was known as 'Nutritional Research' and McCarrison was named its first Director.

Officially the title, with a slight change, still continues as 'Nutrition Research' with a Director as the head. It is, however, not quite clear when the name 'Nutrition Research Laboratories' was first used in official correspondence. It may probably have been sometime after the above mentioned decision of the Governing Body. It was a happy choice and the institution is now known the world over by that name. The name itself is probably not high sounding since it claims to be neither India, All India, Central nor National, but essentially the functions of the Nutrition Research Laboratories have always been of that of an All India Organisation.

McCarrison continued his investigations on the various problems until his retirement from the Nutrition Research Laboratories in 1935. He was succeeded by Dr. W. R. Aykroyd as the second Director. Dr. Aykroyd was connected with the Health Organisation of the League of Nations and had gained valuable experience in the nutrition problems of the world under the Organisation and he applied it in India to the fullest advantage while working as the Director of the Nutrition Research Laboratories. The work of the Laboratories had become so known by this time that Dr. Aykroyd's name became practically synonymous with nutrition in this country. After Dr. Aykroyd left the Nutrition Research Laboratories to join the Food and Agricultural Organisation of the United Nations as the Director of the Nutrition Division the work at the Laboratories was seriously affected for want of a proper guide as the Director. The work on all the aspects of nutritional research was started again with fresh enthusiasm when Dr. V. N. Patwardhan took over as the third Director of the Laboratories Besides the regular research work on nutritional problems the following activities of the Laboratories are worth mentioning.

Educational Activity

Training Courses :—It was inevitable that the facilities existing at the Nutrition Research Laboratories should be utilised for the training of personnel for nutrition work in India. As the Provincial Governments in India awoke to their responsibilities in the matter enlarging the scope of activity of their Public Health Departments, the Laboratories came to their help so far as the training of requisite personnel was concerned. At the same time there was a gradual awakening of consciousness about the importance of nutrition among the public. Naturally some public bodies also desired to have persons trained in nutrition.

The first course in nutrition was instituted in 19 7 and since then training courses in theoretical and practical aspects of nutrition have been held annually at the Nutrition Research Laboratories. Numerous people have benefited from these courses. Most of the Provincial Nutrition Sections of the Public Health Departments have been staffed with personnel trained here. Medical graduates, science graduates, health visitors, social welfare workers, teachers, rationing officers, and other laymen have from time to time attended the courses which were held during the summer months for the last twelve years with only one break in 1945. Recently the course has been modified and enlarged and the basic requirements of qualifications of the trainees have been set at a high standard. Training of personnel for nutrition work in India was a necessity which has been partly made good by these courses. It is felt that there is still plenty of scope for this work particularly with the development of public health schemes in nutrition undertaken throughout the country in the postwar period.

Facilities for Research :—Excellent facilities for research on nutrition and allied sciences have existed in the Laboratories for a number of years. During the last twentyfour years quite a number of young workers have been trained in research. With the experience of work at the Laboratories behind them several of them are occupying responsible positions in the domain of nutrition research where their knowledge is being utilised to the advantage of the country.

The Maharaja of Parlakimedi was very much impressed with the work in progress at the Nutrition Research Laboratories when he visited it in 1926 as a member of the Royal Commission on Agriculture. He generously placed Rupees One Lakh (Rs. 1,00,000) at the disposal of the Indian Research Fund Association for promotion of nutrition research. This money has been held in trust by the Association and the income derived from its investment has been utilised for maintaining two research scholarships each of Rs. 150/- per month. It is an example which should commend itself to the philanthrophists in the country. Besides the Parlakimedi Trust Fund Scholarships research workers at the Nutrition Research Laboratories have been awarded scholarships by other organisations interested in the furtherance of medical research. The Indian Council of Medical Research itself awards scholarships for deserving candidates desirous of working at the Nutrition Research Laboratories.

One drawback in the scheme of things, however, has been that the Indian Universities had not recognised the Nutrition Research Laboratories as a postgraduate centre for research except the University of Madras. The Inter-University Board was recently requested to recommend to its constituent Universities that they should extend such recognition to the Nutrition Research Laboratories. The Board has at one of its meetings accepted this suggestion and the Nutrition Research Laboratories will be considered as a postgraduate centre for research to enable the research workers to submit the results of their work done here in fulfilment of the requirements for postgraduate degrees in their respective Universities. This step in itself will certainly increase the number of young graduates seeking admission to the Nutrition Research Laboratories in order to find an outlet for their scientific talent.

Museum

A museum housing numerous exhibits forms a characteristic feature of the Nutrition Research Laboratories. Here the information on different aspects of nutrition based on findings of work at the Laboratories, as well as work done elsewhere in India and abroad, has been exhibited in a manner which appeals to the laymen who form the bulk of visitors to the Laboratories. The exhibits consist of photographs, charts and models and are so arranged as to be self-explanatory. Replicas of exhibits are in great demand by the public and by organisers of health exhibitions in various parts of the country. Unfortunately it has been possible to meet this demand only to a limited extent.

Advisory Work

For over twenty years the Nutrition Research Laboratories have played an important role in the country in an advisory capacity. As was mentioned by

McCarrison in 1927, the public as well as the official organisations looked to the Nutrition Research Laboratories as the only place where authoritative information on problems connected with nutrition could be obtained. Numerous enquiries from members of the public on almost all aspects of nutrition are annually dealt with. The Central and the State Governments also consult the Nutrition Research Laboratories from time to time. Such requests for advice may call for information or expert opinion on some specific problem or may require undertaking of laboratory investigation in addition. Wherever necessary both the methods are required to be used for the supply of advice and information. During the World War II there was heavy demand on the time and energy of the staff of the Laboratories for this type of work and it is gratifying to note that they adequately fulfilled it. The Director of the Labratories is the Secretary of the Nutrition Advisory Committee of the Indian Council of Medical Research.

Publications

The results of researches carried out in the Laboratories have been published mainly in the Indian Journal of Medical Research and in other scientific journals in India and abroad. Besides, there have been published several lectures and reviews in scientific periodicals. Between 1919-1949 over 325 papers and articles appeared in print. Two of the well-known publications prepared by the Nutrition Research Laboratories are the Health Bulletin No. 23 which has recently appeared in its new edtion and deals with the nutrition qualities and food values of different Indian foodstuffs. Health Bulletin No. 28 deals with the question of rice, the most important cereal of the country.

Future of Nutrition Research

It is clear that the eminence that nutrition research has attained in India is largely due to the work accomplished at the Nutrition Research Laboratories, Coonoor for a period of over three decades. As in the case of most achievements of enduring value the development of these Laboratories into an institution of outstanding position in the field of nutrition research in the East is due to the impetus given to it by its Foundation Director, Sir Robert McCarrison. The Nutrition Research Laboratories at present fulfil an important role in the scientific programme in the country. The needs of India in respect of nutritional research and of the translation of the fruits of such research into practical achievement towards raising the standards of nutrition of our people are so great that there is room for many more institutions like the Coonoor Laboratories That the work of this institution should expand and that it should continue to play an important role in promoting the health and welfare of our people is the wish of all the scientific workers in the country and it is hoped that very soon the Indian Council of Medical Research will be able to find out a suitable place for these Laboratories elsewhere in the country as the limited accommodation at present available to the Laboratories in the Pasteur Institute at Coonoor is a great handicap in expanding the activities.

(Based on the information kindly supplied by the Director of the Nutrition Research Laboratories, Coonoor.)

On the Moral Obligation of the Scientist

A Message from Albert Einstein

To the "Societa Italiana per il Progresso delle Scienze" on the occasion of its Forty-third Meeting in Lucca, 1-4 October 1950.

Let me first thank you most sincerely for your kindness in inviting me to attend the meeting of the "Society for the Advancement of Science". I should gladly have accepted the invitation if my health had permitted me to do so. All I can do under the circumstances is to address you briefly from my home across the ocean. In doing so I am under no illusion that I have something to say which would actually enlarge your insight and understanding. However, we are living in a period of such great external insecurity and with such a lack of firm objectives that the mere confession of our convictions may be of significance even if these convictions, as all value judgments, cannot be proven through logical deductions.

There arises at once the question: should we consider the search for truth - or, more modestly expressed, our efforts to understand the knowable universe through constructive logical thought - as an autonomous objective of our work? Or should our search for truth be subordinated to some other objective, for example to a "practical" one? This question cannot be decided on a logical basis. The decision, however, will have considerable influence upon our thinking and our moral judgement, provided that it is born out of deep and unshakable conviction. Let me then make a confession: for myself, the struggle to gain more insight and understanding is one of those independent objectives without which a thinking individual would find it impossible to have conscious, positive attitude toward life.

It is the very essence of our striving for understanding that on the one hand, it attempts to encompass the great and complex variety of man's experience, and that on the other, it looks for simplicity and economy in the basic assumptions. The belief that these two objectives can exist side by side is, in view of the primitive state of our scientific knowledge, a matter of faith. Without such faith I could not have a strong and unshakable conviction about the independent value of knowledge.

This, in a sense, religious attitude of a man engaged in scientific work has some influence upon his whole personality. For, apart from the knowledge which is offered by accumulated experience and from the rules of logical thinking, there exists in principle for the man in science no authority whose decisions and statements could have in themselves a claim to "Truth". This leads to the paradoxical situation that a person who devotes all his strength to objective matters will develop, from a social point of view, into an extreme individualist who at least in principle, has faith in nothing but his own judgement. It is quite possible to assert that intellectual individualism and the thirst for scientific knowledge emerged simultaneously in history and remained inseparable ever since.

Some one may suggest that the man of science as sketched in these sentences is no more than an abstraction which actually does not exist in classical economics. However, it seems to me that science as we know it today could not have emerged and could not have remained alive if many individuals during many centuries, had not come very close to the ideal.

Of course, not everybody who has learned to use tools and methods, which directly or indirectly, appear to be "scientific" is to me a man of science. I refer only to those individuals in whom the scientific mentality is truly alive.

What then, is the position of today's man of science as a member of society? He obviously is rather proud of the fact that the work of scientists has helped to change radically the economic life of men by almost completely eliminating muscular work. He is distressed by the fact that the results of his scientific work have created a threat to mankind since they have fallen into the hands of morally blind exponents of political power. He is conscious of the fact that technological methods, made possible by his work, have led to a concentration of economic and also political power in the hands of small minorities which have come to dominate completely the lives of masses of people, who appear more and more amorphous. But even worse: the concentration of economic and political power in the hands of a few has not only made the man of science dependent economically, it also threatens his independence from within; the shrewd methods of intellectual and psychic influences which it brings to bear will prevent the development of independent personalities.

Thus the man of science, as we can observe with our own eyes, suffers a truly tragic fate. Striving in great sincerity for clarity and inner independence, he himself, through his sheer superhuman efforts, has fashioned the tools which are being used to make him a slave and to destroy him also from within. He cannot escape being muzzled by those who have political power in their hands. As a soldier he is forced to sacrifice his own life and to destroy the lives of others even when he is convinced of the absurdity of such sacrifices. He is fully aware of the fact that universal destruction is unavoidable since historical development has led to the concentration of all economic, political and military power in the hands of national states. He also realizes that mankind can only be saved if a super-national system, based on law, would be created to eliminate for all time the methods of brute force. However, the man of science has slipped so much that he accepts the slavery inflicted upon him by national states as his inevitable fate. He even degrades himself to such an extent that he helps obediently in the perfection of the means for the general destruction of mankind.

Is there really no escape for the man of science? Must he really tolerate and suffer all these indignities?

Is the time gone for ever when aroused by his inner freedom and the independence of his thinking and his work, he had a chance of enlightening and enriching the lives of his fellow human beings? In placing his work too much on an intellectual basis, has he not forgotten about his responsibility and dignity? My answer is: while it is true that an inherently free and scrupulous person may be destroyed, such an individual can never be enslaved or used as a blind tool.

If the man of science of our day could find the time and the courage to think honestly and critically over his situation and the tasks before him and if he would act accordingly, the possibilities for a sensible and satisfactory solution of the present dangerous international situation would be considerably improved.

(Reproduced from Impact of Science on Society Vol. I No. 3-4, October-December, 1950).

'MARCH OF SCIENCE'

By

A. Rahman, Central Laboratories for Scientific and Industrial Research, Hyderabad-Dn.

(Reproduced with the kind Permission of Station Director, All India Radio, Hyderabad-Deccan)

The March of Science has indeed been glorious. It has multiplied human enjoyments and mitigated human sufferings, it has made the world shrink and has made it a family of nations. It has given man power to soar high in the atmosphere, it has given man newer and more power, and each victory of man has become a secure foundation for a greater and higher development. But there is another side to the picture as well, very aptly depicted by the famous cartoonist Low. Under the caption 'March of Science' Low showed a scared civilisation sitting on a pedestal and witnessing the march of three scientists-one marching with an atom bomb, the other with an anti-atom bomb rocket and the third half on the stage with a H-bomb in his hands. This essentially sums up the tragedy of our times-far reaching technical developments, while administrative power is lacking in control, direction and proper utilisation of such technical advances and achievements. Part of the same tragedy are the problems that we face in our own country when we find deaths due to malnutrition which can be easily treated, due to diseases which can be cured and devastation due to so-called natural calamities which can be controlled. The question naturally arises; what is the cause of this failure? Many people consider it to be the failure of science itself, they lay the blame on scientists; who according to them have unleashed demonical powers uncontrollable by man; as a despairing corollary, they advocate the closure of scientific laboratories. Fortunately for us, even though such people are very vocal they are in no position to influence or change the current of history. But the problems remain, awaiting from us mortals not only a reasonable but essentially a practical answer.

Let me restate the problem, before further analysis. The problem is this:

Why has man not been able to utilise properly and exploit to the fullest extent the technical developments that have been the result of centuries of labour ?

In attempting to answer this question I would like to state in the beginning that causes of such a state of affairs are many and complex and my intention is to study only one factor which is of relatively superior importance. This factor is a scientific mode of thought and the application of the methods of science to problems in the sphere of social activity and to the utilisation of science. I suppose, you will expect me to prove my point that the methods of science can be applied to such fields; I shall do so with an example. Scientists and non-scientists are both familiar with the concept of 'The Average Man'; of course he has no physical existence, his existence is only statistical. This concept was first advocated by the Belgian, Lambert-Adolphe Jacques Quetelet in 1831. Quetelet was an astronomer, but was the founder of scientific sociology; he applied statistics to the study of man's behaviour and called it 'Moral Statistics'. It is worth quoting Quetelet, in his own words; "Thus we pass from one year to another with the sad perspective of seeing the same crimes reproduced in the same order and calling down the same punishment in the same proportion. Sad condition of humanity! We might enumerate in advance how many individuals will stain their hands in the blood of their fellows, how many will be forgers, how many will be poisoners almost as we can enumerate the births and deaths that should occur. There is a budget which we pay with a terrifying regularity; it is that of prisons, chains and the scaffold." Such a study has not been applied to improve the condition of man and we still continue to pay the price, which has increased since the days of Quetelet, for not applying in practice a method which is not only a matter of theory but essential from the practical point of view.

It was considered before the last world war that it was the job of the scientist to design a particular machine, of a manufacturer to produce it and of soldiers to use it. The three independent fields were not coordinated and it was not realised fully that this lack of coordination affected the efficiency of the weapon. To illustrate the dedails we will take one example from the last war. As we know British existence during the last war depended upon their success in keeping the sea routes open and, during the 1941-42 period the U-boat menace was so serious that Britain was finding it difficult to keep these vital routes open. There was a shortage of aircrafts, shortage of convoys and merchant shipping and further the attack against the U-boat was not very successful. Fortunately the British Coastal Command employed Prof. P.M.S. Blackett to tackle the problem. Prof. Blackett collected the statistics for the aerial attack and found that 34% of the attacks were made 15 seconds after the submergence of the U-boat and 15% of the attacks after 15-30 seconds of submergence. Now at that time 100 ft. depth charges were used, which meant that the most effective time for successful attack was roughly 40 seconds after sighting the U-boat, as the latter gains in depth at the rate of 2 ft. per second. Consequently, the U-boat mortality was very low-one in one thousand. This meant that either the depth of charges or the time of attack had to be changed, with any delay in time the direction of U-boat also varies and the possibility of scoring a hit rapidly decreases. Hence the depth of charge was decreased and instead of 100 ft. depth charges, 35 ft. and 20 ft. depth charges were introduced, which resulted in increasingly successful attack on the U-boats, and paved the way for victory. This technique of applying scientific method to the practical and applied side of science is now known as operational research. This roughly means, as will be evident from the above example, that in scientific inventions the technical side is not all-important as was the common understanding till very recently but that the use of invention also imposes limitations, changes and modifications. Technically an invention may be of a higher order, i.e. may require greater effort to accomplish, but it does not necessarily mean that it should be of greater use and benefit as compared to a simpler and more easily obtainable invention.

The method of operational research can be applied to problems of peace-time industry; as a matter of fact it is being applied with increasingly beneficial results by various industries as for example the steel industry, the boot and shoe industry, and the textile industry of Great Britain. In certain other fields which are intimately connected with this complex and highly mechanised civilisation of ours, methods of operational reasearch are of great use, as for example in problems of road repairing. In Britain the annual cost of road repairing is somewhere over 13 crores of rupees. On analysis it was noticed that efficiency and cost varied from place to place, at one place seven men worked at the rate of 165 square miles per man hour while at another it was found that the rate of work was 19 men working at the rate of 50 square miles per man hour. This analysis led to the introduction of new mechanical devices and to the modifying of current practices to reduce costs.

