VIJNAN KARMEE

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VIJNAN KARMEE

Journal of the Association of Scientific Workers of India

(Founder-President : Shri Jawaharlal Nehru)

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

EDITORIAL

Retrospect

The Association of the Scientific Workers in India has grown an year older with the beginning of 1961. The Annual General Body Meeting will be held, as usual, concurrently with the Indian Science Congress Association at Roorkee.

In his Presidential address, last year, Prof. Mahalanobis had stressed the importance of an Organisation like ours and urged upon the Government to take suitable steps and measures to see that an Organisation of this nature gets sufficient funds for the purposes for which this Association is meant. Unfortunately, misconcepts and unfounded prejudices from certain quarters at the Governmental level have so far been responsible for not appreciating or understanding the ideals of the Association of the Scientific Workers in India. By introspection this year, it was felt that improvements can be expected towards raising the stature of the Association by disclaiming of the bias towards Trade Union pattern now existing in the Association bye-laws. Though fundamentally the Association has been registered as a Trade Union for extreme contingencies and protection of the Association through it, it is definite that the Association had never organised or approached any objective meant for the benefit of its members from the Trade Union angle. This fact can be vouchsafed by the eminent past President of the Association during its life.

After careful deliberation this year, the Executive have taken the decision that a recommendation will be made to reform the Association in an "Association Pattern".

Our opinion, however, still stands that an Association can derive strength only internally and not by external form or help from other sources. Since the scientists in the country require a fair deal, let us hope that the year 1961 will bring out more strength to the Association.

EDITORIAL NEWS

SCIENCE AND SAVANT

Professor Muller, the eminent geneticist and Nobel Laureate, while expanding his thesis of gene action and mechanism conceived life in its entirety as a system of cyclic spiral. The nodal point of this spiral he pictured as the gene. Muller's analogies were very apparent and arresting. Life on earth is dependent on the same cosmic laws which determine the cyclic phases of planet earth around the sun, these are observed as seasonal changes in animal and plant populations. The units of population, the bio-unit, and the physiological-cum-anatomical unit, the cell are, again a cyclic phase. The sub-cellular phases in turn pass through the path of periodicity. This latter phenomenon has been more clearly understood as the 'turn-over' at the level of sub-cellural constituents. The processes are inter dependent. What remains as constant, or atleast relatively so, is the gene, which governsynthesis, elaboration, proliferation, decline and decay of the sub-cellular proteins, may perhaps all bio-moeities. But gene in itself after all subject to the 'cyclisation' of Muller.What then remains unchanged is a dull repetition of cyclee, from nucleic acid resynthesis to synthesis of different enzymes, resulting in ever increasing specialisation of physiological and anatomical manifestations of the organisms and organissimal parts, these inturn ascending the spiral of seasonal changes and so forth. As living organisms, and boasting ourselves as most advanced ones in the spiral of evolution, we recognise this turn of celestial as our year, and pay homage to it by partly looking back to the turns already crossed and to turns yet to arrive at!

The year, in retrospect from our point of view, and we hope of our readers also who constitute the terrestrial fraternity of scientific workers, has been yet another leaf in the history of role of science in almost all spheres of human life. To count the important events in the progressing and advancing field of science is a task, the gigantic nature of which one can estimate by just glancing through the millions of references recorded in the indices of thousands of 'reviews' for the year. Technologies, as applied aspect of science, have continued to enthrall the lay mind with its glamours, and perhaps awe, politicians with its promise, and statesman with their strength. There have been perfections in the technology of space flight, and pronouncements in the field of nuclear engineering which assure untold reserves of energy for whatever purpose humanity will use it. However, more important events have been that of increasing co-operation at international level amongst scientists of different ceuntries and nations. The trail of this international co-operation was ofcourse lit by the IGY programme; which was extended and infact covered the period under review. Some of the outstanding events in science for the year, thus owe their primary motivation to IGY programme, although idealogies other than the spirit of science did affect the *modus operandi*. In a truly international science do we have hope for the future of mankind. Along with sponsors of IGY, we wish to record our sincere tributes to UNESCO, and other international scientific societies which are doing the silent but solid service to science by removing the artificial barriers of nationalities in the field of scientific endeavour. In expressing our feelings about this service to science and humanity at large, we are almost drawing from the pronouncements, of Sir Cyril Hinshel wood, the present President of the 'Royal Society', which he made in his address during the tercentenary celebrations of the 'Society' (incidentally it fell in 1960).

Looking ahead, for the incoming year and time, particularly we working scientists in India have a really stupendous task to tackle. Of what is expected from us in the struggle of advancement of our country has already been listed in broad terms in the 'Third Five Year Plan', the draft outline of which is already in circulation. But what we should do as scientists is something more, that is to say not only streamlining efforts, which will of course be evaluated by the out-turn, but maintaining the scientific spirit throughout. Pitfalls in intensified application of any human endeavour are several. It is particularly so in the application of science for rapid advancement of a country of our dimensions ; and one which is still listed as 'backward' in know-how and 'under-developed' economically (or even otherwise ! Readers will, of course, disagree with this view). Application of know-how alone, for instance, does not always lead to the expected results. This uncertainty may sound paradoxical, as something unscientific. But it has happened in past, due not to any fault of 'know-how', but due just to unscientific way of its application. A very good article by Docteur Renaud Paulin ("Science in the Service of Man in Tropical Regions", R. Paulin, in IMPACT of science on Society, a UNESCO Publication (Vol. X (1960), No. 4, pp 230) which deals with such apparent failure of technology in delivering the goods in tropics, has passed through our eyes recently and we recommend it strongly to our readers to go through. The problems are particularly with respect to tropics, but those of us who will be connected with application of science during the period of 'Third Plan' will find ample material by way of directions, as well as warning for pitfalls, which do lurk in the path of applying science for the advancement of India.

May the scientific spirit continue to light the path of scientific workers during 1961 and for years to come.

SCIENCE NEWS

LIGHT ON TRANSISTORS

Cadmium sulphide has been used by American physicists to make a transistor with photo-conductive properties. Changes in the intensity or wavelength of light or other radiation greatly affects its electrical properties. Hence its amplification can be controlled by changing either the intensity or colour of light falling upon it. According to workers at the research laboratories of General Motors, who developed it, the cadmium sulphide transistor can perform functions beyond the scope of conventional circuit components. The device is, however, still in the experimental stage.

The new transistor has the small size, high efficiency and robustness of other semiconductor devices. However, cadmium sulphide does not compare with germanium for ordinary applications, and efficient coupling to other active circuit elements is said to be difficult. Output and input resistances are higher than are usually found with valves and other transistors. The field in which the cadmium sulphide transistor is advantageously applied is broadly limited to photo-multipliers or ion-chamber amplifiers and other uses requiring high-impedance levels.

* * *

Deep-Sea Fungi

Research work carried out by the German ship Anton Dohrn during the International Geophysical Year proves the existence of fungi in the deep sea. A sample taken from the sea floor (at a depth of 200 miles south of Greenland) contained not only phycomycetes (low fungi) but also higher fungi which would grow on introduced sterilised organic material like pollen or straw. It is believed that such fungi are key producers of vitamins in regions where green plants do not thrive.

* * *

Ceramic Ball Bearings

Glass ceramic balls can be used in bearings where the load carrying capacity can be sacrified in favour of a marked resistance to high temperatures. Experiments at the Lewis Research Centre of the National Aeronautics and Space Administration indicate that, although ceramic balls have a load-carrying capacity which is only about one-fifteenth that of normal steel bearing, they nevertheless have considerable advantages for brief applications where a high temperature has to be sustained.

Steel bearings are usually limited to the temperatures at which the lubricating greases begin to break down. This is seldom higher than 200°C even for strontium-based greases, although molybdenum disulphide can of course be used upto almost 400°C. Design engineers will, therefore, welcome a material which allows them to work above these temperatures, even though the mode of application is strictly limited.

Annual General Body Meeting

ANNUAL REPORT OF THE GENERAL SECRETARY (ORGANISATION) 1960

A brief outline of the work carried out by the Central Executive Committee of the Association during the year 1960 is given below :—

CEC Meetings

The year 1960 has beenunique in having had seven Executive Committee Meetings of the Association in the course of the year. Except for one recently held at Hyderabad, all the other meetings were well attended.

The main item of interest during the year centres round the organisational pattern for the ASWI. The CEC has recommended to the Council for its consideration, the question of de-registration of the ASWI from the trade union pattern and converting it to the Societies pattern provided such a step is quite helpful in gathering strength and in getting the much needed recognition of the Association.

Organisation

A statusquo has been maintained in respect of the number of Units/Branches and Affiliated Organisations. As on date, the Association has its active Units/Branches/Affiliated Organisations functioning in the following places :—

Branches

Hyderabad, Lucknow, Roorkee, Jealgora, Mysore. Aligarh, Calcutta and Bahadrabad.

Units

Delhi, Madras, Rajahmundry

Affiliated Organisations

Khamaria, Kirkee and Kanpur (Federation of Defence Scientific Workers)

Lucknow (U.P., PWD Research Institute Scientific Workers Association.)

Madras (Southern Rly. Chemists & Metallurgists Staff Association.)

Economic & Service Condition Problems

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

(a)

	Problem	*Sponsored by*	*Persued with*
1.	Grades of Analytical Asstt. Southern Rly.	Southern Rly. Chemists & Metallurgists Staff Assocn. Madras	1. General Manager Southern Railway 2. Chairman, Rly. Board
2.	Selection of Class II Cadres for Asstt. Chemists & Metallurgists in CMT's Orgn.	—do—	Railway Board
3.	Formation of ASWI Branch at Bahadrabad	Bahadrabad Branch	1. Director IRI and 2. U. P. Govt. through
4.	Forwarding of applications for Employment elsewhere	U. P., PWD Research Institute Scientific Worker's Assocn. Lucknow	1. Chief Engineer, PWD Research 2. U.P. Govt. through Vice-President, Dr. B. Mukerji
5.	Protection under Article 311 of the Constitution for Civilians paid from Defence Estimates	Federation of Defence Scientific Workers	Ministry of Defence
6.	Condonation of ETE Service rendered beetween Two TE Services vis-a-vis Seniority	—do—	—do—
7.	Definition of Family as per Service Rules	—do—	—do—
8.	Liberalisation of Leave Travel Concession	—do—	—do—
9.	Grant of additional increments to Scientific Staff in junior grades	Lucknow Branch	1. Secy., Atomic Energy Commission 2. Chairman, Inter-University Board 3. Ministry of Defence 4. Ministry of Railways 5. CSIR through Dr. S. H. Zaheer, Dr. B. Mukerji
10.	Status of erstwhile Govt. employees of National Instrument Factory	Old NIV unit of Calcutta Branch	Ministry of Commerce and Industry
11.	Admissibility of HRA & CCA to Scientific Staff	Bangalore Branch	C.S.I.R.

Some of the above problems have to be treated as closed and others require attention of the CEC for progressing.

(b) Pay Scales

One of the major problems on which there has been considerable amount of apprehension and feelings in the minds of the scientific workers in the country is the question of Pay Commission Report vis-a-vis implementation of Scientific Policy Resolution. The Central Executive being appraised of these problems, authorised the General Secy. (Org) to draw up a 'NOTE' in consultation with the Hyderabad Branch and FDSW representatives. A detailed note has been drawn up which gives a critical appraisal of the Pay Commission recommendations and recommends the course of action for the Government to the follow if the Scientific Policy Resolution of the Parliament is to mean anything to average scientific worker in the country. This note is to be discussed at a personal level with Prof. MS Thacker and Prof. DS Kothari with a view to be taken up with the the Government in a suitable manner for favourable and satisfactory implementation of the recommendations. It will not be out of place to mention that strong feelings have been expressed by practically all our Branches/Units/Affiliated Organisations in regard to the question of pay scales as re-recommended by the Pay Commission and considerable amount of disappointment is evident from the type or the pattern of resolutions which have been received from them. I hope the Council will discuss all the aspects of the note and give their well considered advice for the CEC next year to follow up.

Staff Council/Staff Committees

Some of the Model Rules and Regulations pertaining to the recognition of Staff Associations, formation of Staff Committees/Councils and procedure for representations, etc., have been obtained from the Ministry of Home Affairs, Ministry of Labour etc. and they have been given suitable publicity through the V. K. for the information of the average scientific worker. One of these questions, viz. the formation of Staff Committee/Councils demands a serious consideration by the ASWI. It has been pointed out by the Ministry of Home Affairs that the Model Instructions referred to, were drawn up, to meet the contingencies and requirements pertaining to the secretarial staff, particularly at Delhi. It has to be noted that according to the environmental conditions and situation, for a particular class of employees, the rules for the formation and conducting of the Staff Committee on the pattern of Whitley Council of UK for purposes of negotiations, arbitration etc. both at departmental and national level, have to be drawn up separately.

In the case of scientific workers, we deal with a new class of personnel with their own unique type of demands, problems and situations ; we have to collaborate and help to draw up certain model rules for Staff Councils which could be taken up for being implemented by the various scientific and technical institutions in the counry. The Government of India have been very seriously considering the question of staff welfare and have even appointed a Sub-Committee to go into the question in detail with a view to find out a satisfactory solution, which would not result in situations like the Central Services strike. The Staff Councils would to a large extent remove the outlook of defeatism in the minds of the average scientific worker, particularly in the junior level, because their right to represent problems pertaining to their welfare and the welfare of the profession would be recognised. They would be heard and they may have satisfaction of seeing their suggestions implemented by negotiations.

Dr. Joseph Fund

All the branches of the ASWI and the CEC passed condolence resolutions on the sad demise of Dr. Joseph and a number of branches raised donations for being sent to the wife of late Dr. Joseph, viz. Mrs. Marry Joseph. A sum of Rs. 2997.00 was collected during the year which has been forwarded to her. A message and acknowledgement received from Mrs. Marry Joseph was reproduced in V. K. during the year.

Scientific Worker's Day

At the suggestion of the Lucknow Branch, the CEC considered the question of organising "Scientific Worker's Day". This matter was referred to all the Branches/Units/Affiliated Organisations. The suggestion nodoubt is very valuable one; an organised day will not only draw the attention to the conditions of scientific workers in the country but would also enable the scientific workers to assess for himself the contribution to scientific efforts and pledge to the country for better performance and renewed efforts.

Observations

I would like to point out certain organisational weaknesses which require our immediate attention. One of these is a lack of initiative and response from our Units/Branches to come forward to consider, represent and negotiate on the grievances or difficulties facing the scientific workers either in their area or the difficulties facing the scientific workers in their sphere of work or in the country in general. On such matters, the Branch/Unit could usefully persue the question with the concerned authorities or institutions and find a satisfactory or suitable solution. At the worst the Association could attempt to do it; whether it fails or succeeds would be a matter of detailed interest only.

Secondly, the problems facing the scientific workers have not been heard or examined with tolerance even by our own leaders in the scientific profession. Quite often representations have been brushed aside as cases of minor detail or as personal representations or as matters of trivial importance etc. I may venture to point out purely from an organisational angle that even a small problem solved by the Association gives a considerable impetus in gathering strength and even a little strength received in this context from our own colleagues high or low, goes a long way towards creating the confidence both in the Association and for faith in mutual co-operation.

Thirdly, links between our existing branches, units and central office is apparently weak. The response to requests, applications, letters and SOS calls both in regard to organisational matters and financial question go unheeded. You will be surprised to observe that our Assocn. strength on paper is about 1400 of which 800 are affiliated members and 600 direct members. Potentially, the income of the Association taking the entire organisation as a whole, should be of the order of Rs. 3500/- to Rs. 4000/- per annum of which the Centre's share should work out about Rs. 2,000/- or so. But a glance at the Treasurer report will indicate that this year we have hardly received Rs. 500/- by way of contribution to the

Central Office ; even a considerable amount out of this sum (approx. Rs. 300/-) has been in the form of book adjustments for TA bills for attending CEC Meetings during the year ! I am afraid it will not be possible for any Central Office to function effectively at Rs. 200/- per annum unless and until the branch executives are fully convinced of their share and responsibility. There has been a mis conception in the minds of many of our members that the contribution received from them goes a long way towards running the V. K. I may point out that our efforts towards making the V. K. self-sufficient are bearing fruits ; practically the V. K. does not draw for its funds from the ASWI resources. In fact, it is unable to do so because the ASWI does not have funds even for its organisational activities. So suggestions to economise on the publication activities would not help unless branches are alert about their collection of funds and contribution to the centre.