In a country like India, where science has not taken firm root and where problems are complex and many we have the opportunity of avoiding mistakes committed by others and learning from others' experience and thus not undergoing all the trials and sufferings which are part of the history of evolution of other countries. It would mean analysing, to begin with, the factors that have hampered our growth in general and then specific features of a particular situation and basing ourselves on the facts collected and conclusions arrived at we can attempt to remove these obstacles in the way of our progress in the same objective way and with the same scientific spirit. Such an approach is very necessary for Indian progress as we are backward compared to other nations, have limited resources, personnel and experience, are faced with great difficulties and have to exercise the greatest possible economy of effort and materials if we are to make any headway. Let us take an example from a field of a limited nature, which incidently is of importance to Hyderabad, that of utilisation of cottonseed. Now cottonseed is an important raw material for Americans and the cottonseed oil industry in America is a very important industry, apart from cotton and oil, linters are used for making gun-cotton, and it is a source of many useful chemicals like furfural, etc.,; its cake is used as feed for cattle, while we in India have only one use for it and that is for feeding cattle, and even in this sphere it is injurious to animals when fed as a whole. For a scientist today it is not enough to say that a particular raw material can be utilised in so many industries, he has to first enquire into the utilisation of materials like cottonseed which are not utilised or not properly utilised. He has to find what factors are responsible for non-utilisation, and then suggest to the administrators, executive measures to be adopted in order to facilitate the proper use of the material. He has to think in terms of establishing new industries in order to utilise important by-products. Cottonseed as a source of oil only cannot compete successfully with other oil producing seeds, but when proper administrative measures are taken and industries started to use by-products, cottonseed can be a very important source of many raw materials, which we are short of, and which we are importing from outside India.

Once again, as you will appreciate, it is a problem of scientific study and of the application of scientific method to the difficulties that face us.

In the onward march of science if the emphasis has so far been on new discoveries, newer inventions and improvements, there has now been a shift in the emphasis to the utilisation and applications of science. Scientists are concerned with inventions and discoveries but they are also concerned with how these inventions are utilised and why they are not utilised and they consider the questions as much a part of their field of study as the technical side. This new awareness and growing consciousness is the forebearer of a new moral and intellectual era, and a befitting answer to those who talk irresponsibly of the immorality and satanic nature of science. It is the foundation of yet greater and higher developments.

"Domestic Fuels for Cities and Villages In Free India"

By

Prof. S. K. Bose, A. R. S. M., B.Sc. (Min.) (London)

(Contributed for symposium on "The Scientific Utilisation of Coal", under the auspices of National Institute of Sciences of India).

I am thankful to Dr. D. N. Wadia for the kind invitation to participate in this Symposium organised by the learned body, National Institute of Sciences of India, Delhi, with the hope that our National Government will be impressed with the array of scientific forces brought to bear on the various problems concerning this most important mineral Coal. I am putting forward few thoughts which had troubled me since I started mining coal nearly 30 years back. The following thoughts ventured to be uppermost in my mind when I read the most thought-provoking and learned Presidential Address "India in Transition—the Role of Science in the Building of New India" at the 13th Annual General Meeting of National Institute of Sciences of India held on the 1st January 1947. It has been pointed out most forcibly on that occasion that the transition period through which this country of ours is passing is fraught with great possibilities being the building period—the period for high resolve and super-sustained endeavour in every field, the time for shedding of shackles of the past centuries. In that connection Dr. Wadia further added " If the tran ition period is utilised in a dynamic, scientifically directed effort to uplift the whole structure of Indian social, industrial and economic life, there is no doubt its magnificient man-power, so far latent, or utilised to a bare fraction of its potential, applied to its great agricultural, water, forest and mineral resources, will lift the country out of its present abnormal economic and industrial depression and put it on the high road to progress and the welfare of its millions."

For the realisation of the above ideals we must stress on the application of science to agriculture and the manufacturing industries. The attempts for such applications of science may cost lot of money at the initial stages for which we should not mind. He will be a narrow-minded and reactionary patriot who will try to hinder this expenditure for full scale realisation of scientific thoughts and the rational harnessing of science to the country's manifold resources.

If we keep in mind the golden saying " Waste not want not", we can easily understand the significance of the following statement made by Dr. Wadia in the same address: "Minerals are a rapidly declining asset and the question of ensuring their maximum utilisation for the benefit of the nation is most important." Next the following sentence comes to my mind as I read in the articles on " Coal in India " by Dr. S. K. Roy in the Journal of Scientific and Industrial Research. Volume 4. No. 4 page 197. " Coal is the most important of all the minerals that we have yet learnt to use." While reading that sentence I thought that it would be just as well to say that we have yet to learn to use Coal. In the chapter on 'The use of coal in the World's Workshop' on page 783 of the book 'Man and Metals' by T. A. Richard, A. R. S. M., D.Sc., the following sentence is of great significance :—"It would appear that the ancients did not know how to burn coal properly." The posterity in Free India may continue to remark in the same strain about us if we fail to direct the country at this juncture to make the best use of our coal reserves by also remembering the following sentence on page 786 of the same book as mentioned above :—"The first intelligent use of coal in Western Europe appears to have been made, on a small scale, in Britain, which was destined in latter centuries to owe much of her industrial supremacy to this invaluable natural resource."

With this, rather too long, preamble my humble suggestion is that our non-metallurgical coals which have been proved by the modern scientists to be the store-house of the raw materials for various chemical industries and fuel oils should be subjected to distillation for the recovery of various valuable bye-products, and the combustible gases should be conveyed in pipes to the cities for use in domestic hearths or industrial plants while the residual coke should be available in the villages for cooking purposes whereby we can get over the smoke nuisance in the cities and enrich ourselves with the various valuable bye-products. For this purpose a reference should be made to the paper "Fuel Oil from Inferior Jharia Coals " by S. K. Roy and S. S. Ghosh, published in the Proceedings of the National Institute of Sciences of India, Vol. VI No. 3, pp. 363-372, and also to the Presidential Address, Section of Geology, Twenty-sixth Indian Science Congress, 1939, where it has been clearly stated that "The approximate figures for the various bye-products of tar which are at present being wasted during the annual soft coke making from the Jharia Coals is as stated below :—

1·5	million gallons	of	Motor spirit (Benzene)
3	"	"	Light Oil (Kerosene)
6	"	"	Fuel and lubricating Oils.
1·5	"	"	Carbolic acid and Creosote Oil.

21,000 tons of Ammonium Sulphate.

30,000 tons of residual Pitch.

15 Million cu. ft. of very rich gas, capable of generating about 50 million Horse Power."

While thinking on this subject of fuels, I also feel like suggesting that wood also should not be any longer directly burnt but should be subjected to distillation for the recovery of various valuable bye-products such as Wood Alcohol, Acetic Acid, Tar, Gases and the charcoal may then be used as domestic fuel for suburban areas.

Nature was very kind in lavishly endowing this country of ours with the various basic sources of wealth but our present miseries are perhaps due to our having indifferently utilised them. However it is never too late to mend our ways.

Letters to the Editors

THE CONGRESS ELECTION MANIFESTO AND SCIENTIFIC RESEARCH IN INDIA

The Indian National Congress has been ruling India for the last five years and it cannot be considered as a remote possibility that it will not be returned to power even in the coming General Elections, though not with such an absolute majority and popularity as in the past. Hence what the Congress has to offer to Indian Science and Technology in its Election Manifesto is of particular interest to scientific workers and the Indian people in general.

Taken as a whole, the Manifesto is delightful for its vagueness and easy generalisation. As the Hindustan Times has editorially pointed out in its issue of the 15th July, 1951, there are many points on which something more definite and concrete could easily have been offered to rouse the enthusiasm of the masses. How would vague statements about education being directed 'in the right channels' and it being looked upon as something which 'trains the intellec and builds the character' and now merely as a means of employment, asks the Hindustan Times, help when millions of youngmen are unemployed and because of defective education are unemployable. For the first time, we are learning from the Editorial that millions of young men are unemployable, whatever may be the reason ! But it is substantially correct when it points out the uselessness of vague generalisations. While they will be obvious in other respects, it is important to mark them prominently in the field of scientific research, as here they are less transparent.

"Considerable progress has been made," clams the manifesto, "in the development of scientific research and the application of science to industry. This must be continued and adequate provision made for technical education." It is difficult to imagine what the authors have in their mind when they claim considerable advance in the field of scientific research. Presumably they had the background of the chain of State Laboratories that were recently set up like the National Physical Laboratory, the National Chemical Laboratory and the like. It is true that considerable sums have been allotted for the building up of these Laboratories. As some of the visiting foreign scientists pointed out at the time of the opening of some of these Laboratories, one cannot be sure whether what Indian Science needs today is the provision of imposing and magnificient buildings. This does not, however, mean that suitable environmental conditions are absolutely unnecessary for scientific research. This apart, there can be no two opinions that massive buildings by themselves do not lead to substantial advances in scientific research. If this is accepted, one cannot but desire that the manifesto could have been more specific and positive both in retrospect and in prospect. The application of science to industry looks a taller chain than even this. Adequate provision for technical education has to be made with a view to the country's industrial and agricultural development. But the experience of the past does not hold much hope of an appropriate absorption of such trained technical personnel in Government and in Industry. Our own experience in the Association has led us to believe that scientific workers in many an establishment have been constantly living under very insecure conditions of employment—some were even served with notices of retrenchment. Expansion of technical education without corresponding expansion of the scope of the employment of such technically trained personnel can only be considered, taking an objective view of the situation, to be a measure aimed at lowering the market value of the former, for as things stand today, a scientific worker is as much a commodity as any other subject to the law of demand and supply.

Talking of heavy industry, the Manifesto goes on to say that priority should be given to those industries which are considered of basic importance, such as, steel, heavy chemicals, fertilisers and machine tools. Much of the industry is in the private sector of the national economy, and instead of just mentioning priority for research in these industries, we should have been glad to see a more concrete definition of the facilities that would be given to the research and the co-ordination of research taking place in different industries.

With regard to agriculture, the Manifesto promises that increased attention will be paid to the preservation of milch and draught cattle and upgrading of cattle breeds for increasing the supply of milk and improvement of agriculture. It goes without saying that the welfare and the improvement of live stock is closely related to the welfare and improvement of the farmers themselves. With an improved economic status for the farmer, he will be in a better position to look after the live stock. Technical advice for such improvement will yield results in such an improved economic condition of the farmer himself and we hope that the economic measures contemplated in the field of agriculture will achieve their desired results. The Manifesto further points out that top priority has been given and must continue to be given to river valley schemes "which are basic for the development of agriculture and power supply" while it must be admitted that the completion of many of the projected river valley schemes will provide much of basic power and water for industry and agriculture, their completion and the maximum exploitation of their possibilities cannot be accomplished without some initial economic adjustment. As a result of adequate finances, a majority of the schemes taken up earlier are now relegated to the back ground and only a few are assigned priorities. Moreover, as the Hindustan Times points out, "a rough figure should have been given about the number of houses that would be constructed and acres of fallow land that would come under the plough and also those that would get well or canal water."

The same is the case with respect to Public Health as well. "Considerable progress has been made in the control of epidemic diseases and provision of improved water supply and general sanitation, control of malaria has been effective in certain areas and has resulted in freeing these areas for intensive cultivation." This would present such a rosy picture of the situation ! Much more has to be achieved before the progress can be described as considerable.

It is common knowledge that scientific and technical work today has ceased to be individual in character and has become collective in nature. Even a scientific analysis, let alone a discovery, cannot be made without a number of scientific workers working in close co-operation. This necessitates a great solicitude for the well being of the individual scientific worker. Some of the most pressing problems facing the scientific workers today are :

(a) insecurity of service and prospects of retrenchment
(b) inadequate salaries
(c) unsuitable working conditions
(d) absence of any inducement to hard work.

The Manifesto has little to offer to the scientific worker, though it makes a mention of scientific research. One would only have liked to have seen a promise for :—

(a) a greater apportionment of funds for scientific and industrial research,
(b) a guarantee of security of service to scientific workers in Government and in Industry,
(c) an assurance that scientific and technical personnel will not have to live under the constant threat of retrenchment,
(d) and above all, a hope that the scientific worker will have his

due place in the economic life of the society he helps to mould and build.

—A Scientific Worker.

THE FIVE YEAR PLAN

The draft outline of the Five Year Plan presented by the National Planning Commission is neither path-breaking nor promising in any sense of the term. Modest in its targets, the plan promises no substantial increase in national income at the end of the stipulated period but raises doubts as to the successful implementation of various measures envisaged in the plan. We are only promised a return to pre-war standards and this is so if no dislocations in the various sectors, particularly those affecting the volume of production, are visualised. A fairly close examination of the Plan, which not infrequently contains series of disjointed remarks and proposals, prompts the question of validity of some of the basic assumptions underlying the various proposals.

Let us consider the all important question of stabilization of the price level. The Commission believes that it will not be difficult to hold the price line in view of the various measures suggested as for example, fixation of parity, rational export-import policy, stricter control etc. However we may have to fall back on deficit financing of the order of Rs. 290 crores in the absence of adequate inflow of foreign capital. Such a measure, even taking into consideration possible utilisation of the Sterling Balances will have added inflationary effects, so kicking the bottom out of the proposed price policy and with disastrous effects on the middle classes. Again, it is not unreasonable to expect price changes, within the existing frame-work, as a result of the suggested increase in excise duties and sales taxes. The Plan is silent on the evolution of practical measures and organisations for stabilising the prices. One would have expected the Commission to take more independent stand and not studiously avoid crucial problems as budget reallocation, prohibition etc. Indeed the levels of expenditure in unproductive services as Security Services will presumably remain stable. Considerable thought does not appear to have been bestowed on possible sources of finance, as capital levy, structural changes in tax system to blot out evasion etc. In this respect, a welcome measure is the proposed •death duties, although it is difficult to forecast the extent of finance that might be expected from this source.

Elsewhere in the Plan, the need has been expressed for fixing parity prices in agriculture which has rightly been accorded the pride of place. As a basic industry, measures in this will determine to a large extent the rate of subsequent economic progress in this country. It is important to reduce the disparity of prices in agricultural commodities in order to provide adequate incentive for growing more food crops etc. Again, it is equally necessary to devise ways of eliminating intermediate charges to cost that bring about the wide differences between producer's and consumer's prices. That the Commission has played about the problem of removing conflicting interests in agriculture without giving due consideration to more fundamental causes, is a fact that hardly escapes attention. One cannot help feeling the lack of vision and independence displayed in the treatment of the subject of "land reform." A co-operative way out has been suggested as a patent cure for all the ills of Indian agriculture. Co-operation is obviously a very desirable form of enterprise and in certain ways has proved highly successful. Nevertheless, if the past experience in this line is any guide, it is necessary to restrain hope with caution. Producer's Co-operatives have not had much of success in this country. On the contrary, as the 'Hindu' has pointed out in one of its Editorials, they have often helped to create vested interests, in view of the fact that a large proportion of the finances came from the big landlords. Further the 'Hindu' draws attention to the plight of co-operative weavers in the Madras State, who were starved of cotton stocks as the material had been diverted to the big mills. A sound policy in regard to allocation of materials and finances between the large industrial establishments and small scale industries is, therefore, any thing but a minor matter.

Something need be mentioned here about planning in the private sector. The Commission expresses the need for a code of discipline to be imposed on private enterprise. In an economy where any form of collectivization is ruled out and which attempts at reconciliation of the interests of the individual with the common good, the question arises naturally, in the absence of positive measures, as to the extent such a code could harmonise with the basic urge for profit-making in private enterprise. Indeed this sector has not received much attention and whatever planning there is, it has not been geared to production programme in the public sector.

It is tempting to ask if the production programme in this sector, particularly in the consumption goods industry will justify the expectations of the Planners. Otherwise, the shortage in production will undoubtedly raise prices making a bad situation worse. In such a context the Commission suggests postponement of current production in preference to future security. Surely a plan derives its usefulness from the balance of provisions it has for checking the short-term disequilibrium conditions and those aimed at building a better future! But the Plan with its many proposals holds out little promise of immediate improvement in living conditions of the majority of people.

Despite these draw-backs the sprinkling of realism visible in some of the proposals and targets merits ready recognition. Undoubtedly a great deal of basic data and study have gone into the preparation of the Plan, and this augurs well for further detailed planning. This is only an outline and let us hope that in the detailed plan to follow more thought will be given to various problems that have either been neglected or scant attention paid and a plan that is best suited to the country's needs and which will ensure the best possible results in a short time will be evolved.

S. V.

ACTIVITIES OF THE BRANCHES

Bombay Branch

The Association of Scientific Workers of India, Bombay Branch has completed its fourth year with modest achievements to its credit. Annual report for the year 1950-51 is given below :—

Membership : The total number on the membership list at the beginning of the year was 79. 62 new members (53 ordinary and 9 associate) have been enrolled and the total membership today is 129. Out of this total number of 129, 106 members are distributed in the follcwing Units :—

(i) Haffkine Institute Unit 60
(ii) Tata Memorial Hospital Unit 24
(iii) Seth G. S. Medical College Unit 22

Besides these, there are 23 members directly attached to the Branch.