Conclusion

From a survey of what has been stated above, I would not like you to get away with a feeling of depression or pessimism. We have passed through much worse critical stages and today we have reached a stage of 'keeping alive' as an organisation ; but I am afraid that cannot be the end. The ASWI has certain objects and aims to fulfil. It has got certain duties to perform to science and to the scientific workers in the country. In the fulfilment of these objectives, the ASWI is not fully active. I would like the scientists, whether young or old, to spare a few moments of their valuable time for improvement of the organisation and the lot of the scientific workers in the country. It is here that I wish to request my colleagues of the profession to have greater confidence in organised efforts, to have greater confidence in themselves and to join in hands for not only demanding for solution of their problems individually but also by giving suggestions and living up to the suggestions.

I take this opportunity to thank the Council and the Central Executive Committee of the Association of Scientific Workers of India for the privilege of having elected me as the General Secretary (Org) and I would like to be excused for any omissions and commissions in the performance of my duties during this year. It would not be out of place to mention that in carrying the responsibilities of this post I have depended much on the goodwill of the office-bearers, members of the Exuctive, Colleagues at the Central Office and in the Branches/Units and Affiliated Organisations. Inspite of his pre-occupations, the President Professor MS Thacker had been kind enough to help me in carrying on the day to day activities and in advising me when I have referred organisational points for his advice.

I wish to thank all of you once again for all the co-operation and help received during the year,

M. R. RAMAN
General Secretary (Org.)

ANNUAL REPORT OF THE GENERAL SECRETARY (PUB.) 1960

Consequent to the election of the General Secy. (Pubn) from Kanpur, the Editorial Office of the Vijnan Karmee had to be shifted from Calcutta to Kanpur. The actual taking-over from Dr. DK Roy took-place in early Jan., 1960. I take this opportunity of thanking the General Body and the Council for my election as the General Secy. (Pubn). The usual formalities for the publication of V. K. from Kanpur took 2½ to 3 months. We had to find a suitable Press for printing the journal and because of the lag in time factor the first few issues from Nov. Dec. 1959, Jan. Feb. and March, 1960 took quite a long period to come out and to be despatched to the members. I must apologise for the delay and possibly the whole year had been attended with major or minor difficulties in posting of journals to the branches. We have, however, taken steps to see that the journal comes out in time and the process has since been standardised,

Format of V. K.

Subsequent to the transfer of the Editorial Office, the format of V. K has been modelled on the following lines :—

Section I	—	Editorial and Editorial News
Section II	—	Science News
Sectien III	—	Articles
Section IV	—	Worker's Forum
Section V	—	Scientific Institutions
Section VI	—	Science and Industry
Section VII	—	Scientific Personnel
Section VIII	—	Association News
Section IX	—	WFSW News

With the change in format, the following objectives were attempted :—

1. Editorial and Editorial News

It may be noted from the V. K. for the year 1960 that it had been the policy of the Editorial Office to stress upon the primary values of a scientist and his relationship to society at large. The importance of the scientist to an under-developed country like ours, the type of work expected of a scientist or scientific worker, the integrity and the honesty of the scientific work and the benefits accruing to humanity have been stressed. The working conditions or the pay structure of the scientist/scientific workers have not been taken as part of the editorial side. On the other hand, these subjects have been dealt with in the special section on Worker's Forum. We will refer to it later. During the year 11 Editorials and 14 Editorial News have been published.

2. Science News

Information obtained from the CSIR Science letters and Embassies like USSR and USA and journals available for our workers have been condensed for publication in V. K. During the year 62 Science News items have been published.

3. Articles

Our claim had so far been to publish articles of a popular nature and in that the maximum help have been taken from the articles obtained from USSR Embassy. As usual, I have got to put a wailing note as most of my other predecessors have done in that there had been much of paucity for articles and contributions from our own members. In fact, it is not worth while to depend on reproducing articles from other journals or articles of a very popular nature from only one Embassy. I would like to request the members present to make up their minds to see that the V. K. is copiously supplied with popular good articles. The nature of the articles may be on the types of research and scientific work carried out in our institutions to which our members belong. It is essential that the public be educated in the achievements of the scientific activities of the institutions in our country wherein our members contribute to a great extent. This will strengthen the Association considerably. 40 articles appeared in the V. K. during the year.

4. **Worker's Forum**

One might have noticed that the working conditions and the difficulties of scientists in service under Government, Quasi-Government and private enterprises have been brought-out under this column. We also requested our readers to come out with criticism or alternate suggestions for improvements in the conditions of scientific workers at large. Somehow or other there has been much of apathy and I would like to request again the members to give their attention to the vital question of the service conditions of scientists and make this column valuable for the Association to take up with employers the difficulties of scientists/ scientific workers. The number of items published in the Section is 15.

5. **Scientific Institutions**

This column was specifically arranged to make the readers of our journal know about the different institutions in the country and the type of work carried out by them. The idea has been taken from the journal of the Royal Institute of Chemistry which has been publishing a series of this type not only dealing with scientific institutions in UK but also the Universities and Colleges. Our ultimate aim is not only present a composite picture of the scientific activities carried out in the country but also to see that critical review is made of the scientific work carried out in these institutions and the benefits which accrue out of such institutions. In the coming years, it is our fervent hope that the specialists in the various fields of sciences will come forward and give critical survey of the work carried out in these institutions. Of course, I mean here only healthy criticism for improvements wherever necessary. Ten institutions as follows were covered during the year:—

(a) Indian Cancer Research Institute
(b) River Research Institute
(c) CDRI, Lucknow
(d) Shri Ram Institute, Delhi
(e) Mining and Geological and Metallurgical Research Institute, Calcutta
(f) C. E. R. I Karaikudi
(g) Regional Research Laboratory, Hyderabad
(h) National Sugar Institute, Kanpur
(i) F. R. I., Dehra Dun
(j) ATIRA, Ahmedabad

6. **Science and Industry**

This column has also been opend with a view to have an idea of the various existing major and minor industries in the country and the bottlenecks and difficulties faced by these industries in this country. We have made this column open to our production chemists and other specialist to come forward with suggestions for improving existing industries. The future plan is to review the three Five Year Plans and the industries which have come out of this planning. The industries covered are as below :—

(a) Iron and Steel

(b) Glycerine
(c) Plastics & Synthetic resins
(d) Sulphuric Acid
(e) Soda Ash
(f) Chlorine
(g) Caustic Soda
(h) Fertilisers

7. Scientific Personnel

Though this column was opened for a statistical survey of the existing personnel and the men required in future for scientific expansion, we have not been able to get things going as we liked. I would request Professor P. C. Mahalanobis to take-over this column and feed us with sufficient information for future issues of V. K.

An Association like ours should be able to impress upon the Government with statistics of scientific personnel and at the same time, the best ways of utilising the talented men available at all places." During the year as many as 88 pages were published.

8. Association News

This column was specifically brought out for the activities of the Centre, various branches, units and affiliated bodies so that each member can get an idea of what is happening in the ASWI. A co-ordinated information was requested from all branches and units but the response had not been good. I would very much like that the branches and units utilise this column to the maximum extent in future. During the year 92 pages were devoted to Association News.

9. WFSW News

Important and salient features of the WFSW have been published in this section for the benefit of members.