General Body Meetings : During the year under review two General Body meetings were held. The first was on the 20th March 1950 to elect new office-bearers. At the same meeting a resolution was moved by Shri N. K. Varma to reduce the annual subscription, both for the full as well as the associate members in view of the grave economic situation but it was pointed out by Shri V. S. Kalbag that it was not possible for the Branch to take that decision but the Central Body should be approached. The Secretary was authorised to elicit the opinion of the Centre regarding the same. The General Secretary of the Association in a later communication has explained that due to the shortage of funds and the heavy cost of pubilshing Vijnan-Karmee the Centre was unable to reduce the rates of the subscription. At the above meeting, however, a resolution was passed that the subscription may be collected from members in not more than three instalments at the convenience of the Office Bearers of the Units of the Branch.

The Second General Body meeting was scheduled to be held on 4th November 1950 which had to be postponed for want of quorum. The adjourned meeting was held on 11th November 1950 to elect the delegates for the Central Council. The following four members were elected unanimously :—

(1) Dr. N. R. Tawde
(2) Shri Y. N. Kotwal
(3) Dr. P. N. Sarangdhar
(4) Kumari K. Ramaswami.

Shri N. K. Varma and Shri Y. S. Nimbkar were elected as alternate delegates.

The above meeting considered the two new Labour Bills along with the resolution of the Delhi Branch regarding the same. The General Body after discussion authorised the Executive Committee to go into the details and put forward suggestions for the consideration of the General Body. The General Body also passed a resolution expressing its grave concern over the unjust detention of Dr. Usch Shen Chein and Dr. Ralph Spitzer. The resolution was moved by Dr. P. N. Sarangdhar requesting the Central Executive Committee to consolidate the views of different Branches and send a resolution expressing its resentment to the Embassies concerned in our country and to the World Federation of Scientific Workers.

The Branch Executive Committee : The Branch Executive Committee held nine meetings during the year under review. The Committee considered the various issues facing the Association, the main being that of the recognition by the Government of Bombay. The Association had been in correspondence with the Government since its registration as a Trade Union in 1948 but the Government of Bombay had not replied to its request for recognition. The Committee sought the advice of the Centre regarding the matter. The General Secretary after consultation with the Labour Ministry in New Delhi wrote in one of his communications that due to the constitutional set up of the Association the Central Government alone could give a blanket recognition to the Association but the Government was not prepared to consider the question till the new Labour Bills had gone through in the Parliament. However the attempts to secure the recognition of Bombay Government have not been abandoned. The Executive Committee also discussed the steps to be taken regarding some cases of injustice done to scientific workers and has repre entated these cases to the authorities concerned.

Units: During the year under review two more Units were organised, one at the Tata Memorial Hospital and the other at Seth G. S. Medical College at Parel. We hope all the success to these Units and the Association.

Trade Union Activities: There are two cases pending before the Association. The case regarding the revision of pay scales of Technicians at the Haffkine Institute had been represented to the Government last year. The same has been pursued and an interview with the Hon. Minister for Public Health was sought but the Association was asked to seek recognition for collective bargaining before an inteview could be granted. The other case of injustice done to Dr. Sarangdhar, Ex-Superintendent of Fisheries (Marine), has also been represented to the Government but no satisfactory reply has been received and the case may be pursued further. On the whole it may be said that the Association mainly suffers in its activity due to the want of recognition and can be remedied only by gaining more strength and support from the Scientific Workers of the City.

Other Activities

The Branch organised three lectures during the year. The first one was a paper presented by Shri Y. N. Kotwal, Superintendent of Dadar Purification Works, Bombay Municipality on "Wealth from Waste" under the presidentship of the Hon. Dr. Jivraj Mehta, Minister of Public Works, Government of Bombay. The lecturer mainly described the production of fuel gases from organic waste and their economical utilisation. It was also accompanied by two technical films by the courtesy of British Information Services. Dr. Ganapathi, Assistant Director Haffkine Institute, delivered an interesting address on "Some Technical and Socio economical aspects of the Indian Patent Law" under the presidentship of Shri D. B. Daphtary, Bar-at-law Advocate General, Bombay High Court. The lecturer pointed out in a lucid address the defects of the Indian Patent Law and how it affected the Scientific Workers and the Industry. A lecture by Prof. L. Rosenfeld of Holland was arranged on behalf of the Association on 24.1.51 under the presidentship of Dr. N. R. Tawde on "Nuclear Forces". The lecture proved to be very popular and was largely attended.

ACKNOWLEDGEMENTS

On behalf of the Association most grateful thanks to the following for their kind co-operation were expressed.

(1) The Director, Haffkine Institute, Bombay 12.

(2) The Superintendent, Tata Memorial Hospital Bombay 12.

(3) Principal, Podar College of Commerce, Matunga, Bombay 19.

(4) The Director, University Department of Chemical Technology, Bombay 19.

The Association has completed its fourth year and all the members of the scientific profession are requested to take active interest and help the Association to gain more strength so that it may serve the scientific world and the country as a whole.

Calcutta Branch

The First Meeting of the Executive Committee for the year 1951-52 of the Association of Scientific Workers of India Calcutta Branch was held on 9th June, 1951 at the Department of Applied Chemistry, 92, Upper Circular Road, Calcutta-9. The following subjects were discussed at the meeting :—

(1) Organisation.

(2) Realisation of subscriptions due, and,

(3) Miscellaneous.

In the absence of the President of the Branch, Dr. C R. Das Gupta, who was unable to attend due to some previous engagement, Dr. S. Banerjee, Vice-President, was voted to the chair. The following members were present at the meeting :—

Dr. S. Banerjee (*in the chair*)
Dr. B. Banerjee
Lala G. C. Das
Dr. A. B. Roy Choudhury
Mr. S. N. Ghosh
Mr. N. K. Nag
Mr. K. M. Chatterjee
Mr. H. P. Chattopadhay
Dr. S. K. Bose
Dr. D. K. Chaudhuri (Secretary)

The members of the Committee present discussed the agenda in a very friendly atmosphere giving their constructive suggestions for the betterment of the Association. Decisions arrived at the meeting may be briefly stated as follows :—

(1) To circulate through Newspapers requesting scientific workers to convey their grievances to the Secretary of the Association of Scientific workers of India, Calcutta Branch, so that the Association might be of some help to them.

(2) To approach different Laboratories and Institutions requesting scientific workers to become members of this Association.

(3) Resolutions and decisions made at the Executive Committee meetings should be circulated to all members of the Association.

(4) To call meetings of the General Body of the Association, if necessary, to discuss urgent matters connected with the Association.

(5) Units should be requested to call monthly meetings and to organise lectures of scientific or of general interest when other members of the Association should also be invited.

(6) Messrs. K. M. Chatterjee and M. K. Nag of the Mathematical Instrument Office and Anthropology Department, Indian Museum, Calcutta respectively,

should be requested by letters to contact the scientific workers of the Survey of India and Geological Survey of India respectively and enlist them as members of the Association.

(7) The meetings of the Executive Committee of the Association of Scientific Workers of India, Calcutta Branch, should be held in different Institutions of Laboratories by rotation to create interest among the members.

(8) The Secretary of the Association should write to the President, Dr. Amal Kumar Roy Chowdhury, of the organising Committee of the South Calcutta Citizens formed against the abolition of the Lake Medical College and Hospitals, informing the Resolution taken by the Executive Committee of this Association and also should request Dr. Roy Chowdhury to take one representative in their Executive Committee from this Association.

The Branch recently held a Symposium on "Social Responsibilities of the Scientific Worker." Professors S. N. Bose and K. V. Krishnan and Dr. B. C. Guha spoke on the occasion.

Prof. S. N. Bose said that this Association could render great service if it could promote co-operation among the scientific workers of the country. It is often found that individually men are all right but in the mass they exhibit unlovely qualities. If the scientific workers co-operated and helped each other, considerable progress could be made. Prof. Bose said that scientific workers shared with the rest of the community the responsibility to see that science is used only for the good of man and scientific workers must exert themselves in this regard.

Prof. K. V. Krishnan developed his theme on the social responsibility of the medical scientist. He must see that the good and welfare of the society are advanced by his work as a medical scientist. He has responsibility not only to his patients but also to the community as a whole. Thus the disease might spread or the cause of the disease might be certain condition of living, which it should be his duty to help to rectify. Prof. Krishnan gave concrete illustrations of cases and circumstances to show how the medical scientist can discharge his responsibilities to the (i) patient (ii) family, (iii) community and (iv) profession in a satisfactory manner.

Dr. B. C. Guha said that one of the main objects of the Association of Scientific Workers of India was to promote comradeship among the scietific workers in this country, to which Prof. S. N. Bose had referred. He said that the solidarity of scientific workers was one of the greatest needs of the hour. They have to fight for their own rights and for bettering their own living conditions. This is no parochial question. If the scientific profession becomes unattractive, it is bound to have its repercussion on the community as a whole and to adversely affect its progress. Dr. Guha said that scientific workers have a special social responsibility as they are the people who are gathering the new knowledge which can be and is being used for doing great harm to mankind. The banning of the atom bomb and of weapons of mass destruction has been demanded by the Association of Scientific Workers of India. It is for all the scientific workers to mobilise public opinion on this question and make the demand irresistable. They must stand against a new war with all their united might.

Delhi Branch

The Delhi Branch of the Association of Scientific workers of India has sponsored a Symposuim on "Social Relations of Science". There has been a growing consciousness on the part of the scientists and the general public in India of the role of science and scientific thought in the general life of society; but, the need still remains to give a concrete definition of this relationship to ensure a better co-operation between science and society to their mutual benefit and advantage.

In pursuance of the above objective, the Delhi Branch of the Association of Scientific Workers of India proposes to convene a Symposium on the "Social Relations of Science" in the middle of October this year. Those interested are requested to participate in the symposium by giving an address on any subject of their choice. Details regarding the date, time and place of the symposium will be notified later. It would greatly facilitate an enlightened discussion on the subject if a paper or a brief summary is made available well in advance

Correspondence on the subject may be made with Shri M. L. Aggarwal, Secretary, Delhi Branch, Association of Scientific Workers of India, 1/3 Krishen Nagar, Karolbagh, New Delhi.

Naihati Branch

The first Executive Body meeting of the session was held on 5th June 1951 with Sri N. K. Gupta in the chair. The following business was conducted at the meeting :

(a) Suggestions received from different members for giving more publicity to the Naihati Branch of the Association by showing pictures in scientific line, arranging popular lectures from renowned scientists and distinguished persons etc. were considered.

(b) Suggestions were also received for reporting the difficulties encountered by individual scientific workers, special incidences and activities of the Units and the Branch and other affairs of general interest to Vijnan-Karmee both personally and through the Association.

(c) A resolution was passed requesting the Unit Secretaries to maintain a list of persons qualified for becoming members in the locality and to approach them and earnestly try to enrol them as new members.

(d) A discussion was held regarding the nescessity of Central Research Laboratories and National Planning and the following requests were put to the Head Quarters.

(1) Head Quarters should invite suggestions from every Branch on national planning in the industrial line on the strength of which Central Executive Committee will give suggestions to the Government on it. Central Executive Committee will also request the Government to establish a number of Central Research Laboratories which are essential for our country at the moment.

(2) Vijnan-Karmee should give more preference to the articles on trade union line to those of academic interest.

(3) Head Quarters should prepare a list of full members of the Association and supply it to the Branches, the cost of which

can, of course, be taken from the Branches.

Patna Branch

The General elections of office-bearers of the Sabour Unit of the Patna Branch were held on July, the 25th, 1950 and Sri A. B. Saran (Asst. Botanist, Rice) was elected President and Sri N. B. Syamal (Lecturer in Horticulture) was elected Secretary.

During the course of the year the members of the unit were privileged to have the talks of :—

1. Sri A. Ram, Lecturer in Agriculture on "The Importance of Animals in Human Life".
2. Sri R. S. Roy, Horticulturist, Bihar, on "The Organisation and Working of the Horticultural Section in the State of Bihar".
3. Sri U. P. Verma, Fruit Preservation Officer, Bihar on "The Fruit and Vegetable Preservation Industry in Bihar".
4. Dr. R. H. Richharia, Economic Botanist, Bihar, on "Romances with Fibres".
5. Dr. H. N. Mukerjee, Agricultural Chemist, Bihar on "The Manurial Requirements of Bihar Soils".

Poona Branch

The following details have been received from the Secretary of the Poona Branch regarding the election of the Executive Committee an account of which appeared in the June issue of the Vijnan-Karmee.

An Extra-Ordinary meeting of the General Body of the Poona Branch was held in Training Section Hall of the Meteorological Office, Poona-5, on Sunday the 24th June 1951 at 10 A. M.

2. 23 members were present. Sri S. Basu presided.

3. The Secretary gave a review of the situation since the Second Annual General Body Meeting held on 24th December, 1950. The whole question was fully discussed by the members present. The chairman of the meeting with the consent of the House, proposed the following resolution :—

"Thie Extra-Ordinary Meeting of the General Body of the Poona Branch of the Association held on 24th June 1951, having considered the present situation of the Poona Branch of the Association, resolves to appoint an ad hoc Executive Committee to carry on the management of the Branch until such time as a new Committee can be elected.

For this purpose, the following members are appointed.

President :	Sri S. Basu
Vice-President :	Sri P. K. Shirodkar
	Sri K. K. Chakraborthy
Secretary :	Sri L. Y. Sane
Joint Secretary :	Sri K. M. Saraph
Treasurer :	Miss H. K. Deshmukh
Members :	Dr. K. S. Gill
	Sri S. R. Mitra
	Sri V. S. Karandikar
	Miss L. S. Iyer

(*Ex-officio members*)

Unit Secretary PH & PW Unit

Unit Secretary, Meteor. Unit

Unit Secretary, Bhor Unit

The above Committee is hereby directed to take necessary steps for reviving the activities of the Units and the Branch".

The above resolution was unanimously approved by the House.

The Association of Scientific Workers Ordnance Establishments, Kirkee have started a Bulletin for giving information to the members on the various activities of their Association and other elected bodies.

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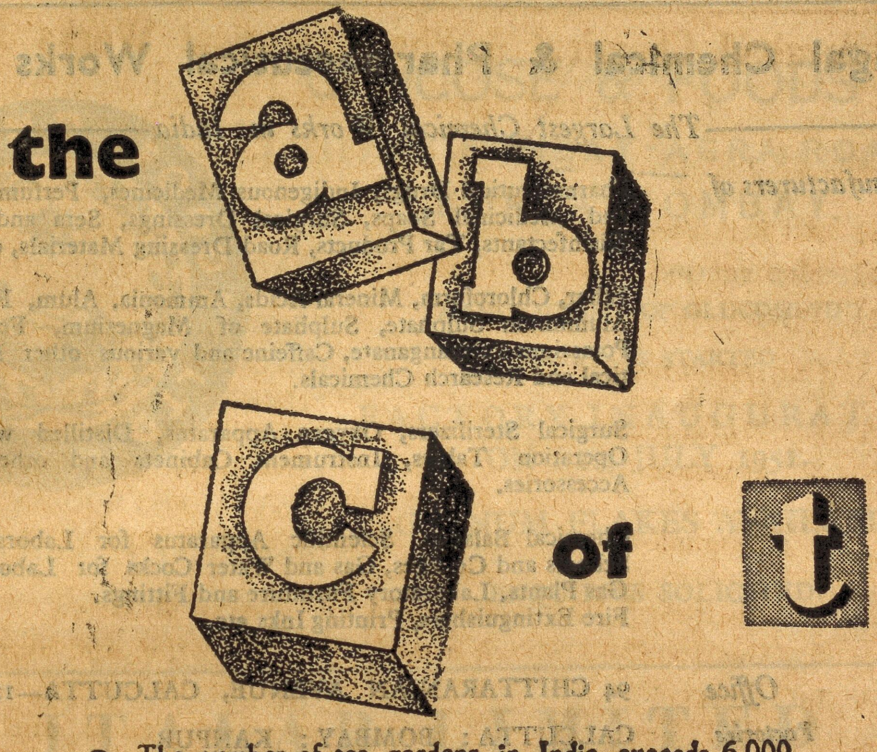

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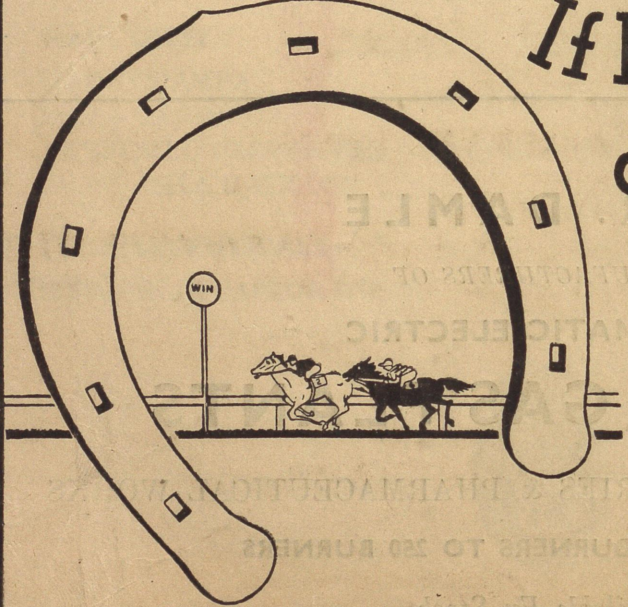

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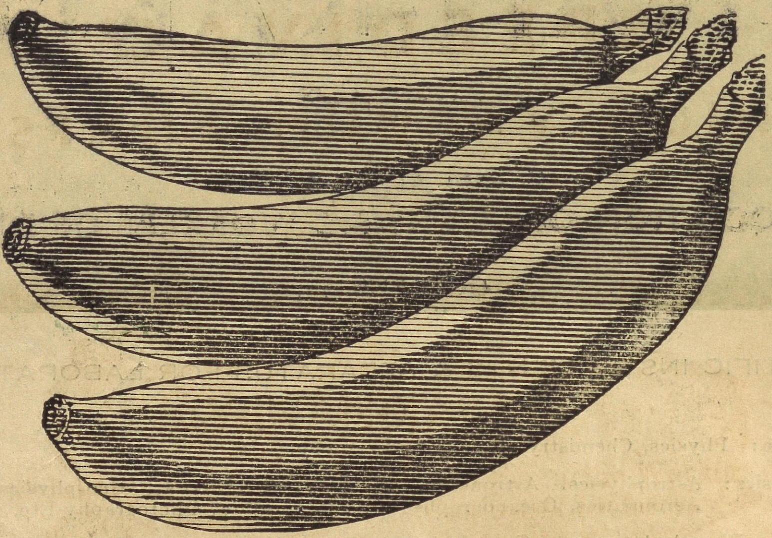

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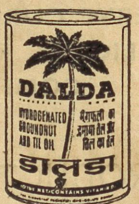

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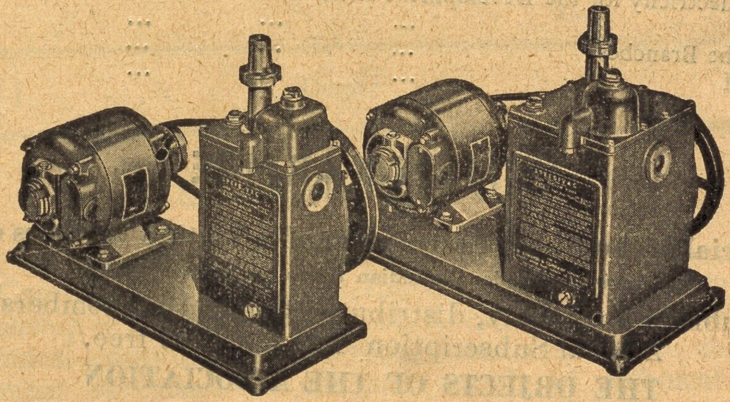

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THE OBJECTS OF THE ASSOCIATION

ARE

To improve and safeguard the economic interests, the conditions of life and the professional and social status of all Scientific Workers in India

AND

To work for the most effective use of science and the scientific method for the uplift and welfare of the society as a whole.

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2. Signed articles and letters to the Editors from the scientific persons in general and members of the Association in particular will be published. Assumed names may be accepted for the letters but the authors must give their full names and addresses. The editors as well as the Association are not responsible for the views expressed in the communications.
3. The editors reserve the right of accepting or rejecting a communication for publication as well as to make minor alterations, if necessary, before publishing the articles, letters etc. Articles, letters etc. not selected for publication can be returned only if postage stamps are enclosed.
4. Communications should be addressed to the General Secretary, Association of Scientific Workers of India, 22 Havelock Square, New Delhi 3.

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VIJNAN-KARMEE

विज्ञानकर्मी

VOL. III] October, 1951 [No. 10

TECHNICAL EDUCATION

In our November, 1950 issue we referred to the recommendations of the Committee appointed by the Government of India under the Chairmanship of the Hon'ble Mr. N. R. Sarkar to survey the facilities for technical education and to recommend steps to be taken by the Government to ensure an adequate supply of technical personnel required for post-war industrial development. We also stated that the Committee had recommended the establishment of four Institutes on the line of the Massachussets Institute of Technology and that the establishment of the Institute in the Eastern Region had already been taken in hand while exploratory work about another Institute in the Western Region was in progress. The establishment of the remaining two Institutes had been shelved for the present on account of economic reasons.

2. The Institute in the Eastern Region has been established at Kharagpur under the name 'The Indian Institute of Technology' and it was formally opened on 18th August, 1951 by the Hon'ble Maulana Abul Kalam Azad, Minister for Education, Government of India. The Hon'ble Minister characterised the prevailing system of education in the country as academic and stressed the necessity for improving the facilities of higher technical education in the country so that we could ourselves meet most of our needs for high level scientific and technical personnel. It appears that the establishment of the other three Institutes has been kept in abeyance as the Hon'ble Minister in his speech stated that the Institute at Kharagpur was intended to cater to the needs of the country as a whole.

3. We are glad that the Government of India have found one of the scientists in the country fit enough to take the responsibility of the Directorship of such an important institution. We are glad that Dr. J. C. Ghosh who was formerly the Director of the Indian Institute

of Science, Bangalore and the Director-General of Industry and Supply, Government of India, has volunteered to take up this responsibility. We have no doubt that under his guidance the Institute would take its place as one of the finest institutions of its kind not only in India but in the world. Hon'ble Mr. N. R. Sarkar also considered that there was hardly anyone in India better fitted to give a direction and purpose to an institute of this kind than Dr. J. C. Ghosh.

4. Hon'ble Mr. N. R. Sarkar in his message at the opening ceremony pointed out that institutions like the Indian Institute of Technology do not live merely by their buildings or structures, equipments or laboratories; they live by tradition. This does not, however, mean that the buildings and laboratories have no importance. Apart from the places of work, the housing arrangements for the students are very important. We have given an account elsewhere in this issue of the First International Congress of Students Housing held in Paris in 1950. The object of this Congress was to ascertain the best possible conditions of housing for students in which men and women students must live to enable them to pursue their activities to the best advantage, devote themselves to study and reflection, exchange ideas and by human contacts and friendships improve and widen their minds and judgment. Dr. J. C. Ghosh in his welcome address mentioned that they wished to develop at the Indian Institute of Technology a residential system which would merge every teacher and student into a community of men inspired by the will to live a life of the highest endeavour.

5. In our November, 1950 issue we referred to the fate of a technologist in the present state of many of the private industries in this country and expressed our anxiety as to the fate of the young scientific workers who would be taken to specialised technical education in their enthusiasm for being co-sharers in the material advancement of this country. Hon'ble Maulana Abul Kalam Azad has expressed his view that there was no point in providing specialised courses merely because such courses existed elsewhere, but that courses should be provided only if a clear need for their provision was felt. It is necessary that all the students who will be trained in institutes like the Indian Institute of Technology must be assured of suitable employment. They should not add to the present difficulties of unemployment or mal-employment of scientifically trained workers. Lord McGowan in his address entitled "1851-1951: A Century of British Industry" given at the Royal Society of Arts in January, 1951 stressed that the scientifically trained men and women in industry must be rapidly absorbed by industry, as fast as the supply allowed. He referred to the old idea that a career in applied sciences in industry was inferior in status to other professions. He said that this idea must be killed stone-dead and that the educational system must be reorganised and technical colleges upgraded to share the burden with the universities.

6. In the basic document drawn up by Unesco for discussion on the "Concept of Man and the Philosophy of Education in East and West" it has been stated that in both East and West education is today the crux of the problem. Training of technicians plays an important and efficient part in society. In his article, reproducted in this issue, on "Technology and Society" in 'IMPACT of Science on Society' Prof. Forbes has stated that there is an indirect impact of technology on society. Technology enriches material culture and hence takes part in shaping society. Technical education, properly planned and imparted, is sure to lead the country towards the goal of improving the general standard of the people and we wish, like Dr. J. C. Ghosh, that the scientifically trained technical workers dedicate themselves to the service of the motherland.

NOTICE

Members are requested to ensure that they have paid the subscription up-to-date to the Branch or Unit concerned and that they are members of good standing. The next Annual General Meeting of the Association of Scientific Workers of India will be held at Calcutta in the first week of January, 1952. The provisional date is 5th January, 1952.

—*General Secretaries,*
A. S. W. I.

OUR INSTITUTES

The Institute of Technology, Kharagpur.

The Indian Institute of Technology owes its origin to the recommendations of a Committee of Industrialists and Educationists which met in 1946 under the Chairmanship of the Hon'ble Mr. N. R. Sarkar, to survey the facilities for technical education and to recommend steps to be taken by the Government to ensure an adequate supply of technical personnel required for post-war industrial development. The Government of India took immediate action and sanctioned the scheme for the establishment of the Indian Institute of Technology at Kharagpur for training students in undergraduate courses in Engineering and Technology and for imparting advanced post-graduate instruction in selected subjects which was non-existent heretofore. The Government of West Bengal made in 1948 a munificent gift of an area of 1,200 acres of land at Kharagpur along with the existing structures standing thereon for the Institute. The site which the Institute occupies almost borders on the States of Bihar and Orissa and is within easy reach of the industrial town of Jamshedpur and the great city of Calcutta. Close contact between the Public, Industry, Business and Education, as was envisaged by the Committee can, therefore, be easily established and maintained.

In order to bring the Institute into being and to direct its functions, the Government of India appointed a 7—members Board of Governors consisting of the Hon'ble Dr. B. C. Roy, the Hon'ble Sri N. R. Sarkar, Mr. Jahangir J. Gandhi, Dr. Tara Chand, Mr. K. R. K. Menon, Mr. T. Sivasankar and Dr. J. C. Ghosh. The Board of Governors were unanimous that, pending construction of the new building for the Institute, its activities should not be held in abeyance, but the existing Collectorate Buildings should be utilised for teaching about 200 undergraduate students in Engineering and for starting a few selected post-graduate courses.

A number of post-graduate courses in Engineering and Technology have been suggested for introduction in the Institute, but the Board of Governors felt that it would be necessary in the first instance to obtain authoritative opinion from responsible experts in industry, commerce and education regarding the necessity of introducing these courses and the prospects of employment of the technologists so trained. A number of Expert Committees was, therefore, set up and it has now been decided to start six post-graduate and under-graduate courses in the Institute as recommended by the Expert Committees in addition to the (a) Civil Engineering, (b) Building Construction, (c) Mechanical Engineering and (d) Electrical Engineering Branches. The Expert Committee's recommendations are summarised below. The recommendations of the Expert Committees on (a) Refrigeration and Air Conditioning and (b) Electrical Communication Engineering are yet to be received.

1. Agricultural Engineering.

It is not advisable to open post-graduate courses until proper facilities for basic training in the subject have been provided.

So far, Agricultural Engineers have been drawn from the ranks of engineers, who had some sort of training in engineering aspects of agriculture, either through practical experience or by going through a course of studies in India or abroad. This method might have met the situation so far, but in view of the fact that the development of agriculture in the immediate future may proceed along the lines followed by Western countries, it is necessary that larger number of Agricultural Engineers are trained in the country. The yield of food grains per acre has definitely gone down. It is common knowledge that there has been a general progressive deterioration in the efficiency of agriculture as a whole. The problem is how to bring back the efficiency to the old level and then to raise it further. To the accomplishment of this task, properly trained Agricultural Engineers may contribute a good deal. A 4-year undergraduate course in Agricultural Engineering for 50 students to begin with and a postgraduate course in Soil and Water Conservation as well as in Farm-power and Machinery should, therefore, be started.

2. Food Technology.

A Department of Food and Fermentation Technology should be started in the Institute as there is definite scope for specialisation in these subjects. In a tropical country, the preservation of food stuffs is of special importance. Food grains have to be stored properly in order to eliminate wastage owing to the action of elements and rodents. Perishable foodstuffs like fish, vegetables, milk etc, also require to be handled by modern methods whereby spoilage is prevented and at the same time waste materials are utilised. It is obvious that the 'Grow More-Food' campaign loses much of its value if the food that is grown is not adequately preserved and carefully processed. In the light of the foregoing, introductory courses in Food Technology and Industrial Microbiology should be incorporated in the undergraduate curricula of Chemical Engineering students and specialised postgraduate courses (one year) in Food Technology and Fermentation Technology should be offered to such of the chemical engineering graduates who had an initiation into these subjects at undergraduate level. These postgraduate courses should also be kept open in the beginning to a limited number of candidates having M. Sc. (Tech) or M. Sc. (Applied Chemistry) or M.Sc. (Biochemistry). Co-operative courses should be organised in the Departments of Chemical Engineering, Refrigeration and Air Conditioning, and Food and Fermentation Technology in subjects of common interest with mutual advantage.

3. Business Management and Industrial Administration.

A postgraduate department for training exclusively in management subiects should be set up in the Institute at an early date. This department should offer instruction in Industrial Engineering for Engineering graduates (one-year course), in Business Management for Commerce graduates (one-year course) and in Industrial Administration (two-year course). Short term refresher courses in management subjects should also be arranged during vacation months in the Institute for the benefit of junior executives in Business and Industry, Government officers and Labour leaders who may wish to avail themselves of such opportunities.

As full co-operation of the business and industrial community of this region is considered essential in order to organise and develop this department successfully, it is intended that this Committee also function as a Standing Advisory Committee to review periodically the work of the department.

4. Mechanical Handling.

It is necessary to institute a post-graduate course in Mechanical Handling to impart specialised instruction on the various aspects of excavating, hoisting, loading, conveying, unloading and placing machinery and equipment. Persons with specialised training in this field will contribute a great deal to the successful execution of the country's development projects and the efficient operation of mines, ports and industries. The course should extend over a period of one full academic year, the first 12 weeks of which should be devoted to the teaching of the fundamental principles of design and operation of the structural, mechanical and electrical engineering aspects of the various types of mechanical handling machinery and equipment. The second term of 6 weeks should be devoted to practical training, so as to familiarise the students in the actual working, repair and maintenance of the different types of mechanised equipment used in mines, ports, construction projects, river valley development projects etc. The third term should be devoted to extending the teaching imparted during the first term with particular reference to the practical experience gained during the second term. The course should be left open to graduates in mechanical, electrical or mining engineering who had at least one year's experience to their credit in electrical or mechanical engineering practice of the type that would be beneficial for assimilating postgraduate instruction in the subject.

5. Transport Engineering.

A beginning should be made in the Indian Institute of Technology by starting a comprehensive postgraduate course in Road Transport Engineering to train mechanical engineering graduates in the engineering and service aspects of Road Transportation. Opportunities should also be provided to young engineers and transport officers who are already employed in Road Transport undertakings to receive short-term and intensive training in specific subjects relating to the service aspects of Road Transportation.

A higher technical and specialised course in Railway Transport Engineering may not be within the immediate purview of the Institute as a comprehensive scheme of examination and training by Railway authorities had ensured an adequate supply of qualified personnel to take charge of senior executive posts in Railway Engineering Services. But short term and intensive courses in specific subjects relating to the service aspects of railway transportation will prove useful to young railway engineers and railway transport officers who who are in the employ of the Railways.

There is no need to start a long-term and extensive postgraduate course in Water Transport Engineering in the Institute, but there exists some scope for teaching the service aspects of Water Tranportation in the absence of proper facilities in this regard.

6. Naval Architecture.

There is a definite need for properly trained Naval Architects. Although the requirement is limited at present, this is likely to increase gradually. In the case of Marine Engineers, the scope of employment is at present limited as the Industry is not interested in the manufacture of marine engines. This question is at the moment under active consideration of the Sub-Committee appointed for the purpose.

The Hon'ble Maulana Abul Kalam Azad opened the Indian Institute of Technology on the 18th of August, 1951. In his opening address the Minister for Education referred to the prevailing system of education in the country as mainly literary and academic. He said, "it has not supplied us with the high level scientific and technical personnel that is necessary for developing our economic and material resources, and improving the standard of life of our people. For such education we have had to send our students abroad, and from various points of view this has never been and cannot be fully satisfactory." The Hon'ble Minister said that one of the first decisions he took on assuming charge of his office was that the facilities of higher technical education in the country to meet most of our needs must be created. The large number of the youngmen who had been going for higher training could then receive such training in the country itself. He looked forward to the day when facilities of technical education in India would be of such a level that people from abroad would come to India for higher scientific and technical training. The Government of India had already before them a scheme for establishing four institutions of the standard of the Massachusetts Institute of Technology and the Indian Institute of Technology, Kharagpur was the first of them.

The Hon'ble Shri N. R. Sarkar who was unable to attend the opening ceremony on account of illness sent a message of blessings. He ended his message with the following words:—

"I have one word to add. Institutions like this do not live merely by their buildings or structures, equipments or laboratories. Institutions of the type we are building here today live by tradition. The Indian Institute of Technology must build up that tradition, for it is in such high tradition that its future success must depend. Fortunately there is hardly any one in India better fitted to give a direction and purpose to an Institute like this, ensuring its high tradition, than Dr. J. C. Ghosh, its Director. I am sure that under his able stewardship the Indian Institute of Technoloy will grow from more to more."