Distribution

1200 copies of each issue of V. K. were printed during the year and their distribution has been as follows :—

Members	—	750
Scientists	—	50
Scientific Institutions/Libraries	—	200
Advertisers	—	150
Foreign scientists and scientific Institutions	—	50

Finance

When the Editorial office was shifted from Calcutta to Kanpur, the debts of the Association to the printers and the paper merchants at Calcutta were as much as Rs. 7,000/-. We have been able to pay the debts to the Calcutta Press and paper merchants. Due to this economical condition, we started using news-print paper for publication of V. K. and possibly some of the members have not been happy over the change. The running of the journal has been more or less dependent on the advertisement revenues and I must thank in this connection, the Hyderabad Branch and Dr. S. Husain Zaheer in particular for the help rendered in securing advertisements. The revenue from advertisers has been increased. Inspite of this, with the running expenses of V. K. to the extent of Rs. 700/- per month, it would not be possible to manage without grant-in-aid from the Govt. of India. Our efforts have been mainly centered round the cutting down of the expenditure and at the same time to increase the revenue from advertisements. As the printing charges are now on the increase, it would be necessary to revise these rates for the coming year. If the rates are increased then possibly with the present number of advertisers we would be in a safe position to meet the expenditure on the publication of V. K. I would even go to the extent of saying that the get-up and the contents of the journals can be greatly improved with only a small amount of money from the Government grant.

Our Future

I have already received a number of constructive suggestions for the improvement of V. K. I would be implementing these suggestions but I shall also welcome other members of the General Body to offer their suggestions/remarks. I would like to maintain the format of the V. K. as it is now with additions/alterations if suggested by members. I would also like the various branches/units to take up some of these sections so that the burden on the Editorial Office is lessened to some extent. For example, I have already suggested that Prof. P. C. Mahalanobis should take over the feeding of the section under "Science Personnel". I would be happy if the Hyderabad Branch takes over the section under Science and Industry. Another proposal which I have got in mind is to add a last section as "Students Corner". In the coming year, I would like the journal to be sent to the Universities, Colleges and Schools so that young scientists in the making get a good idea of scientists and their activities. In this section, it is proposed to not only deal with specific scientific achievement in all fields but also to invite the young scientists of the country to come out with their own ideas on scientific matters. I hope that this has the approval of the General Body. A few more sections on "Scientific Societies and Contribution of Organisations" like CSIR, Defence, Agricultural Research, Railway etc., are also being thought of. I expect that the news items of the journal should have 4 to 5 pages printed of matters bearing on branch news and these two columns which we have thought of would take about 8 to 10 printed pages,

Once again I thank you all for giving me the opportunity of being the General Secretary (Pubn) for the year under review. I also thank the members of the Advisory Board and the Editorial Board for their valuable help and co-operation.

S. Ramabadran
General Secretary (Pub.)

REPORT OF THE TREASURER 1960

I now have the privilege of presenting the report of the Treasurer for the fourth year in succession. However, the progress in the financial position of the Association leaves me in a doubt about the use of the word "Privilege".

In the enclosures I have presented, the audited statement of accounts for the financial year 1959-60 together with the audit observations. The income and expenditure accounts for the period 1-4-60 to 15-12-60 as also the estimates for the period 16-12-60 to 31-3-1961 have been given. The budget estimates for the year1961 have been presented as the third enclosure to this report. These would give an idea of the financial position of the Association as on date.

I am very sorry to point out that the response from our constituent Units/Branches/Affiliated Organisations towards our financial commitments has been very poor. A glance of the income and expenditure account together with the membership position as on date would clearly indicate that the Central Office has been forced to meet the commitments single handed. As a rough estimates, it may be indicated that the dues from the Affiliated Organisations should be of the order of Rs. 750/- and that from the Branches/Units should be of the order of Rs. 1500/-, totaling to about Rs. 2250/- of which we have hardly received Rs. 500/-. Inspite of repeated requests and SOS calls during the year I have not been able to get any satisfactory response from our constituent bodies. This requires a serious review by all of you who have assembled at this Annual meeting.

There has not been any change in the membership position of the Association during the year. The Central Executive Committee was cognisant of this position and certain efforts were to be made by our President for an increase in the membership. I may point out that even if 33% of the scientific workers in the country become members of this Association, the membership should not be less than 10,000 and even if a rupee contribution is made to the Central Body for running the ASWI the financial position should be quite satisfactory for the purpose. Unfortunately, for reasons already known to you, the ASWI continues to pass through the doldrums year after year.

On the Publiction side the expenditure has been increasing over the years and this year the order of expenditure will be about Rs. 15,000 as against 10 to 12,000/- in the previous years. In this context, the Government grant and the NISI Grant have come in as a big source of help not to speak of the help received from the Advertisements. The VK has been practically maintained on these basis. Though the regular publication of the VK during the last year has enabled our getting a better response from advertisers, yet there is considerable avenues for improvement and I should think that with a little response from the active members of the Association in the various Branches we could easily build up advertisement revenues to the tune of another 3 to 4,000 - rupees. This again requires the serious consideration of all present.

In the coming years if the ASWI has to subsist as a vital organisation meeting the sacred aims and objects mentioned in the Constitution, the onus of responsibility will depend much on the membership and the response towards meeting the financial commitments. I do not think, it is necessary for me to emphasise that it is the financial status in organisation like ours that gives it a standing whether for the purpose of fulfiling the right obligations or for creating impression on our own membership.

I wish to thank all the members of the Executive and the Association for the confidence that they have reposed in me during all these years.

J. N. MISRA
Treasurer

ACTUAL OF INCOME & EXPENDITURE ACCOUNTS DURING THE PERIOD 1-4-60 TO 15-12-60

Expenditure	Rs. nP	*Income*	Rs. nP
I. Organisation Side		Membership Fee—	
T. A. and Conveyance	243.71	(i) Direct	30.50
Stationery and Printing	50.66	(ii) From Branches	499.11
Postage and Telegram	187.46	Publication Grants—	
Bank Charges	9.50	(i) From NISI	500.00
Miscellaneous expenses	59.00	(ii) Government of India	3,500.00
Audit and Accountancy	50.00	Advertisement revenue	2,909.10
Payment to Mrs. Marry Joseph	2,997.43	Sale of Journal	5.00
II. Publication Side (Vijnan Karmee)		Dr. Joseph Fund	2,997.43
Printing	6,564.49	Excess of expenditure over income	5,378.28*
Paper	1,230.00		
Estt. Expenses	562.00		
Travelling and Conveyance Allowances	352.74		
V. K. Stationery	240.80		
V.K. Postage	505.10		
Miscellaneous	34.49		
Office Equipment	164.78		
Bank Charges	34.50		
Payment to M/s. Pooran Press (liability 1959-60)	1,090.70		
Payments Outstanding—			
M/s. Bholanath Paper House	1,102.06		
Estt. charges	340.00		
Total	15,819.42	Total	15,819.42

* This represents unpaid Bills of Printers/Paper Merchants etc.

ESTIMATES OF INCOME & EXPENDITURE DURING THE PERIOD 16-12-1960 TO 31-3-1961

Income		*Expenditure*	Rs. nP.
Subscription Fees			
(i) Direct	30.00	Travelling allowances to officers	300.00
(ii) from Branches	500.00	Printing & Stationery	150.00
Advertisement revenue	2000.00	Postage	50.00
Grants & Donation :—		**V. K. Publication**	
(i) from Govt. of India	4500.00	Publication of Jan., Feb. & March issues of V. K.	2700.00
(ii) from NISI	500.00	Payment of outstanding bills	6978.00
Sale of Journal	10.00		
Excess of expenditure over income	2638.00		
Total	10178.00	Total	10178.00

BUDGET PROPOSALS FOR THE FINANCIAL YEAR 1-4-1961 to 31-3-1962

Income

	Rs. nP.
Subscriptions	2500.00
Advertisement Revenue	3500.00
Grants and Donations	10000.00
Sale of Journal	100.00
Total	16100.00

Expenditure

	Rs. nP.
Organisation	
Allowances and expenses to Officers	500.00
Establishment Expenses	500.00
Audit Fee	75.00
Stationery, Printing & Postage	900.00
Affiliation Fee	100.00
Miscellaneous Expenses	100.00
V. K. Publication	
Printing	7800.00
Paper	3025.00
Estt. Expenses	900.00
Travelling allowances, etc.	600.00
Stationery	400.00
Postage	1000.00
Miscellaneous	100.00
Bank Charges	100.00
Total	16100.00

Income & Expenditure Account for the Year Ending 31st March, 1960

Expenditure

	Rs.	nP.
To Salaries	291	00
,, Rent	—	
,, Stationery & Printing ...	456	61
,, Travelling & Conveyance ...	1,107	73
,, Postage & Telegrams ...	335	17
,, Vijnan Karmee Publication and Distribution Expenses ...	10,396	92
,, Miscellaneous Expenses ..	98	25
,, Bank Charges	15	10
,, Depreciation	55	50
,, Audit Fees	70	00
,, Donation to Scientific Workers Association Kanpur for Symposium	200	00
,, Balance being excess of Income over Expenditure carried to General Fund	470	63
Total ...	13,496	91

Income

	Rs.	nP.	Rs.	nP.
By Subscription :				
From Members ...	68	50		
Centres share from ... Branches ...	1,955	23	2,023	73
,, Vijnan Karmee Publication Grant-in-aid from :				
Government of India ...	6,000	00		
National Institute of Sciences, India ...	500	00	6,500	00
,, Advertisement Income from Vijnan Karmee			4,920	33
,, Sale of Vijnan Karmee			40	85
,, Miscellaneous Income			12	00
Total ...			13,496	91

REPORT OF THE AUDITORS

In connection with the audit of accounts of your Association for the year ended 31st March, 1960, we beg to make the following observations by way of our separate report, a reference to which appears in our report of even dated at the foot of the Balance Sheet as at 31st March, 1960 :—

1. Postage expenses of Rs. 432.72 nP included under the head "Vijnan Karmee" Publication and Distribution expenses have been certified by the General Secy.

2. "Vijnan Karmee Publication and Distribution Expenses" include expenses for Jan. '59 to Feb. '60 issues. The General Secy. informs us that March '60 issue was not published and/or sent to printing upto 31st March, '60.

3. Income from Branches, Units and Affiliated Organizations has been adjusted on actual receipt basis as before. No account is available for subscriptions due from the aforesaid but not received. The accounts of Branches and Units have not been incorporated in these accounts.

Kanpur :
June 21st, 1960.

GUPTA & CO.
Chartered Accountants.

BALANCE SHEET AS AT 31st MARCH, 1960

LIABILITIES

	Rs.	nP.
Deposit on account of India Regional Centre of World Federation of Scientific Workers	829	03
Liabilities of Vijnan Karmee Publication Expenses	3,309	88
Membership received in advance ...	5	00
Total ...	4,143	91

ASSETS

	Rs.	nP.	Rs.	nP.
Metal Boxes :				
Balance as per last account ...	13	00		
Additions during the year ...	12	00		
	25	00		
Less depreciation for the year	2	00	23	00
Office Equipment :				
Balance as per last account ...	16	50		
Additions during the year ...	33	00		
	49	50		
Less depreciation for the year	3	50	46	00
Duplex Machine :				
Balance as per last account ...	419	62		
Less depreciation for the year	50	00	369	62
Advances for expenses			210	14
Advertisement revenue outstanding ...			1,534	97
Outstanding Membership (individual) subscription ...			5	00
Stock of Paper for V. K. Publications ...			533	00
Cash & Bank Balances :				
Cash in hand ...	119	88		
Cash at Banks ...	1,065	74	1,185	62
General Fund Account :				
Balance (Dr) as per last account ...	707	19		
Less excess of Income over Expenditure as per foregoing account ...	470	63	236	56
Total			4,143	91

M. S. THACKER
President

S. RAMABHADRAN
M. R. RAMAN
} *General Secretaries*

J. N. MISRA
Treasurer

AUDITOR'S REPORT

The above setforth Income and Expenditure account for the year ended 31st March, 1960, and the above setforth Balance Sheet as at 31st March, 1960, of the Association of Scientific Workers of India, Kanpur has been examined by us from the books of accounts produced. Subject to our separate report of even date, the above setforth accounts give a true and correct state of affairs of the Association, as per informations and explanations given to us and as shown by the books of the Association.

Kanpur :
Dated, 21st June, 1960.

GUPTA & Co.
Chartered Accountants.

DRAFT REPORT ON PAY SCALES OF SCIENTIFIC WORKERS

I. Introduction

In this Memorandum a critical review of the recommendations of the Pay Commission as accepted by the Government has been made in as far as these relate to the scientific and technological workers. The determining factors of the background for scientific work (in the light of the Science Policy Resolution of the Government of India) the factors which have been totally ignored by the Pay Commission, have been brought out. A case has been made out whereby the scientific workers are to be considered as a class distinct from the administrative and industrial cadres. An attempt has also been made to analyse the requirements expected of a scientific worker and this has been related to their emo luments. The question of training of scientific workers before they are finally absorbed in the profession with due regard to their academic backgrounds and their ability and capacity including their interest in the profession, in relation to the efficient performance of their duties, has been discussed. Recommendations involving policy decisions by the Government of India as an employing agency and also certain minor modifications which have to be brought out in regard to the pay structure have been made. These are, however, not to be viewed as any demand for fresh revision of the Pay Commission Report in regard to scientific workers but these have to be viewed in the light of the short-comings requiring minor alterations which become necessary for bringing about efficiency in scientific work and which become expedient for the implementation of the Scientific Policy Resolution of the Government of India. The main recommendations contained in the memorandum seek the introduction of a single scale for scientific workers in what is known as Non-Gazetted cadre and in the event of this not being feasible, immediately minor alterations in the various grades recommended by the Pay Commission have been sought for. The memorandum also recommends the ratio in which the scientific workers in different scales should be employed in the event of graded system being finally accepted. As regards the fixation of pay in the recommended grades, the memorandum categorically accepts the present rules as recommended by the Pay Commission. As regards the rules framed by the Pay Commission for the fixation of the pay in the new scales, the Association accepts these rules without any qualification in order not to add further to administrative problems in this regard.

A detailed description of the principal themes and their subsidiary justification forms the basis of what follows *ad infra.* Starting with a critical study of pay scales which are ignored by the Pay Commission this memorandum proceeds ahead to examine and underline the determining factors which in actual implementation of science affect the pay scales of scientific workers. *The discussions and arguments presented take not only the present factors into account but are intended to streamline the approach towards a long-range and planned scientific requirement of the country both in terms of imminent necessities/existing conditions as well as futuristic trends.* This is followed by a reassessment of Pay Commission Report in the light of preceding evidence and draw out the obvious short-comings where they affect both the field of science as a career as well as Governmental and legislative intentions with regard to science which are embodied in the Scientific Policy Resolution. The memorandum is wound up with final recommendations. This recommendatory part of the present document is again intended to cover up the schism between the Pay Commission recommendations and the obvious arbitrary basis of pay scales (as far as science is concerned) on one hand; and the Commission's report and Governmental/Parliamentary approach towards integrated advancement of science in the country on other hand.

Whereas a fully evidenced and justified scale of pays in scientific careers is recommended as an ideal meeting not only the science's requirement for its growth, but also supplemented and backed by legislative intentions. the memorandum is aware of the hurdles likely to come in the implementation of this 'ideal scale of pays'.

Keeping this in view the recommendation has been made to be adopted in two phases, viz., as first phase of unification of grades with minor changes in grades followed within 3-5 years by introduction of second phase. The justifications for adoption are given in the recommendations.

II. Critical Study of Pay Scales

The Pay Commission while making recommendations for different grades in the scientific cadres has completely ignored the case of the lower income groups, (what are known as the "Non-Gazetted" grades) This Association has made a detailed scientific study of the various grades both in the prescribed scales and the revised scales with the following results :—

(a) Emoluments on the time scale

Tables 1 to 13 attached give an exact idea of the emoluments per month drawn by an individual in the prescribed and revised scales of pay over the time range relevant to the respective scale. These provide a comparative idea of the benefits or otherwise of the revised scales at different time stages.