Dr. J. C. Ghosh, in welcoming the guests, said that the ceremony marked the beginning of the realization of a dream cherished by many leaders in education and industry in India. The students would recognise that great national leaders have released forces which are directing a new phase of development in human-nature itself in India - that the pathetic and placid contentment of a helpless and ignorant people resigned to the vagaries of fate is being replaced by a mental unrest, a faith in human effort and an urge for human betterment. He hoped that the students would serve the country not only by expert counsels in their own fields but also as leaders in community enterprises and by developing in the country that dispassionate outlook which should be inseparable attribute of the scientifiically trained mind. Dr. Ghosh stated that they wished to develop a residential system which will merge every teacher and student into a community of men inspired by the will to live a life of the highest endeavour. The primary aims would be to cultivate intellectual powers and not merely to acquire routine skills and memorise facts, to contribute to the world's store house of scientific and technological knowledge and not merely to draw upon it as ignoble parasites. Dr. Ghosh ended his speech with the following :—

"This is hollowed ground, where we are meeting today. Men have suffered here terribly in their struggle for a great cause. Men have died here so that India may become free. They believed in the ancient saying of the sages of our land - अशयं हिशरं ब्रह्म God is Absolute Fearlessness. They believed in harmony of thought, speech and action - मनस्येकं वचस्येकं कर्मण्येकं and shaped their their lives accordingly. May, those who come here, dedicate themselves, as they did, to the service of the motherland ! May something of their devoted spirits be part of our own selves ! May we forget our little difficulties and keep always before us our cherished goal ! May our students here, in fashioning their lives, transform the bit of the world in which they live and move into the ideals of those who have laid down their lives here ! May they, in the world which they create; have no fear of the future, of fellowmen, and of Nature! May that world have more enterprise than inaction, more knowledge than ignorance, more harmony than discord, more love than hate !

TECHNOLOGY AND SOCIETY

By

Professor R. J. Forbes of Amsterdam University.

Of late historians have begun to appreciate the history of technology as part of the history of civilization and sociologists have recognized its value for the study of the impact of technology on modern society. Though the history of technology as presented in modern handbooks is far from complete and shows some serious gaps, more particularly in Antiquity, the data collected are sufficient to permit an attempt to assess the social effects of technology in the past. Such studies will seldom be found in histories of technology, as engineers and technologists have not often bothered to give more than the technical evolution and they usually lack the necessary historical or sociological training.

The history of technology can be interpreted as a long struggle for co-operation between craftsmen and scientists. The one-sided contact between these two groups of students of natural objects in pre-classical Antiquity was loosened in classical times through sociological factors. Only by the end of the Middle Ages was the slow progress of technology by trial and error enlivened, as science awoke to the social importance of technology and as the leading crafsmen established a link with theoretical science. Since then, co-operation has become closer and closer. From the seventeenth century onwards the scientific societies played an important part in this process and thus laid the foundations for the establishment of technology as applied science, as we know it today.

The impact of technology on society is both direct and indirect. The direct impact is generally the most easy to study and assess. Technology is bent on extending and improving material culture by observing and using natural objects and forces. Assisted by extraneous means, Man the Maker devises methods of changing natural materials into artefacts or products that be uses. Hence the old craftsman was a utilitarian many centuries before science began to point to the benefit of mankind as one of the goals of theoretical study of Nature.

Whatever its aims and methods may be, technology is limited from the very start by Nature itself. The materials it uses have certain natural characteristics beyond which the technologist cannot go. Again, the craftsman or engineer uses and harnesses certain forces of nature, but these too have their natural limits. Thirdly, the history of technology coincides more or less with that of the machine, that is the instrument by which man partly or wholly relieves himself of the work to be done. As soon as he succeeds in getting Nature to do his job, he has created some form of prime mover. The story of technical achievement during the centuries can be written as the story of ever-increasing concentration of energy by means of prime movers on to the material to be transformed. Hence the achievements of technology during each period should first be assessed by its efficiency in working the available materials, in harnessing natural forces and in concentrating energy at the point needed for the production of the artefact or technical product.

The study of the social effects of technology should, therefore, always begin by investigating the available materials and soures of energy and by determining how efficiently they were used. This involves a proper study of the tools and instruments developed and if possible actual measurement of what can be achieved with them, because this is the only safe way of assessing this efficiency critically.

This immediately leads us to the main force behind the evolution of technology, the inventor, whose discoveries and inventions are the bricks from which the house of material civilization is built. The methods of the inventor did change during the ages, but then as now his powers were often overrated and misrepresented. Here again we find that the inventor, like the common craftsman, is not only limited by the natural characteristics of the materials and means he uses. The forms of his products are also limited by the laws of his spiritual world. The Egyptian sculptor, so characteristically called "he who makes alive", produced statues which had to conform to certain rules in order to be endowed with magical potency by the final "Ritual of Opening the Mouth" and serve the community in the desired way. As an artist and a sculptor he was able to shape his material in many other ways, as is proved by the models from his workshop, but the shape of the final product was limited by convention. We find the same when we examine tools, arms, processes and techniques. Social patterns backed by religious and philosophical concepts place restrictions on the evolution of the material equipment, even in our days of utility and materialism.

The fact that Man the Maker chooses certain of the restricted possibilities should make us wary of adopting a materialistic attitude towards the history of technology. Even in primitive societies today, material culture is linked up with many aspects of society. If therefore a given civilization will select, from the past or from its own experience, those forms that suit it, this shows that Man the Maker can never be separated from Man the Thinker. With regard to the inventory of discoveries and inventions from which each period and each civilization chooses, we can truly speak of evolution, because nothing gets lost but only pushed into the background. This is certainly not true in the history of ideas or spiritual values. Such a belief as polytheism, once a strong factor casting its shadow on technology too, has vanished forever from the Western world. This brings us to the indirect impact of technology on soceity. Technology enriches material culture and hence takes part in shaping society, not only directly, by producing goods and things, but also because in the act of creating these material achievements it acquires data that are absorbed into the spiritual world and enrich it in many ways. Conversely, the world of spiritual values has acted upon technology by making and directing its choice of the possibilities embodied in the materials and forces at its disposal.

This action of technology on society through accumulation of spiritual values, and the indirect achievements thus obtained, are most difficult to assess. A rough survey of the history of glass will demonstrate this. The earliest techniques of moulding heated sticks of glass on clay cores made only small bottles for perfumes and ointments possible. In the first century B. C. the discovery of blowing and annealing glass opend up the possibility of shaping household articles from glass, like bottles and vases, created a competitive material for household utensils, and made possible the substitution of glass for mica as a material for window-panes. Then the invention of spectacles (around 1380), and a few centuries later that of telescopes and microscopes, opened up new prospects, this time in scientific research, where glass vessels had already assisted the alchemist to study chemical reactions better. The advent of purer chemicals and casting techniques at the end of the eighteenth century provided the glass industry with the possibility of creating new and purer types of glass, and their combination made more efficient scientific instruments possible. What this meant to science and to humanity in general cannot be expressed in these few lines.

The difficulty of tracing those threads in the tapestry of civilization which belong to technology is increased when we fail to shake off our custom of comparing past civilizations with ours and transplanting modern ideas and slogans into them. Production figures and the output of factories, "invention intensity factors" or other numerical data, purely economic or political reasoning, will lead us to wrong conclusions. The very place of technology in an ancient society should be invesigated, the status of its craftsmen, engineers and inventors, the meaning of "labour", "slavery", "machine" and all those words associated with technology should be studied. Did words like "progress", "mechanization", "efficiency", "c l a s s struggle", "proletariat", "factory", "production process", "employer" have any meaning and if so, was it perphaps a different one from that of today? It is well known thas the study of the meaning of fundamental terms in the history of science has led to the recognition that the intrinsic value of such words shifts in the course of centuries as science develops. The same is true for those that pertain to technology, and its social effects could never be judged without this knowledge.

The measure of co-operation between science and technology should also be carefully studied. This should be done with due recognition of the true nature of invention, and due regard to the historical data on the transmission of discoveries and inventions. Invention is a complex of very diverse elements, and the new "combination" of data which results in the invention is not only determined by the scientific grasp of the inventor on these data but by the fact that as a child of his period he is directed in his selection. Invention is a slow, a very slow, process of accretion of little details, an evolution somewhat like a biological process, but it can hardly ever be blamed on one man only. All this long chain of inventions is governed by the spiritual world in which it takes form. The inventions are prompted by the imaginative power of that world and its real or imaginary "needs". They are often predicted by those dreamers of the world who are the real spiritual leaders of their civilization. Gradual changes in a culture, such as the growth of wealth, education and industrialization, will evoke inventions which, like plants, have a short active life, persist, but are rarely rejuvenated. Moreover "invention is the mother of necessity" rather than the reverse statement that is so commonly accepted.

The diffusion of inventions and discoveries is another important factor not to be overlooked, nor should we project the rapid spread of these inventions in modern times back into the past. For early times show even more clearly than the present day that the transmission of ideas and techniques is not directly related to the mobility of man, to the development of communication. The resistance of "recipients" and "transmitters", of discoveries and inventions varies greatly. Such resistance is the direct result of the structure and fundamental principles of culture itself. Spiritual values may defer the acquisition of material achievements much longer than will the lack of technical knowledge. Still, research on this transmission, and into the question of where and when these new discoveries and inventions buttress or conflict with the "receiving" civilization is sorely lacking in the history of technology.

The impact of technology on society can also be studied from the other end. Sociology has rightly rejected its former belief in social evolution as something akin to biological evolutionary processes. For society is even more closely bound to the spiritual world of its period than is technology. The social order is firmly founded on the religious and philosophical tenets of a civilization. It is not static, but its changes are apt to be slow, as basic tenets will not suddenly change. Here the way in which new techniques and technical products are prompted, acquired and absorbed can be traced and interpreted with a proper knowledge of the basic techniques and the scientific principles involved. A study of the changes in social structure, its forms and its terminology can yield invaluable data for the history of technology.

The most urgent requisite for the history of technology is the creation of histories of technological equipment, tools and instruments as well as processes, with proper attention given to the social impact.

Up to the present moment this field has been practically unexplored, and it is bound to yield more material concerning the social impact of technology than any other. Careful attention should be given at the same time to the scientific and technical terminology of the period, in order to assess the social consequences at their proper value. Only when this is achieved can we judge more accurately the impact of technology on society.

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STUDENT HOUSING

During the summer of 1950, the University City of Paris (Cité Universitaire) had been the scence of the First International Congress on Student Housing, at which gathered delegates from some twenty different countries.

The object of this Congress was to ascertain the best possible conditions of housing for students in the widest sense of the term, that is, conditions, in which men and women students must live to enable them to pursue their activities to the best advantage, devote themselves to study and reflection, exchange ideas, and by human contacts and friendships improve and widen their minds and judgment.

The first consideration was the problem of housing in its narrowest and most exact meaning. And this in itself is already of prime importance.

It is not enough, however, to build houses, rooms, dining-halls. They must be built according to a principle to allow the student to attain to the fullest the things for which he lives. His dwelling-place must be a part of his life, it must help to forming the kind of spirit that is the aim of the University, the human ideal that it seeks to impart to the student.

It is this respect that the Congress on Student Housing has an interesting part to play. A thousand questions arise when students' houses or University cities have to be built, when they have to be furnished, students and teachers made to live and grow in them, conditions created for them to work in and to get to know one another, when they have to be run either with or without the students. Other problems are concerned with their location. What site would be the most suitable in relation to urban centres of population, how best can these centres of work and study be protected from disturbing influences from the outside and yet how best maintain, between such homes and the outside world, the contact and exchange necessary, for without them the student would develop away from the world or reality and would thus miss his true purpose, his true purpose being to learn to know and understand the world.

Further, other questions must be examined from the administrative and financial point of view. These are the management of students' homes, for instance. Other communal experiments must be studied. The students' private means must be considered, as well as the contribution that can be made by the authorities and private initiative. This is a particularly acute problem in view of the increase in the number of students from all social classes.

Still another problem is the organisation of the public services of a student city in relation to the students' needs in the realm of culture, social life, artistic pursuits, sport, material requirements, as well as hygiene and health.

One more problem is that of the furnishing and interior decorating of the bedrooms, living rooms, the technical building processes, the maximum number of rooms per building, the housing of married students etc.

Delegates from twenty different countries devoted themselves to the study of these problems over a period of four days. They consisted of educators, sociologists, architects, town planners, specialists on cultural problems and community life. They numbered 215 : 155 from abroad and 60 from France.

It was the first time that people have met in such large numbers to study internationally so precise and so far reaching a social programme. (Based on information published in News from France 1-1-51).

"Hobbies and Handicrafts in Schools"

Sukh Dayal M.Sc. B. T., Science Master, Government High School Jagadhri.

To quote Mrs. Beverly,

"A hobby will make you charming. For charm lies in self-forgetfulness. A hobby will contribute to your success if you are a business or a professional person. A hobby will keep you young—even make you younger. A hobby will be a solace when all the world seems to go wrong. A hobby will fortify you against the flagging years. Lasso one now and train it and ride it hard. If you weary of it, break in another."

Hobby is something which appeals to the very spirit. This gives man an outlet for the full expression of one's erstwhile dormant faculties. Man is inquisitive by nature and inquisitive and creative he must remain for the whole of his life unless he chooses to dull his faculties and go againt nature.

Most of us work for 8 hours to earn our living, sleep for 6-7 hours and spend 2-3 hours to look to our personal cleanliness and take our meals. Still we can have 5-6 hours as our leisure time. It is open to us either to fritter away our energy or canalise it into useful channels. We should cultivate some hobby but such a pursuit should be educative, recreative, ennobling and profitable if possible.

If we picture to our mind how much time we waste, we shall begin to tremble in our shoes. Just visualise how much time we idle away in gossips, how much time we waste in roaming about aimlessly or while away in playing at cards or at chess not with the idea of refreshing our fatigued or worn out minds but to kill time.

Just think of an Indian farmer, who is the back bone of the society. He is idle for more than six months in a year. Devil finds idle hands work to do. So no wonder, he embroils himself in litigation and petty feuds. He has never cared to learn how to make use of his leisure time. Is it not a colossal waste of time for a nation which is starving, a nation which has still to show the world that it is capable of retaining the hard won freedom and still further to contribute its share in every sphere of human activity so as to win respect and occupy an honoured place in the comity of nations ?

'Child is the father of man.' Every where education of the young is stressed for it is in that period when the impressions made are lasting. In this impressionable age of 4-16 years, you can mould or train your child into anything you want. It is this period when you can arouse sentiments, develop a keen sense of patriotism, teach morality and inculcate in the mind a civic sense, a love for justice, love for work and a consumate desire to be useful and serviceable.

So school period is the most important period in the life of the child. No wonder, in all civilised countries keen interest in schools is taken by all, parents, educationists, social workers, politicians. Curricula are well thought out, activities are well planned and conscientious teachers of high calibre and good education, men with initiative and progressive outlook on life are selected to impart education to their children who will be the masters of the country in due course.

In India our education lacks in many respects. Social education is altogether non-existent. Hobbies and Handicrafts are not regular subjects in the curriculum. We rarely come across schools or colleges where such things are taught regularly. So what is the result ? Boys leaving the the school find themselves at sea. The knowledge they acquired by rote is soon forgotten. They had never the chance to develop taste in any recreative work or a profitable pursuit to keep them busy and widen their interest and outlook. This sorry state of affairs must end soon. It will take time for the educational system to be overhauled. In the meantime, we whether we may be teachers, guardians, parents, social workers, should see that our children who are fast growing do not suffer in all-round education. We should strive to create multifarious interests in our children so that they may choose one or two occupations to adopt as their life-long pursuits when they grow up.

Don't you feel disgusted when you see a science graduate unable even to mend a fuse if electric current fails in his house, unable to prepare ordinary washing soap or writing ink or mend a puncture much less overhauling a bicycle ? The young man may on the other hand know relativity theory (,perhaps the three dimensional equations of Einstein) or laws of thermodynamics. There is nothing wrong in learning these things. These must be learnt but what I mean to drive at is that we should be practical people right from the start. We must be familiar with the working of simple things of daily use around us and try to set them right if something goes wrong instead of calling in a mistri every time to do a petty job. We must develop in us a practical sense so to say.

I often talk to my students, "If every German soldier could be a mechanic and a motor driver, why not you" ? I often seize opportunities of telling the boys some stories of great inventions and describe to them the life of the inventors. Such stories and accounts when told in a colourful way never fail to create interest in the boys. In fact boys like these things so much that they sit spell-bound and never feel such talks boring.

For some years past I, in my humble way, have been trying to inculcate a love of hobbies among my students. The response has always been encouraging. I feel proud to say that by organising the hobbies not only I myself have gained a lot but my old students (some of them studying in colleges and some fixed up in service or business) who come to see me, express the feeling that they really learnt something worth knowing at school and they never fail to enqnire as to how the 'Hobbies Club' is going on in the school. They feel so much interested. It gives me pleasure to find that most of the boys are maintaining interest in their hobbies and in a few cases I can see signs of their becoming specialists.

A hobby or a handicraft today, who knows, may carve out a profession for the boy when he grows up. A wise parent, a real teacher is always on the lookout for an opportunity to create a taste for some hobby in a child. Take a child to a library, give him books of his taste. Let him browse at will. Soon he will feel interested in reading and may become a scholar one day. Give a child a mechano set. Let him build a simple model. Soon he will like to build another, though more complex in nature. One successful attempt will prove to be a stepping stone for another. It is just possible, the child may grow up to be a first rate engineer. How is it that America today leads the world in engineering? Those who have seen things for themselves tell us that there is hardly any town where there is no mechano club. Every child possesses some sort of mechano set. What better gift or present can be given to a child than a mechano set?

To my mind nothing seems more instructive and nothing which calls for higher intellectual training as well as practical skill as models making. I always encourage my boys to make any type of model or devise any interesting experiment that he might like to perform. In doing so I know the boy will have to overcome many types of difficulties. He might be required to saw wooden planks, plane them, nail them or solder a plate, bore a hole in wood or cardboard, attach a spring, fix screws and perhaps bend a tubing.

Some of my students have prepared good working models of fire alarms of several kinds (using mercury, using a metal rod for expansion, or melting of wax), vortex rings box (NH_3 and Hcl or smoke produced by burning turpentine oil), electrical devices, water mill, water turbine, steam turbine, simple dynamo etc. Now a days one of our students is actively busy in building a good house of cardboard, fitted with doors, windows, ventilators, an electric line with a fuse box, switches etc. All the furniture inside the room is to be toy furniture.

The importance of models making is recognised in all quarters. Haveli project Dam, like other dams, would not have come into existence had experiments on models not been tried to begin with. Mr. R. B. Khosla and Mr. Bose of the Punjab Irrigation Research Institute who earned international fame for building a dam over sandy strata at Haveli Bahadur Shah in the West Punjab evolved the plan after long experimentation over models.

All the companies which build motor cars, aeroplanes, ships, have in their laboratories scientists building up and designing new type of toy models, testing various theories and studying various factors like stream-lining, resistance to air, speed, the type of the engine, size of the engine etc.

In India, as far as my knowledge goes, there is only one institution in Bombay where all those who are interested in hobbies work or models making assemble in the evening and spend fruitful hours. An annual competition is held and prizes are awarded. If a net work of such institutions, partly financed by State or some philanthropists or leading industrialists like Birla, Dalmia, Thapar and Puri, spreads throughout the length and breadth of the country, there is no reason why our country should lag behind others in scientific achievements.

There are 70 boys in our Club. As all work together we have divided them into groups according to the liking of the individuals. Hobbies work is attempted on Saturday after school hours. Periodic shows are arranged. Some of the hobbies attempted are :— (1) Toys Making. (2) Food Products. (3) Photography. (4) Plaster Work. (5) Magic Lantern and Slides making. (6) Models (7) Painting and Varnishing. (8) Mechano Models (9) Models making and interesting experiments. (10) Making Wax Papers, Sand and Glass papers. (11) Locks repair and fitting keys to locks (12) Making envelopes, flower pots, kites, buntings. (13) Making Puggas (the earthen moulds) used in Metal Industry. (14) Weaving of Durrees and satches, making of hand fans. (15) Overhauling of a bicycle.

"Earn While You Learn"

There is no doubt about the fact that our present system of education is one sided. It fails to develop all the faculties. We lay more emphasis on theoretical rather than on practical side. The present curricula hardly impart any training of hands and limbs and without such education we lack the real outlook on life and its problems which one gets after having experienced practical difficulties. There must be launched a movement, "HANDICRAFTS FOR ALL" in the schools. Out of 5-6 hours that are devoted to studies, one hour may be devoted to hobbies and handicrafts. In my opinion every class must be given training not in one handicraft but in several.

The school stage is to develop all the dormant faculties in the child. A boy should try his own hand on every handicraft that he is fitted for according to his psychological age. In higher classes, the boy may pick up some trade or handicraft as his main occupation for future.

In the present set of things only a few handicrafts can be started but the main idea at school stage should not be so much as perfection in one handicraft or art but acquisition of general minimum efficiency in a variety of handicrafts and hobbies. Every boy must spend some days in learning all the handicrafts and hobbies set for the class.

If class-wise handicrafts are fixed upon in the school, the boys can learn many handicrafts upto the middle class standard. In higher classes the aim should be specialization of the handicrafts chosen by the student according to his bent of mind. But such handicrafts should be of a nature which should bring in sufficient income for the student to pave his way in after life. The boys should be allowed to pay their school dues through their earnings.

In the ideal state of affairs a school should be self sufficient in its needs. It should rather be a work centre, a hive of busy bees, humming with activity, fitted with small handy modern machines suitable for cottage industries.

There should be set apart (in due course, of course) special rooms in the school where all such machines or appliances to be worked by the students are set up.

India being primarily an agricultural country, the foremost importance may be attached to agriculture. It is all the more crying as we, as a nation, are short of food. Any knowledge imparted to the youngsters to produce two blades of grass where one already grows will prove beneficial to the nation and no subject provides better field of nature study than this subject. A school worth the name must have an orchard, a vegetable garden, a nursery, a dairy farm, a poultry farm and a bee colony if possible. Composing should be taught to conserve cow dung, sweepings and all sorts of refuse.

In America schools are centres of all activities. The science master assisted by his students analyses routine samples of town water supply, milk, milk products or food products for the municipality of the town. So in a small town the school teacher is a sort of Public Analyst. Such things can be arranged in our country if the experts put their heads together. The Municipality can pay some money by way of such services to the school. It will prove economical to the municipal committees, a source of income to schools and a training in applied science to the senior outgoing students.

(Summary of a paper read at the Abdullapur Branch meeting held on 29-5-1951).

NEWS AND VIEWS

1. Bulletin of the Technical Club, Maithon

The publication of a Quarterly Bulletin by the Technical Club at the Maithon Camp of the Damodar Valley Corporation is a good sign showing a desire on the part of the large number of workers to have a common platform on which their several problems could be discussed. The Technical Club was formed on 22nd March, 1950 as a result of the efforts of Shri Kamlesh Ray and Shri D. Venkataraman. The purpose of the Club is to arrange (a) technical lectures and discussions of general interest (b) outings and tours to places of technical interest (c) facilities for technical hobbies (d) to develop a technical library of reference books and journals and (e) to maintain records of the club activities in the Bulletin.

2. Scientific Films

The Association of Scientific Workers of India at their Fifth Annual General Meeting held at Bangalore on 5th January, 1951 passed a resolution recommending to the Ministry of Information and Broadcasting, the Ministry of Education and the Film Industry in the country, to co-operate with the scientific workers in producing scientific films which could be used for popularisation of science. The Ministry of Information and Broadcasting have advised the General Secretary of the Association that the Ministry would be glad to receive suggestions regarding production of films on scientific subjects. Any suggestions regarding scientific films should be sent to the General Secretary. Association of Scientific Workers of India.

3. Facilities for Scientific Workers to attend Meetings of Scientific Associations.

The Associatiation of Scientific Workers of India in their Memorandum regarding the scales of pay and conditions of service of scientific workers had suggested that the scientific workers should be given all facilities to attend or take part in the meetings organised by scientific associations like the Indian Science Congress Association, the National Institute of Sciences of India, Institute of Engineers and other similar bodies. The General Secretary of the Association has now been advised by the Ministry of Natural Resources and Scientific Research that they have considered that Government servants who are invitees, members, official delegates of the organisation concerned or have been asked to read papers at a conference may be given facilities to attend meetings by the grant to them of special casual leave to the extent required. It is also suggested by the Ministry that requests from individual Government servants for leave to attend meetings of scientific associations may be considered in the light of the above decision.

4. Professor Khankhoje on Agricultural Education in India.

Professor Khankhoje, who came to India to work as the chairman of a committee on agriculture appointed by the Madhya Pradesh Government, has gone back to Mexico. Prof. Khankhoje exiled himself from India due to political conviction in 1906 and he is a naturalised Mexican citizen at present. Prof. Khankhoje has a wealth of knowledge gleaned from many years of work and study of agriculture and allied sciences in the U.S.A. and Mexico. He has referred to the system of education in India and expressed his opinion that our agricultural schools and colleges should be scientific and practical to the extent that every student who enters these institutions should work as a common labourer and practise all kinds of operations, earning his livelihood and education through money earned in these institutions. He has stated that unless our graduates learned the dignity of labour and the application of sciences in agriculture there was not much advantage of theoretical and liberal education. Our students should learn the exploitation of land and not the exploitation of man by man.

(abstracted from American Reporter, 22nd August, 1951).

5. Oil Refineries in India.

It is understood that the Government of India is negotiating with some foreign companies operating in this country for the establishment of a two million ton oil refinery in Bombay State or two refineries of one million ton each in Bombay and Madras. A proposal for the establishment of oil refineries in India was mooted three years ago. A six man committee, formed by some of the major oil companies operating in India in 1948, had reported against the proposal on account of the exceedingly heavy cost involved. The Government of India have now asked these companies to re-consider the proposal. On account of recent developments in Iran, many Indian oil technicians have been compelled to return to this country and if the scheme of setting up a refinery materialises it would help to find employment for the Indian technicians. There is at present only one small refinery at Digboi in Assam which meets a very small part of India's requirements.

6. Statistics and Industry.

The importance of statistics for efficient management of industries was stressed by Dr. John Mathhai in his address at the annual meeting of the Bureau of Industrial Statistics. He emphasised that statistics was knowledge but the right use was wisdom. He warned statisticians against the abuses of an over jealous and an unintelligent application of statistics which had a demoralising effect on the standard of objectivity and scientific detachment expected of statisticians. Dr. Mathhai suggested the establishment of an all-India cadre of statisticians, controlled by a central body, assuring their financial security and independence. With the setting up of such a central organanisation, the scope of statistical information could be increased and its quality improved.

7. Advisory Body for All India Radio.

The Ministry of Information and Broadcasting have constituted a Scientific Advisory Committee to study and advise on up-to-date methods of broadcasting. The Committee consists of Mr. B. V. Baliga (Convenor and Chairman), Mr. S. N. Kalra, Dr. K. S. Krishnan, Director, National Physical Laboratory, Delhi and Prof. K. Srinivasan of Indian Institute of Science, Bangalore.

PARLIAMENTARY NOTES

1. Planning and Prohibition.

Professor S. N. Mishra, Parliamentary Secretary to the Prime Minister told Mr. H. V. Kamath in Parliament on 20th August, 1951 that the question of prohibition was being examined by the Planning Commission and the Planning Commission would make its recommendations only after the investigations under way in the States of Madhya Predesh and Bombay were complete.

2. Kosi Project.

The Prime Minister stated in Parliament on 22nd August, 1951 that the Kosi Project in Bihar had not been included in the First Five-Year Plan because of various difficulties. Hon'ble Mr. Sri Prakash, Minister for Natural Resources said that the project was at present being examined by an Advisory Committee.

3. New Iron and Steel Plants.

Hon'ble Mr. Hari Krishna Mehtab, the Commerce and Industry Minister, stated in Parliament on 23rd August, 1951 that the Government had not finally given up the idea of installing two iron and steel plants, one in Madhya Predesh and the other in Orissa. This matter had also been considered by the Planning Commission.

4. Tariff Commission.

The Parliament passed the Tariff Commission Bill on 25th August, 1951. During the third reading of the Bill, several

Members of the Parliament laid stress on the importance of consumer interests in protected industries. Mr. Hussain Imam and Mr. Syamanandan Sahaya emphasized the need for a stable import policy for the industrialisation of the country. Mr. Imam wanted that even the import policy should come under the purview of the Tariff Commission.

5. Scientific Man-power.

Hon'ble Maulana Abul-Kalam Azad told Mr. S. C. Samanta on 4th September, 1951 in Parliament that of the recommendations of the Scientific Man Power Committee three schemes were under implementation, namely (1) Research Scholarships Scheme, (2) Practical Training Stipends Scheme (3) Scheme for Grants to Universities and Research Institutions.

6. Vanaspati Bill.

The Parliament took for consideration on 6th September 1951 Pandit Thakur Das Bhargava's Bill for the banning of vanaspati. Mr. V. J. Gupta spoke in defence of vanaspati. He said that there was insufficient ghee to meet the needs of the country and ghee was too expensive. In any case vanaspati was pure and much purer than the other crude edible oils. If the country did not want to eat vanaspati we could still produce it and export it with profit. Hon'ble Mr. K. M. Munshi told the House that vanaspati was found to be not in any way deleterious to health as the result of investigations carried out by a panel of scientists in the country and if it was used for adulteration of ghee it was another matter. This did not provide any ground for banning the production of the article altogether.

7. Cure for Leprosy.

Raj Kumari Amrit Kaur, the Health Minister, stated in Parliament on 12th September, 1951 that a request was made to the Soviet Government for information regarding a drug for leprosy cure reported to have been discovered in Russia. The Soviet Government had intimated that the matter was still in an experimental laboratory stage and that no drug had been released for sale on the Soviet market.

8. Aluminium Industry.

Hon'ble Mr. Hare Krishna Mehtab stated in Parliament on 14th September, 1951 that plans for the expansion of aluminium industry in India were being investigated by the two main aluminium factories which together produced 3,678 tons as against the total requirements of 15,000 tons. One of the factories was making a survey to start another factory. The other had asked for financial assistance from the Government. The Minister stated that no subsidy was needed to be given to the industry because Indian prices compared very favourably with those of imported materials.

9. Synthetic Petrol.

Hon'ble Mr. D. P. Karmarkar, Deputy Minister for Commerce and Industry, told Parliament on 18th September, 1951 while replying to a question by Mr. R.K. Sidhwa that the Planning Commission and a special committee of the Council of Scientific and Industrial Research were examining the report of Koppers Company of America on the question of setting up of a synthetic petrol plant in India. He added that the Government of India had accepted in principle the scheme but the question of capital outlay which was estimated at Rs. 20.87 crores was now under consideration.

Small Scale Synthetic Organic Chemical Industry in India

By

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Synthetic Organic Chemical Industry is one of the most important key industries that every country worth the name must have. If the basic raw materials are not available in the country, they must be imported for starting such industries. The raw materials for this industry are mostly derived from coal, mineral oils and gases, forest and agricultural produce and animal wastes. No organised effort has yet been made in India to produce synthetic organic chemicals from the last two sources. Unfortunately we have no source of natural oils and gases so far. The only remaining source for us is coal.

From these sources the basic organic chemicals are obtained and from such chemicals in turn are produced organic compounds known as intermediates. The processing industries use the intermediates to produce the final products such as dyes, drugs, developers etc. The term intermediate is rather elastic and often an intermediate for one industry is the finished product for other industries. India does not produce any intermediates as yet. We have also no factories producing carbide, cyanamide which in their turn give important intermediates for organic chemical industry.

It is pointed out that intermediates cannot be produced unless there is a market for them in the country. On the other hand small scale processing industries are not started because the intermediates are not available. The result is that there is a stalemate in the country and all progress in this field has been held up.

In the interest of this country it is absolutely essential that a synthetic organic chemical industry is started on as large a scale as possible and in all possible fields such as dyes, drugs, photography, perfumery, etc. There is nothing wrong even if some or all the intermediates have to be imported. This would give us experience and help to remove unemployment. When a demand for intermediates is thus created the Government or big finance would step in to provide for the same. A country like Switzerland which depends entirely upon imported intermediates for its organic chemical industry supplies to India about rupees one crore worth of dyes, drugs and fine chemicals. Could we then not do this when we have a vast home market ?

This short note is submitted just by way of a suggestion to the technicians and financiers and it is hoped that this will stimulate their interest in this new field of industrial enterprise. Small scale industries requiring capital from about Rs. 50,000 to Rs. 500,000 may be started with about six months of spade work and survey. A number of products in the field of dyes, pharmaceuticals, rubber acceleraters, photographic developers etc. can be manufactured here from imported intermediates. In citing the various products, the consumption, comparative ease of manufacture, availability of intermediates from abroad and simplicity of equipment are taken into consideration.

DYES

Indian Textile Industry makes it one of the biggest consumers of dyes in the world. In 1937-38 we imported dyes worth 3·5 crores, in 1941-42 5 crores and today, in spite of import restrictions, we import them to the extent of about 8 crores. The consumption would increase as the textile industry expands and is freed from the present artificial restrictions. It is, therefore, sad to see that none of our financiers have given attention to this field of industry. Only one big company has been floated for the purpose and it is expected to go into production of dyes in a year or so. The Dyes Exploratory Commission, appointed by the Government in 1941, published its report by the end of 1945 recommending that some fifty products should be produced in about fifteen years and an immediate beginning should be made to produce some of these dyes from imported intermediates. So far nothing is known as to what action Government has taken on this report. In the meantime the country has been exploited by foreigners who can dictate and charge any prices they like and also dump products of inferior qualities in the market in the absence of any local competition. The artificial division of currency areas also helps the manufacturers of dyes in the soft currency zones to charge higher prices as they know that our importers cannot import from the Dollar area. Before the war the prices and distribution of dyes were controlled by a cartel of foreigners to the great disadvantage of India; to-day officially there is no cartel, but unofficially all the foreign interests are working to make the most from the Indian market and help their own reconstruction at our cost. The only remedy under the present circumstances seems to be to start manufacturing dyes from imported raw materials on a small scale. During the war a few factories were started in the country and they are manufacturing stabilised azoics and solubilised vats from imported azoics and vats. The following also could be manufactured with advantage from the respective imported intermediates. (1) Congo-Red—India consumes very large quantities of this dye. In 1941-42 we imported about 8 lakh pounds in spite of restrictions and war conditions. One factory has already made a beginning to manufacture this dye. To start with both Benzedine and Naphthionic acid should be imported and when the coupling technique is mastered, Benzedine should be manufactured from Nitro-benzene which is usually available in ample quantity. Later Naphthionic acid should be made from Alpha-Naphthylamine. (2) Acid Orange II—This is another important dye consumed on a large scale and can be made from Beta-Naphthol and Sulphanilic Acid. The Government should grant exemption from import duty to manufacturers of dyes for Beta-Naphthol which is classed as a Naphthol dye for purposes of duty. Both these intermediates could be made here easily whenever the demand arises (3) Metanil Yellow—This is an important dye needed in the country for colouring food-stuffs and for dyeing. We import about 2 to 3 lakh pounds every year. It would pay to produce it here from imported Metanilic Acid and Diphenylamine. Metanilic Acid could be produced later from Nitro-Benzene. (4) Malachite Green and Methyl Violet—These are important basic dyes consumed on a large scale and are manufactured from Dimethyl Aniline, Benzaldehyde, Phenol etc. (5) Ink-Blue—This is an important dye for the ink manufacturers who have been finding it difficult of late to get a good quality from abroad. The intermediates needed are Para and Ortho Toluidine and Aniline. (6) Nigrosine-base Indulines—These need Nitrobenzene and Aniline which are usually available. They are mainly used by the leather trade and printing ink manufacturers. Oil-soluble dyes also have a good market and the same can be made from Aniline, Beta-Naphthol etc.