(b) Comparison of minimum/maximum of the time scale

Improvements, if any, (in the revised scales over the prescribed scales of pay) for the various grades in respect of minimum and maximum have been indicated in Table 14. The ratio of the minimum and maximum in the prescribed and the revised scales give an idea whether there has been a trend towards any improvement in the monetary benefits at the end of time scales.

It will be observed that the ratios have remained practically stationary; *that is to say the Improvements in term of minimum and maximum if any are practically negligible.* Slight imropvements are discernible in the scales of Senior Scientific Officers Gde. I & II, Junior Scientific Asstt. Gd. II and Chargeman Gde. I. In other cases, there is acually a fall in the ratio indicating that the maximum has not moved forward, with slight increase if any in the minimum. *It is thus clear that no attempt has been made to improve the scale limit.*

(c) Average emoluments

The average monthly emoluments (AME) for the period covering the entire time scale have been calculated both for the prescribed and the revised scales of pay in Table 15 [columns 5 & (c) (d)]. The values for AME indicate the annual improvements

Table 1

P. Sc. O.

Prescribed Scale : 1000-50-1500

Revised Scale : 1100-50-1600

Years of service	Prescribed Scale			Revised Scale		
	Pay	D.A.	Total	Pay	D.A.	Total
Initial	1000	100	1100	1100	—	1100
After 1 year	1050	50	1100	1150	—	1150
„ 2 „	1100	—	1100	1200	—	1200
„ 3 „	1150	—	1150	1250	—	1250
„ 4 „	1200	—	1200	1300	—	1300
„ 5 „	1250	—	1250	1350	—	1350
„ 6 „	1300	—	1300	1400	—	1400
„ 7 „	1350	—	1350	1450	—	1450
„ 8 „	1400	—	1400	1500	—	1500
„ 9 „	1450	—	1450	1550	—	1550
„ 10 „	1500	—	1500	1600	—	1600

Table 2

S.S.O. Gr. I

Prescribed Scale : 600-40-1000-1000-1050-1050-1100-1100-1150

Revised Scale : 700-50-1250

Years of service	Prescribed Scale			Revised Scale		
	Pay	D.A.	Total	Pay	D.A.	Total
Initial	600	85	685	700	—	700
After 1 year	640	85	725	750	—	750
„ 2 „	680	85	765	800	—	800
„ 3 „	720	85	805	850	—	850
„ 4 „	760	100	860	900	—	900
„ 5 „	800	100	900	950	—	950
„ 6 „	840	100	940	1000	—	1000
„ 7 „	880	100	980	1050	—	1050
„ 8 „	920	100	1020	1100	—	1100
„ 9 „	960	100	1060	1150	—	1150
„ 10 „	1000	100	1100	1200	—	1200
„ 11 „	1000	100	1100	1250	—	1250
„ 12 „	1050	50	1100			
„ 13 „	1050	50	1100			
„ 14 „	1100	—	1100			
„ 15 „	1100	—	1100			
„ 16 „	1150	—	1150			

Table 3

S. S. O. Gr. II

Prescribed Scale : 350-350-380-30-770-40-850

Revised Scale : 400-40-800-50-950

Years of service	Prescribed Scale			Revised Scale		
	Pay	D.A.	Total	Pay	D.A.	Total
Initial	350	70	420	400	—	400
After 1 year	350	70	420	440	—	440
„ 2 „	380	70	450	480	—	480
„ 3 „	380	70	450	520	—	520
„ 4 „	410	70	480	560	—	560
„ 5 „	440	70	510	600	—	600
„ 6 „	470	70	540	640	—	640
„ 7 „	500	70	570	680	—	680
„ 8 „	530	85	615	720	—	720
„ 9 „	560	85	645	760	—	760
„ 10 „	590	85	675	800	—	800
„ 11 „	620	85	705	850	—	850
„ 12 „	650	85	735	900	—	900
„ 13 „	680	85	765	950	—	950
„ 14 „	710	85	795			
„ 15 „	740	85	825			
„ 16 „	770	100	870			
„ 17 „	810	100	910			
„ 18 „	850	100	950			

Table 4

J. S. O.

Prescribed Scale : 275-25-500-30-800

Revised Scale : 350-25-500-30-830-35-900

Years of service	Prescribed Scale			Revised Scale		
	Pay	D.A.	Total	Pay	D.A.	Total
Initial	275	70	345	350	—	350
After 1 year	300	70	370	375	—	375
„ 2 „	325	70	395	400	—	400
„ 3 „	350	70	420	425	—	425
„ 4 „	375	70	445	450	—	450
„ 5 „	400	70	470	475	—	475
„ 6 „	425	70	495	500	—	500
„ 7 „	450	70	520	530	—	530
„ 8 „	475	70	545	560	—	560
„ 9 „	500	70	570	590	—	590
„ 10 „	530	85	615	620	—	620
„ 11 „	560	85	645	650	—	650
„ 12 „	590	85	675	680	—	680
„ 13 „	620	85	705	710	—	710
„ 14 „	650	85	735	740	—	740
„ 15 „	680	85	765	770	—	770
„ 16 „	710	85	795	800	—	800
„ 17 „	740	85	825	830	—	830
„ 18 „	770	100	870	865	—	865
„ 19 „	800	100	900	900	—	900

Table 5

S. S. A.

Prescribed Scale :

(*i*) *Non-CSIR*—250-10-300-15-450-25/2-500

(*ii*) *CSIR* —250-25-500

Revised Scale —325-15-475-20-575

Years of Service	Prescribed Scale						Revised Scale		
	Non-CSIR			CSIR					
	Pay	DA	Total	Pay	DA	Total	Pay	DA	Total
Initial	250	70	320	250	70	320	325	—	325
After 1 Year	260	70	330	275	70	345	340	—	340
„ 2 „	270	70	340	300	70	370	355	—	355
„ 3 „	280	70	350	325	70	395	370	—	370
„ 4 „	290	70	360	350	70	420	385	—	385
„ 5 „	300	70	370	375	70	445	400	—	400
„ 6 „	315	70	385	400	70	470	415	—	415
„ 7 „	330	70	400	425	70	495	430	—	430
„ 8 „	345	70	415	450	70	520	445	—	445
„ 9 „	360	70	430	475	70	545	460	—	460
„ 10 „	375	70	445	500	70	570	475	—	475
„ 11 „	390	70	460				495	—	495
„ 12 „	405	70	475				515	—	515
„ 13 „	420	70	490				535	—	535
„ 14 „	435	70	505				555	—	555
„ 15 „	450	70	520				575	—	575
„ 16 „	450	70	520						
„ 17 „	475	70	545						
„ 18 „	475	70	545						
„ 19 „	500	70	570						

Table 6

J. S. A. I

Prescribed Scale : 160-10-330

Revised Scale : 210-10-290-15-425

Years of service	Prescribed Scale			Revised Scale		
	Pay	D.A.	Total	Pay	D.A.	Total
Initial	160	65	225	210	20	230
After 1 Year	170	65	235	220	20	240
,, 2 ,,	180	65	245	230	20	250
,, 3 ,,	190	65	255	240	20	260
,, 4 ,,	200	70	270	250	20	270
,, 5 ,,	210	70	280	260	20	280
,, 6 ,,	220	70	290	270	20	290
,, 7 ,,	230	70	300	280	20	300
,, 8 ,,	240	70	310	290	20	310
,, 9 ,,	250	70	320	305	15	320
,, 10 ,,	260	70	330	320	—	320
,, 11 ,,	270	70	340	335	—	335
,, 12 ,,	280	70	350	350	—	350
,, 13 ,,	290	70	360	365	—	365
,, 14 ,,	300	70	370	380	—	380
,, 15 ,,	310	70	380	395	—	395
,, 16 ,,	320	70	390	410	—	410
,, 17 ,,	330	70	400	425	—	425