Some vat dyes can be produced immediately if Anthraquinone is made available at moderate rates along with Phthalic Anhydride. For these, however, Oleum, Chloro-Sulphonic acid should be available locally at cheap rates in good quanity. Aluminium Chloride will have to be imported from abroad till it is made here. At present Anthraquinone and Phthalic Anhydride are not available from abroad except at high prices and so the prospects are not very bright.

PERFUMERY MATERIALS

Esters such as Amyl Acetate, Butyl Acetate, Amyl Salicylate could be produced from the Fusel Oil which is a by-product of power alcohol.

Xylene and Toluene Musks could be made in India from Xylene and Toluene. They find a good market here.

Yara Yara—Beta Naphthol Methyl Ether is made from Beta Naphthol and Mathanol or Dimethyl Sulphate.

Methyl Anthranilate which is also in good demand could be made from imported Anthranilic Acid and Methanol.

SYNTHETIC DRUGS

Though there are a number of pharmaceutical manufacturers in the country, very few have taken up the manufacture of synthetic drugs like Aspirin, Antipyrine, Aceto Phenetidine, Phenol-phthalein. It is high time that a start should be made to produce them. Salicyclic acid derivatives cannot be produced unless the same is available at a reasonable cost. Putting up a Salicylic Acid plant would be a costly affair and it would be worth while if the National Chemical Laboratory could design and find out the cost of a plant producing say about 100 lbs a day starting from Benzene or Phenol.

Anti-Pyrine would pay if made here from Aceto Acetic Ester and Methyl Ester which have to be imported. Phenyl Hydrazine could be made here.

Aceto-Phentidine can be made starting from Phenol which is usually available. Ethyl Ester and Acetic Anhydride will have to be imported.

RUBBER ACCELERATERS

There is a demand in the country for these chemicals and some of them can be made here from Carbon-bi-Sulphide which is not available at present. Perhaps some of the rayon factories may be able to supply this after some time. Till then it will have to be imported and acceleraters of the C. A. and Z. D. C. type could be made here.

PHOTOGRAPHIC DEVELOPERS

India consumes large quantities of Hydroquinone and Metol. Hydroquinone is made in India lately, but the production is not enough to meet the demand. Metol is not yet being made. They are made from Aniline, Para-Amino-Phenol, Chlor-Acetic-acid. Chlor-Acetic Acid may be made here or imported in the beginning.

The above have been cited as examples of what can be done here in the synthetic chemical field from imported intermediates with comparatively simple equipment that can easily be fabricated here. A study of the markets and a survey of the chemical processes will show several more to the interested student.

It is only hoped that the Government would at least give liberal facilities for importing the intermediates from any area preferably on 'Open General Licence' or at least on a freely licensed basis. They should also be exempted from import duties as an encouragement to the manufacturers. If necessary protection may also be given if a need for the same is felt any time from inequitable competition from outside. Chemical Laboratories in the country should work up the processes and prepare schemes with a view to get financiers interested. The Government may be needing a number of organic chemicals for their Defence Department which at present they may be getting from abroad. They should invite manufacturers to study if they could be made here.

If a number of such small scale synthetic organic chemical industries are thus started in the country, they will be on a good and solid foundation and the basic organic chemical industry could grow in due course.

(Paper read by Mr. T. R. Sathe, Associated Research Laboratories, Bhatghar, Distt: Poona at the National Chemical Laboratory, Poona at the Symposium on Fine Organic Chemicals, Drugs, Dyes etc., held on the 8th June, 1951).

Necessity of Electricity for the Development of Metalliferous Mines in India

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Metals form one of the earth's most important resources in the support and enrichment of human life. With the progress of civilisation consumption of metals has steadily increased in all free countries. Hence in *Free India* the need for more metals should naturally be realised in view of rising living standards as well as increasing population. Everywhere there should be a sustained drive to bring into use mineral resources as yet untapped, to build up with the revenues obtained from this source more productive and diversified economies.

For the necessary development of metalliferous mines in India cheap electrical energy is of fundamental importance specially in those areas where coal is not locally available. For example, it may be noted that in Mysore State the Kolar Gold Fields could be developed to great depths of about 10,000 feet by the utilisation of the hydro-electric power of the Cauvery Falls since 1903. Annual consumption of power in Kolar Gold Mines has now exceded 100,000,000 K. W. Hours. Some time back for the Lead-Zinc-Silver Mines of Burma Corporation Ltd., hydro-electric power was obtained from the neighbouring Mansam Falls where several turbines were installed with an aggregate capacity of more than 10,000

K. W. For the development of Rand Gold Mines in South Africa as early as in 1906 the most important power supply system originated with the idea of developing the water-power of the Victotia Falls. The capacity of the power stations for Rand Mines was more th n 200,000 K. V. A. nearly a decade ago.

As compared to the figures stated above, the aggregate horse power of electrical plant used in the coal mines in India increased from 122,833 in 1945 to 131,801 in 1946 and in metalliferous mines the respective figures were only 8, 568 in 1945 and 10,437 in 1946 as published in the Annual Reports of the Chief Inspector of Mines in India excluding the States.

Since the separation of Burma it has become necessary to develop the Lead-Zinc-Silver Deposits in India. As a result of intensive investigation during the last war valuable deposits have been located at a place known as Zawar about 29 miles from Udaipur. There the Mochia Magra Hill was estimated recently to have more than 1,378, 000 tons of ore containing at least 20% Lead and 7% Zinc with some Silver. Besides this hill there are at least thirty other hills in the same area where ancients had extensively worked for such valuable ores. Coal and other fuels are not available locally. Not far away from this area, however, there are excellent sites for large reservoirs of water which can be harnessed for irrigation of the land and generating necessary power economically for the rapid development of these and other valuable metalliferous deposits for the amelioration of the condition of the people as well as for their protection.

Incidentally these large reservoirs of water in this State will change the face of the earth to the satisfaction of all and revive the past glories though one may not easily believe such a possibility at the present time when the hills in this area appear to be so barren and are so close to the famous deserts of Rajputana. But when one finds more than a million tons of slag heaps in an area which is far away from coalfields one naturally concludes that the ancients must have consumed the local timbers for the mining and smelting of these ores. Without foresight the consumption of timber might have been so ruthlessly carried out in those early times when the land was in the height of its glory that the area became deforested and the climate was so affected thereby that the region gradually became arid as at present. So it is possible that the land would be smiling again in the near future by the successful planning and development by modern scientific methods.

The following reference has been made to deforestation in the book entitled "Man and Metals" by T. A. Richard. Page 779. "In the process of time the demand for fuel caused the destruction of the woodlands to such an extent that many regions became deforested, and the climate was changed thereby. For example, the smelting of silver-lead ore at the mines of Laurium contributed to the denudation of Attica. Plato, in the Critias dialogue, tells us that in the old days there was an abundance of forest on the mountains. "Of this last", he says, "the traces still remain, for there are some of the mountains which now only afford sustenance to bees, whereas not long ago there were still remaining roofs cut from the trees growing there, which were of a size sufficient to cover the largest houses; and there were many other high trees, bearing fruit, and abundance of food for cattle.

Moreover the land enjoyed rain from heaven year by year, not, as now, losing the water which flows off the earth into the sea, but, having an abundance in all places, and receiving and treasuring up in the close clay soil the water which drained from the heights, and letting this off into the hollows, providing everywhere abundant streams of fountains and rivers; and this proves the truth of what I am saying. Attica, once well clothed with leafy verdure, has become an arid region. Cyprus has suffered likewise; once reputed the most fruitful island in the Mediterranean, it was stripped of its woods when it fell into the hands of the Turks, the consequences being a diminution of rainfull, the drying of watercourses, the formation of swamps on the seashore, and the prevalence of a deadly form of malaria. Other examples might be cited. The tumbled hills of the Sierra Morena, in southern Spain, where once great forests stood, are to-day bare, in mute testimony to the destructive activity of the miner, successively Iberian, Carthaginian, and Roman, who despoiled the woods for the charcoal needed to smelt the silver, lead, and copper ores of this rich mineral region. The modern mining districts of Colorado and Montana, all of which were started amid pine forests, are today bleak and bare, only the stumps of trees remaining to remind the newcomer of the days when the prospector found shelter under the spreading boughs. The effects of deforestation have been studied scientifically; it has been ascertained that the forest is a regulator of climate, because it decreases extremes of temperature in the vicinity; the forest is cooler and more humid than the level country, it stores the snow and rain, retarding the melting of the one and conserving the other in its leafy soil, thereby enabling the accumulation of water to feed the springs that flow gently into the plain when required for cultivation. The coolness and moisture of the forest promote the condensation of the lower layer of clouds: the differences of temperature between forests and plains cause a healthful circulation of the air, the woods serve to check the destructive effect of violent winds. Deforestation, therefore, diminishes the rainfall, increases the evaporation, causes extremes of temperature, and facilitates the destructive action of torrents, avalanches, and landslips. Such disastrous effects have ensued in many regions on account of the consumption of wood as fuel on the hearth and as charcoal in metallurgic furnaces. During later days the lavish use of timber in mines has caused the hillsides to be denuded of their growth, as most of our Western American mining districts show. A typical example of deforestation is to be seen on the eastern slope of Sierra Nevada, overlooking the Truches Valley, where the cutting of trees to provide timber for the deep mines of Comstock left the hillsides exposed to erosion so that to-day they are bleak, barren, and hideous. Most of the old mining regions tell the same tale, from Linares to Leadville, from Potosi to Porcupine."

In India today we have a large number of metalliferous mines which are only at the initial stage of development. With the supply of electricity they will surely be in a position to step up their production of ores and complete the smelting thereof in order to cope with the steeply rising demands of metals for the amelioration of the condition of the people in *Free India* and their protection.

CELLULOSE

By

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Cellulose is one of the most abundant materials in the world and at the same time a facsinating compound. Its uses cover a wide field. The chemistry of cellulose has seen great development since 1837 when Payen, the French agricultural chemist, first dealt with it. Thus in the last 100 years it has evolved into one of the main branches of chemistry and now there are volumes written on this subject. And yet, there are more unsolved problems in cellulose chemistry than solved ones. The active work of the last century has contributed largely and opened up many fields of research leading to a better understanding of Cellulose Chemistry.

1. Occurrence, Isolation & Purification.

Cellulose is present mostly in vegetable kingdom and to a lesser extent in animal and mineral kingdoms. For example, more than 1/3 of all the vegetable matter is cellulose, certain kinds of fungi and bacteria and minerals are akin to cellulose. But cellulose from vegetable matter is the one mostly exploited and the term cellulose is after the cells in the plants and 'ose' from the common ending of sugars. In the animal kingdom is found tunicin and in the mineral kingdom the fossils of woods, peat, certain types of lignites and sepperite.

By and large the cellulose is isolated from wood. It is done by extracting the cellulose portion from the non-cellulose portion by either mechanical or chemical means. Newsprint made from grinding the soft wood is an example of mechanical treatment. Fine papers and wrapping papers are all made by chemical treatment. In recent years, both the mechanical and chemical treatments are combined and processes of cellulose isolation such as Asplund, semi-chemical etc. are fast gaining ground. The process of isolating cellulose from vegetable matter is freeing it from oils and fats, waxes, resins and pectins, colouring matter and lignin. Once the material is free from the above substances, it is technically called 'pulp', the starting point of cellulose products.

The pulp can be used with admixtures of various other things in making cellulose products. But if the cellulose is needed for making cellulose derivatives like raw film, rayon, paints, plastics and explosives, the pulp needs further purification. The pulp for these purposes must have very low ash content, higher purity and consequently bright colour, free from lignin and rich in L-cellulose or insolubles in 17.5% sodium hydroxide in cold. It is purified by bleaching in several steps, acid bleach hot and cold, caustic extraction, alkaline bleach and final neutralisation etc. In the case of cellulose from cotton, as it is the purest form of cellulose in nature, it requires less vigourous treatments and consequently the yield is also high as degradation is less.

2. Structure & Chemistry.

Cellulose is mostly crystalline, partly amorphous and 'meso-colloid' and is thus a compound of divergent physical states. There are also present the fibrils which are minute and surprisingly enough they play a very great part in the behaviour of cellulose. As yet no single cellulose molecule has been isolated, but its dimer cellobiose has lately been isolated from starch. This isolation has more than ever confirmed the earlier findings that chemically a cellulose molecule is a polysaccharide of sufficient chain length to be insoluble in water, dilute acids and alkalies, consisting of anhydro-glucose units linked together through the 1, 4 carbon atoms with a B-glucosidal linkage and exhibiting a characteristic x-ray diagram. The degree of polymerization may be anything from 2-2500. Native cotton has a D.P. from 1500-2500 and the 'meso-colloid' 50-500. Thus cellulose is a material belonging to the higher polymer domain which with every stage of treatment degrades down to its dimer or trimer. From a glance at the structure it may seem a simple molecule but it must be borne in mind that cellulose exists in a three dimensional unit and hence the primary and secondary valence bonds van der Waals forces interreact. Futher, cellulose is a loose spiral formation and is not a linear polymer. There are primary and secondary hydroxyl groups with their varying reactivities, the pyranose ring and then the 1-4 glucosidal link which snaps easily and on methylation produces a trimethyl. The replacement of (OH) groups can be accomplished one after the other depending upon the reactivity, rate of reaction and blocking. With all the light that the sugar chemists have been able to throw on glucose the cellulose molecule still remains complicated both in it physical and chemical states.

3. Substance in Association with Cellulose.

As stated previously, there are the oils, fats, waxes and gums, resins, pectins, the colouring matters, sterols and lignin. When the pulp is freed of the above, it is more or less pure and it can then be fractionated into L and B celluloses which are made up of sugar units like arabinose, mannose, fructose etc. Lignin is a fascinating material. The structure of lignin is not established as yet but the by-products manufactured from lignin are innumerable. From the waste sulphite liquor, which contains most of the lignin, products like yeasts, alcohol, vanillin, tannin, plastics and various organic chemicals are manufactured. Each and every one of them is industrially exploited. Besides the above there are certain amounts of inorganic chemicals to be accounted for in the shape of ash and salts. The limit of ash in pulp used far rayon manufacture is of the order of less than 1%. The effect of these small amounts is considerable and hence in purification of pulp it is of major importance. The hemicellulose fractions are of low D. P. and have an enormous effect on the strength and other properties of the products made. They belong more and more to the amorphous regions of cellulose and thus fall into the 'Meso-colloid' division and thus exhibit the properties of colloids.

4. Fibre structure and its Implications in respect to Chemical Reactions and Physical uses.

The fibrils are tiny hair like appendages to the main fibre. They are firmly attached and they play a great part in imparting chemical and physical properties to the products made. For example, a new process called 'curlator' is developed in Canada which employs these fibrils to impart higher strength properties and better appearance to the finished products. In a way these fibrils could be considered as the parts of the cellulose which matt together and effect a sheet. They are highly reactive and susceptible. Until the advent of electron microscope the presence and part played by these tiny parts could not be established. The fibrils are reactive. In cotton, they are present to an extent of 2-5%. The reactivity of fibrils is closely connected with the physical properties of the final product such as wet and dry strengths. They contribute towards the polymolecularity of the cellulose derivatives like acetates, xanthates, nitrates etc., and exert an influence on spinning, casting, opacity, etc. It has also been suggested that the non-cellulose constituents are in association with them. It is this association and dissociation that open up new centres of reactions like the end-groups which are reducing, non-reducing etc.

5. Physical Properties of Cellulose and its Derivatives.

The viscosity of cellulose and its interpretations have been the progress of recent times. Staudinger showed that the viscosity data could be used to determine the D. P. of the product. The ultracentrifuge employed by Prof. Svedberg has solved many anomalies of cellulose chemistry. With the help of electron microscope a fibril could be photographed. By esterification like acetylation and methylation, nitration, etc. the points of cleavage could be determined and by subsequent hydrolysis the various fractions could be separated. The strength of a single cellulose fibre is said to be more than that of a steel wire of the same dimensions. Plastics made out of it have gradually begun to replace metals in engineering applications. Gears, nuts and bolts and stress bearing parts are now being made. The advantages are lightness, translucency, wear resistance and hence less maintenance charges and stability like non-brittleness and dimensional change. The fibres can be rendered waterproof, impermeable and fire-retardant.