Table 7

J. S. A. II

Prescribed Scale ; 100-5-120-8-200

Revised Scale : 150-5-160-8-240-8-280-10-300

Years of service	Prescribed Scale			Revised Scale		
	Pay	D.A.	Total	Pay	D.A.	Total
Initial	100	60	160	150	20	170
After 1 Year	105	60	165	155	20	175
,, 2 ,,	110	60	170	160	20	180
,, 3 ,,	115	60	175	168	20	188
,, 4 ,,	120	60	180	176	20	196
,, 5 ,,	128	60	188	184	20	204
,, 6 ,,	136	60	196	192	20	212
,, 7 ,,	144	60	204	200	20	220
,, 8 ,,	152	65	217	208	20	228
,, 9 ,,	160	65	225	216	20	236
,, 10 ,,	168	65	233	224	20	244
,, 11 ,,	176	65	241	232	20	252
,, 12 ,,	184	65	249	240	20	260
,, 13 ,,	192	65	257	248	20	268
,, 14 ,,	200	70	270	256	20	276
,, 15 ,,				264	20	284
,, 16 ,,				272	20	292
,, 17 ,,				280	20	300
,, 18 ,,				290	20	310
,, 19 ,,				300	20	320

Table 8

Foreman

Prescribed Scale : 360-20-500

Revised Scale : 450-25-650

Years of service	Prescribed Scale			Revised Scale		
	Pay	D.A.	Total	Pay	D.A.	Total
Initial	360	70	430	450	—	450
After 1 Year	380	70	450	475	—	475
,, 2 ,,	400	70	470	500	—	500
,, 3 ,,	420	70	490	525	—	525
,, 4 ,,	440	70	510	550	—	550
,, 5 ,,	460	70	530	575	—	575
,, 6 ,,	480	70	550	600	—	600
,, 7 ,,	500	70	570	625	—	625
,, 8 ,,				650	—	650

Table 9

Asstt. Foreman

Prescribed Scale : 300-20-400.

Revised Scale : 370-20-450-25-500

Years of service	Prescribed Scale			Revised Scale		
	Pay	D.A.	Total	Pay	D.A.	Total
Initial	300	70	370	370	—	370
After 1 Year	320	70	390	390	—	390
,, 2 ,,	340	70	410	410	—	410
,, 3 ,,	360	70	430	430	—	430
,, 4 ,,	380	70	450	450	—	450
,, 5 ,,	400	70	470	475	—	475
,, 6 ,,				500	—	500

Table 10

Chargeman Gr. I.
Prescribed Scale : 260-15-350.
Revised Scale : 335-15-485.

Years of Service	Prescribed Scale			Revised Scale		
	Pay	D.A.	Total	Pay	D.A.	Total
Initial	260	70	330	335	—	335
After 1 Year	275	70	345	350	—	350
,, 2 ,,	290	70	360	365	—	365
,, 3 ,,	305	70	375	380	—	380
,, 4 ,,	320	70	390	395	—	395
,, 5 ,,	335	70	405	410	—	410
,, 6 ,,	350	70	420	425	—	425
,, 7 ,,				440	—	440
,, 8 ,,				455	—	455
,, 9 ,,				470	—	470
,, 10 ,,				485	—	485

Table 11

Chargeman Gr. II
Prescribed Scale : 200-10-300.
Revised Scale : 250-10-290-15-380.

Years of Service	Prescribed Scale			Revised Scale		
	Pay	D.A.	Total	Pay	D.A.	Total
Initial	200	70	270	250	20	270
After 1 Year	210	70	280	260	20	280
,, 2 ,,	220	70	290	270	20	290
,, 3 ,,	230	70	300	280	20	300
,, 4 ,,	240	70	310	290	20	310
,, 5 ,,	250	70	320	305	15	320
,, 6 ,,	260	70	330	320	—	320
,, 7 ,,	270	70	340	335	—	335
,, 8 ,,	280	70	350	350	—	350
,, 9 ,,	290	70	360	365	—	365
,, 10 ,,	300	70	370	380	—	380

Table 12

Tech. Supr. Gr. II
Prescribed Scale : 150-7-185-8-225.
Revised Scale : 205-7-240-8-280.

Years of Service	Prescribed Scale			Revised Scale		
	Pay	D.A.	Total	Pay	D.A.	Total
Initial	150	60	210	205	20	225
After 1 Year	157	65	222	212	20	232
,, 2 ,,	164	65	229	219	20	239
,, 3 ,,	171	65	236	226	20	246
,, 4 ,,	178	65	243	233	20	253
,, 5 ,,	185	65	250	240	20	260
,, 6 ,,	193	65	258	248	20	268
,, 7 ,,	201	70	271	256	20	276
,, 8 ,,	209	70	279	264	20	284
,, 9 ,,	217	70	287	272	20	292
,, 10 ,,	225	70	295	280	20	300

Table 13

Tech. Supr. Gr. III
Prescribed Scale : 100-5-125-6-155-6-185.
Revised Scale : 150-5-175-6-205-7-240.

Years of Service	Prescribed Scale			Revised Scale		
	Pay	D.A.	Total	Pay	D.A.	Total
Initial	100	60	160	150	20	170
After 1 Year	105	60	165	155	20	175
,, 2 ,,	110	60	170	160	20	180
,, 3 ,,	115	60	175	165	20	185
,, 4 ,,	120	60	180	170	20	190
,, 5 ,,	125	60	185	175	20	195
,, 6 ,,	131	60	191	181	20	201
,, 7 ,,	137	60	197	187	20	207
,, 8 ,,	143	60	203	193	20	213
,, 9 ,,	149	60	209	199	20	219
,, 10 ,,	155	65	220	205	20	225
,, 11 ,,	161	65	226	212	20	232
,, 12 ,,	167	65	232	219	20	239
,, 13 ,,	173	65	238	226	20	246
,, 14 ,,	179	65	244	233	20	253
,, 15 ,,	185	65	250	240	20	260

Table 15

Emoluments of the time Scales

Designation	Minimum of Scale		Maximum of Scale		Ratio Maximum : Minimum	
	Prescribed	Revised	Prescribed	Revised	Prescribed	Revised
	(a)	(b)	(c)	(d)	(e)=$\frac{(c)}{(a)}$	(f)=$\frac{(d)}{(b)}$
P. Sc. O	1100	1100	1500	1600	1.36	1.41
SSO Gr. I.	685	700	1150	1250	1.68	1.79
SSO Gr. II.	420	400	950	950	2.26	2.38
J. S. O.	345	350	900	900	2.61	2.57
S.S.A (CSIR)	320	325	570	575	1.78	1.77
S.S.A. (Others)	320	325	570	575	1.78	1.77
J.S.A. I.	225	230	400	425	1.77	1.85
J.S.A. II.	160	170	270	320	1.69	1.88
Sup. Gr. III.	160	170	250	260	1.62	1.53
Sup. Gr. II.	210	225	295	300	1.40	1.33
Chargeman Gr. II.	270	270	370	380	1.37	1.41
Chargeman Gr. I.	330	335	420	485	1.27	1.45
Asstt. Foreman	370	370	470	500	1.27	1.35

Table 16

Average Monthly Emoluments (AME)