To appreciate and understand cellulose with any degree of accuracy, one must be a botanist, a mathematician and versed in all branches of chemistry like organic, inorganic, physical and colloid. Naturally one cannot be an expert in every branch and so there is a need for coordination among the scientists. Perhaps no other compound requires the pooling of knowledge of various scientists to the same extent as cellulose does. The cellulose is built up in nature but the mechanism is not yet established. It can be built by bactertia too right from two carbon units like acetic acid to a cellulose polymolecular chain. The reverse is also true. Thus all herbivorous animals that take up cellulose break it up into products which are required for nutrition of the body. The day when this mechanism is reproduced by man half of the world's food problems would be solved. That certainly would be a happy day. Whoever can reproduce this mechanism would be the greatest benefactor of mankind.

(*A summary of the address given to the Association of Scientific Workers of India, Poona Branch on November 26, 1950.*)

ACTIVITIES OF THE BRANCHES

Bangalore Branch.

On 7th August 1951, the Scientific Film Society of India exhibited the following films and members of the Association of Scientific Workers of India were invited.

1. News Magazine.
2. Eskimo Sea Hunters.
3. International House.
4. Modern Milk Marketing.
5. NYU Television Workshop.

The Secretary of the A.S.W.I. (Bangalore) was elected ex-officio to the Executive Committee of the Scientific Film Society of India.

On 10th August 1951, the Branch Executive held a meeting under the chairmanship of Mr. M. R. K. Rao, Vice-President of the Branch. The proceedings of the Central Executive Committee held on 5-5-1951 were discussed.

The Branch Executive Committee also congratulated three of its members, Dr. S. S. De on his appointment as Regional Food Adviser, Asia and the Far East under the F.A.O., Dr. N. R. Srinivasan on his being awarded a scholarship under the Colombo Plan to visit South East Asian Countries and Dr. M. V. C. Sastri on his being appointed Lecturer in Applied Chemistry at the Indian Institute of Technology, Kharagpur.

On 6-9-51, the following films were exhibited under the auspices of the Branch :—

(1) Principles of Dry Friction.
(2) Smoke Streams (2 reels).
(3) Weather-theory of atmospheric waves.

On 7-9-51, Mr. P. Viswanathan of Travancore Minerals, Ltd., Quilon spoke on 'Titanium and Zirconium Resources of India'. Dr. B. S. Ramakrishna, President of the Branch presided. A summary of the lecture will appear in the November issue of the 'Vijnan-Karmee'.

Delhi Branch.

The Delhi Branch arranged on 9th September, 1951 in the Lady Hardinge Medical College Convocation Hall a lecture on 'Science in Russia' by Dr. J. J. Chinoy of the Botany Department of the University of Delhi. Dr. Chinoy was one of the few scientists who recently visited U.S.S.R. Col. Jaswant Singh, Director, Central Malaria Institute, Delhi and President of the Delhi Branch of the Association presided. Dr. Chinoy narrated his experiences in the journey and said that though they were guests of the U.S.S.R. they were not in any way treated differently-not even as regards the customs regulations. Dr. Chinoy said that in the U.S.S.R. the scientists are highly paid workers. All the resources of the State are at their disposal. All the research carried out in the country is planned research and there is practically no individualistic research. The research work is planned round the practical and burning problems of the day. Dr. Chinoy gave a few details of the organisation of the Agricultural, Medical and Hydro-electrical research in the U.S.S.R. and promised to deal with the other aspects in another lecture. As regards agricultural research there is the Leningrad Academy of Agricultural Sciences under the directorship of Lysenko. There are 15 research institutes of this academy distributed all over the country. Special stress is laid on having research laboratories in collective farms. There is an Institute of Genetics in Moscow. Lysenko has enunciated his new theory of genetics which has given rise to a controversy between Russian and Western schools. Unfortunately the controversy was not on a scientific basis. The Russian Scientists have been able to convert winter rye into spring rye. Recently Russia has become self-sufficient in tea. The Russian scientists have evolved coloured natural cotton with khaki colour. In the U.S.S.R. the Academy of Medicine is a separate organisation and does not come under the scientific organisations. In the Medical Research Institutes there are more girls than boys. There are no private medical practitioners in the U.S.S.R. Fundamental work in medical research is carried out at the Pavlov Institute. Pavlov has erected a monument to the dog which he used as his test animal. In the U.S.S.R. human child is practically treated as God and there is in Leningrad a Pedriatics Institute. The Hydro-electric Institute at Moscow is also concerned with afforestation plans and two hundred and fifty million acres of land have been put under forest. They are also developing waterways linking important cities by digging new canals. Dr. Chinoy promised to speak about the Academy of Sciences and other bodies in his next lecture.

India Meteorologcial Department Unit.

The following films were shown at the Observatory premises on 20-8-51 by courtesy of U.S.I.S.

(1) This is New York.

(2) Everymans' Empire.

(3) Tuberculosis.

(4) Power of plants.

Hyderabad Branch.

Study Circle.

The first meeting on behalf of the Study Circle Committee of the Branch was held on 3rd August, 1951 at Nizam College with Dr. Sultana Iyengar in the chair. Mr. G. S. N. Rao, Joint Secretary of the Branch explained the aims and objects of the Study Circle. He stated that the Study Circle will hold meetings from time to time in which papers would be read and discussed with a view to develop social conciousness amongst scientific workers and science consciousness amongst the people.

The paper entitled "Scientific Method-Parts 1 & 2" prepared by Mr. Abdul Rahman (Central Laboratories) and Mr. Anisur Rahman (Osmania University) was then read. The paper dealt with the historical development of Scientific Method and how it had evolved through the ages. It described the role of philosophers and thinkers and how that led to the further stage where experimentation became a vital part of the Scientific Method. The role of factors, such as instruments of production, and other forms of social organisation as affecting its development was hinted. Finally the paper defined as to what was Scientific Method and how it could be made applicable to the problems of the day.

A short discussion took place after which Mr. Baldev Singh, Convenor of the Study Circle Committee, explained the necessity of scientists changing their way of thinking and appreciating the social relations of science. He said that without such conciousness amongst scientific workers, the misuse of science could not be prevented. He gave the future programme of the Study Circle.

Film Shows :

Display of the following films was arranged at various Institutions as given below :—

1.	Colour in Clay	Y. W. C. A. Hall Hyderabad, 2nd June, 1951
2.	Atomic Physics	Y. W. C. A. Hall Hyderabad, 2nd June, 1951
3.	Plastics	Nizam College, 10th August, 1951.
4.	Devel pment of a Chick	Y. W. C. A. Hall, 13th August, 1951.
5.	Development of a Rabbit	Physics Department, Osmania University, 17th August, 1951.
6.	Power Lines	Osmania Women's College : 20th August 1951. Physics Department, Osmania University, 22nd August 1951.

All the above films were very kindly lent by the British Council. The shows at all the places were very well attended and appreciated.

NOTICE

ASSOCIATION OF SCIENTIFIC WORKERS OF INDIA

The Head Office of the Association (22, Havelock Square, New Delhi) has sent the followng Circular Letter to the Branches/Units in connection with the forthcoming meetings of the Council and General Body.

" The next meeting of the Council of the Association will be held at Calcutta sometime during the first week of January, 1952 at the time of the Science Congress Session. Provisionally, 4th January, 1952 has been fixed for the Council meeting. This letter is being sent to the Branches/ Units for information and guidance on the various points connected with the Council meeting. The Branches/Units should take the appropriate action and try to send the material in time to the General Secretary at the above address.

1. According to Rule No. 7 the Council may elect as Honorary Members persons of distinction whose public acts have contributed to the advancement of science and the welfare of the scientific workers. Suggestions for the election of Honorary Members, if any, would be welcome.
2. According to Rule No. 45 each Branch has to elect to the Council a number of delegates in the proportion of 1 to every 25 members. According to Rule No. 46 each Branch has to submit to the Head Office the list of members of the Branch and delegates elected to the Council not less than eight weeks before each Annual Council meeting. Substitute delegates may be elected and the list submitted to the Head Office.
3. According to Rule No. 52 any motion to alter the Rules of the Association cannot be placed on the agenda unless three Branches or 15 Units submit in writing not less than three weeks before the date of the

Council Meeting that they support a motion for altering the rules.

4. Any motion, according to Rule No. 49, must be submitted in writing not later than eight weeks before the date of the Council Meeting. Members of the Association wishing to move resolutions at the Annual General Meeting shall ordinarily send them to the General Secretary with the opinion of the Branch concerned at least eight weeks before the Annual General Meeting (Rule No. 71).

The provisional date for the General Meeting is 5th January, 1952.

5. According to No. 65 all Branches shall be invited to submit to the Head Office, eight weeks prior to the Annual Council Meeting, nominations to fill the vacancies in the Central Executive Committee. Such nominations shall reach the General Secretary not less than 6 weeks before the Council meeting. The nominations should be duly proposed and seconded with the written consent of the person proposed.

RESEARCH FELLOW-SHIPS OF THE NATIONAL INSTITUTE OF SCIENCES OF INDIA.

NIS Senior Research Fellowships.

1. Dr. A. M. Naqvi, Ph.D., to work on "Solar Problems" at the University of Delhi.

2. Dr. S. C. Shome, Ph.D., (Dacca & Cantab) to work on "Corrosion of Metals" at the National Metallurgical Laboratory, Jamshedpur.

3. Dr. B. G. L. Swamy, D.Sc. (Mysore) to work on "The Comparative morphology and relationships of some of the families of the order Ranales, at the Madras University.

NIS Junior Research Fellowships.

1. Mr. D. Basu, M.A. to work on "The Waldian approach to the problems of Estimation", at the Indian Statistical Institute, Calcutta.

2. Dr. M. Datta, D. Phil, to work on "New Probabilistic approach to the basis of Statistical Physics", at the Calcutta University.

3. Dr. A. M. Mehta, D.Phil (Oxon) to work on "Investigation of biles (from slaughter houses in Bombay) with a view to search for 11 and 12 oxygenated steroids needed for synthesis of anti-arthritic compounds related to cortisone", at the Haffkine Institute, Bombay.

4. Dr. A. K. Mukherjee, M.B., D.T.M., to work on "Cultivation of E. histolytica in a bacteria free mediaum", at the Indian Institute for Medical Research, Calcutta.

5. Dr. (Mrs.) T. S. Sarojini, Ph.D. (Madras), to work on "Studies in Soil Fungi with special reference to Fusariose disease of cajanus", at the Madras University.

6. Mr. E. G. Silas, B.Sc. (Hon. Madras), to work on the "Zoogeography

of the Western Ghats as evidenced by distribution of Fishes", at the Madras University.

7. Mr. T. B. Sinha, M.Sc. (Alld), to work on the "Morphology and taxonomy of Mites", at the Allahabad University.

ICI (India) Research Fellowships

1. Dr. B. K. Banerjee, D.Phil (Cal.), to work on "Physico-chemical studies of Glass", at the Indian Association for the Cultivation of Science, Calcutta.

2. Dr. A. Ganguli, Ph.D. (Edin.), to work on "Investigation on Potato Virus Diseases", at the Bose Institute, Calcutta.

3. Dr. P. T. Rao, D.Sc. (Waltair) to work on "Complex Molecular Spectra of the Transition Groups of Elements (in the near-infrared and the visible)", at the Andhra University Waltair.

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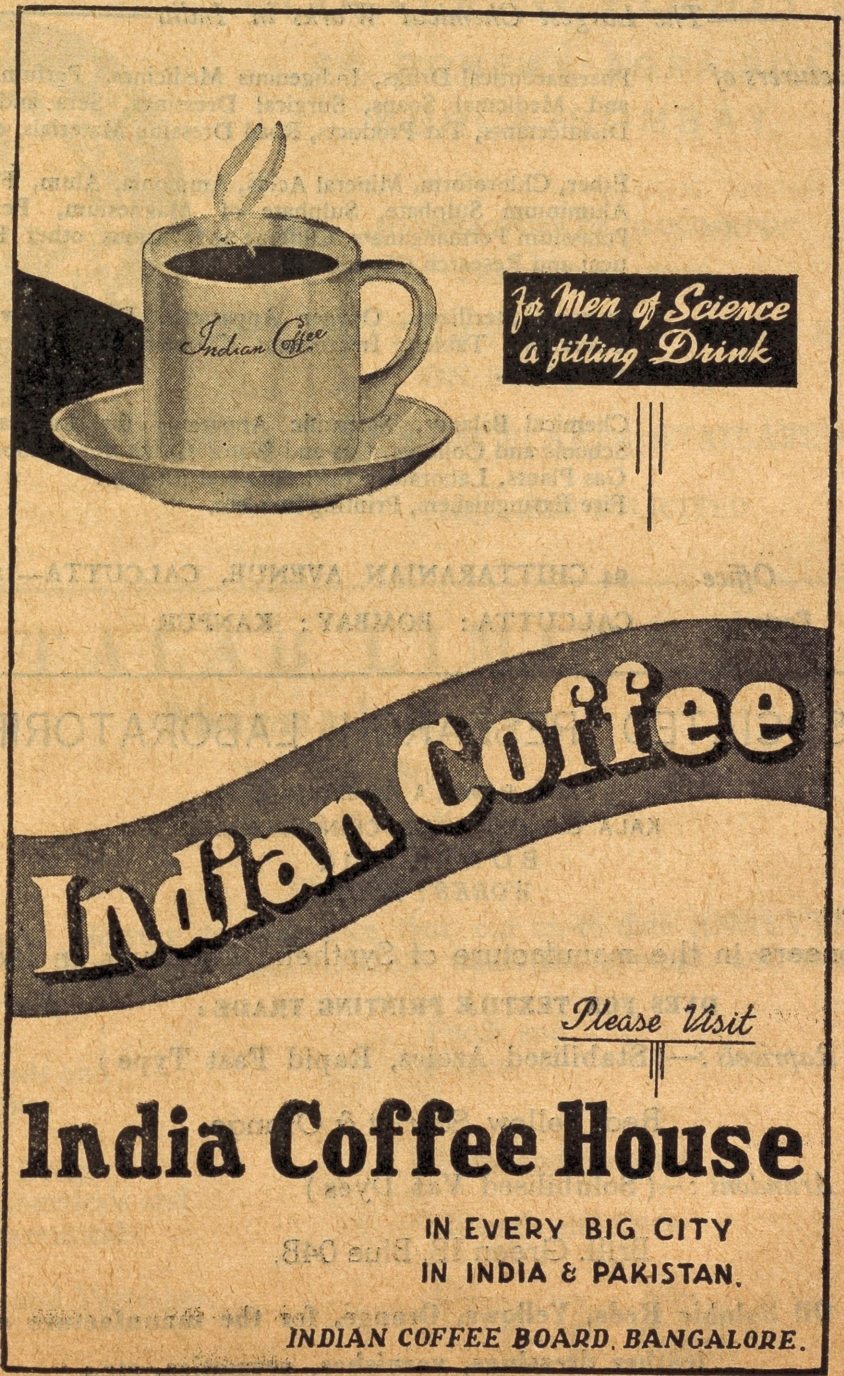
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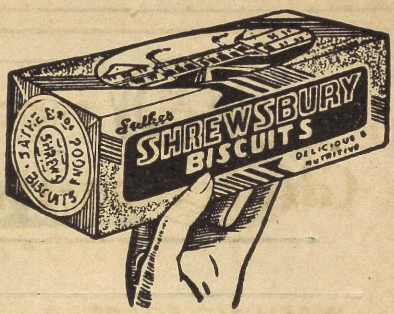

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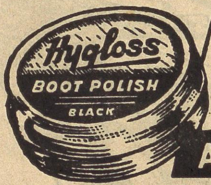

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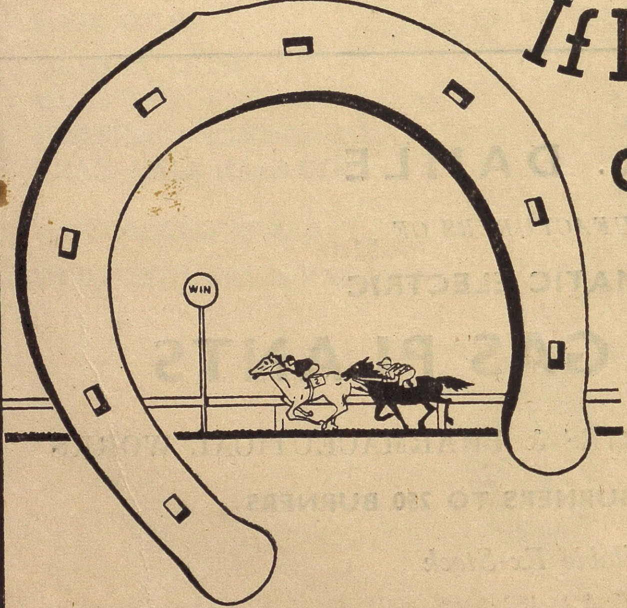

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