Designation			Emoluments/Monthly Initially		Average Monthly Emoluments		Benefits over the Minimum	
			Prescribed (a)	Revised (b)	Prescribed (c)*	Revised (d)*	Prescribed (e) = (c)—(a)	Revised (f)=(d)—(b)
1. P. Sc. O		End of 10 Yrs.	1100	1100	1263.63	1350.00	163.63	250.00
2. SSO Gr. I.	(a)	„ „ 12 „	685	700	911.25	975.00	226.25	275.00
	(b)	„ „ 17 „	685	700	969.70	1055.80	284.70	335.80
3. SSO Gr. II.	(c)	„ „ 14 „	420	400	568.57	664.29	148.57	264.29
	(d)	„ „ 19 „	420	400	647.90	739.42	227.90	339.42
4. J. S. O.			340	350	604.75	611.00	264.75	261.00
5. SSA (CSIR)	(a)	„ „ 16 „	320	325	484.06	442.19	164.06	117.19
	(b)	„ „ 11 „	320	325	445.00	400.00	125.00	75.00
6. SSA (Others)	(a)	„ „ 16 „	320	325	412.19	442.19	92.19	117.19
	(b)	„ „ 20 „	320	325	438.75	468.75	118.75	143.75
7. JSA I		„ „ 18 „	225	230	313.89	318.33	88.89	88.33
8. JSA II	(a)	„ „ 15 „	160	170	208.67	220.60	48.67	50.60
	(b)	„ „ 20 „	160	170	224.00	240.75	64.00	70.75
9. Asstt. Foreman	(a)	„ „ 6 „	370	370	420.00	420.83	50.00	50.83
	(b)	„ „ 7 „	370	370	427.14	432.14	57.14	62.14
10. Chargeman Gr. I	(a)	„ „ 6 „	330	335	375.00	408.57	45.00	73.57
	(b)	„ „ 7 „	330	335	391.36	428.18	61.36	93.18
11. Chargeman Gr. II		„ „ 11 „	270	270	320.00	329.09	50.00	59.90
Tech. Sup. Gr. II		„ „ 11 „	210	225	234.55	243.18	34.35	18.18
Tech. Sup. Gr. III		„ „ 16 „	160	170	202.81	211.88	42.81	41.88

* Based on Table 1 to 12 $= \dfrac{\text{Monthly emoluments over scale}}{\text{No. of Yrs. in the scale}}$

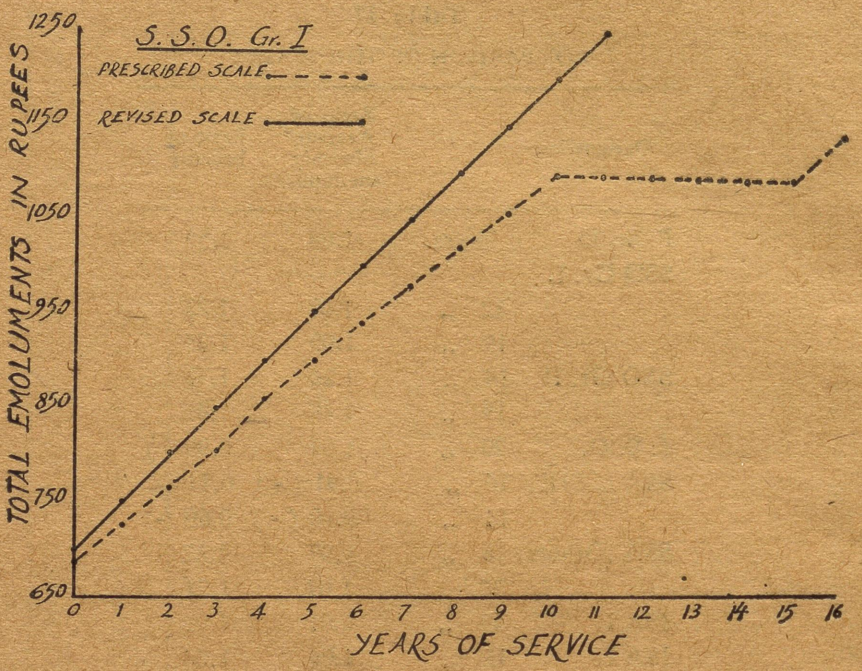
Table 17

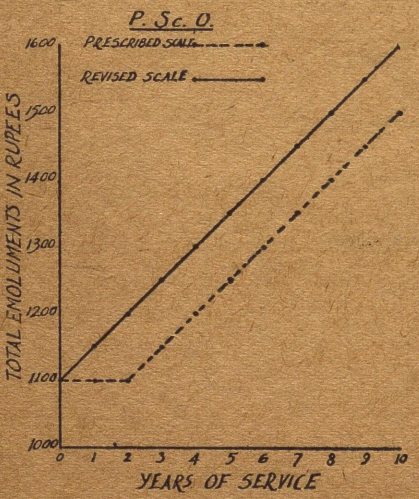
COMPARISON OF THE SCALES

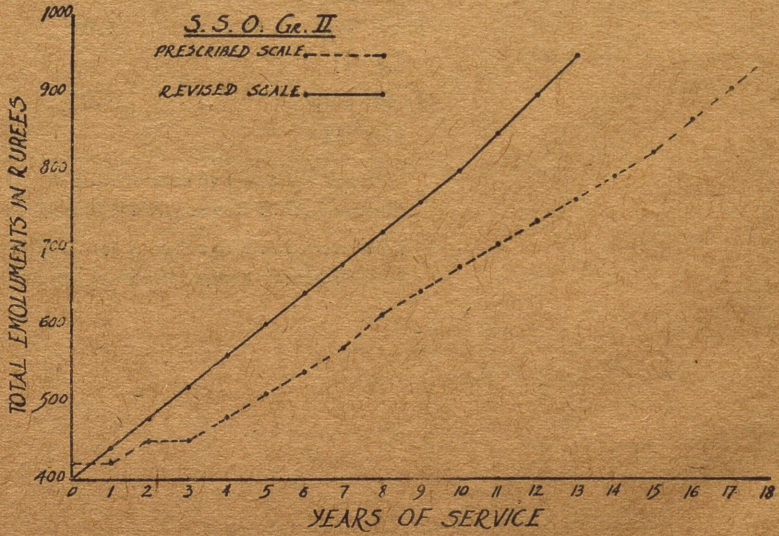
Designation		Ratio of Average* Monthly emoluments	Ratio of benefit†
P. Sc. O	10 yrs.	1.06	1.53
SSO Gr. I.			
	12 ,,	1.07	1.22
	19 ,,	1.09	1.25
SSO Gr. II	14 ,,	1.26	1.78
	19 ,,	1.49	1.49
J. S. O.	20 ,,	1.01	0.99 (-)
SSA (CSIR)	16 ,,	0.91 (-)	0.71 (-)
	11 ,,	0.90 (-)	0.60 (-)
SSA (Others)	16 ,,	1.07	1.27
	20 ,,	1.07	1.21
JSA I	19 ,,	1.01	1.00
JSA II	15 ,,	1.06	1.04
	20 ,,	1.07	1.10
Asstt.Foreman	6 ,,	1.00	1.01
	7 ,,	1.01	1.09
Chargeman Gr. I	6 ,,	1.09	1.63
	7 ,,	1.09	1.52
Chargeman Gr. II	11 ,,	1.03	1.20
Tech. Sup. Gr. II	11 ,,	1.04	0.53 (-)
Tech. Sup. Gr. III	15 ,,	1.05	0.88 (-)

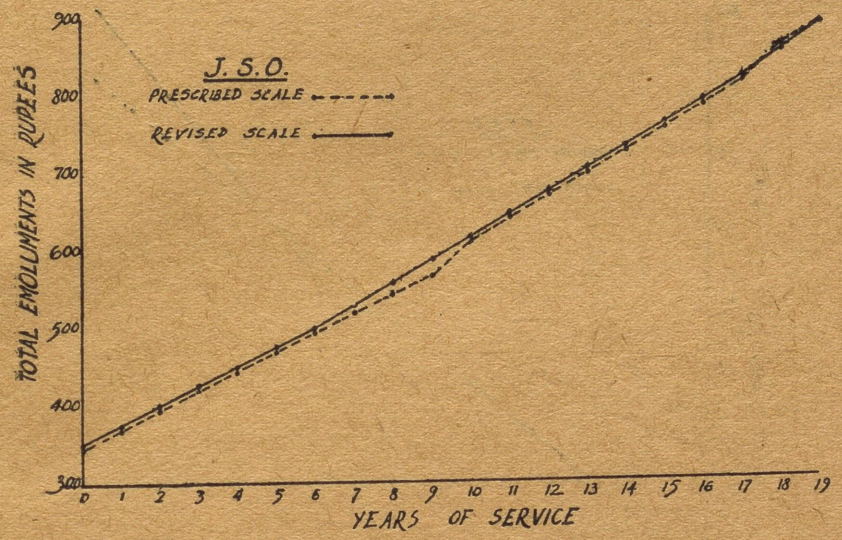
* Based on Table 16 columns (c) & (d) :
Ratio of AME Revised/AME Prescribed

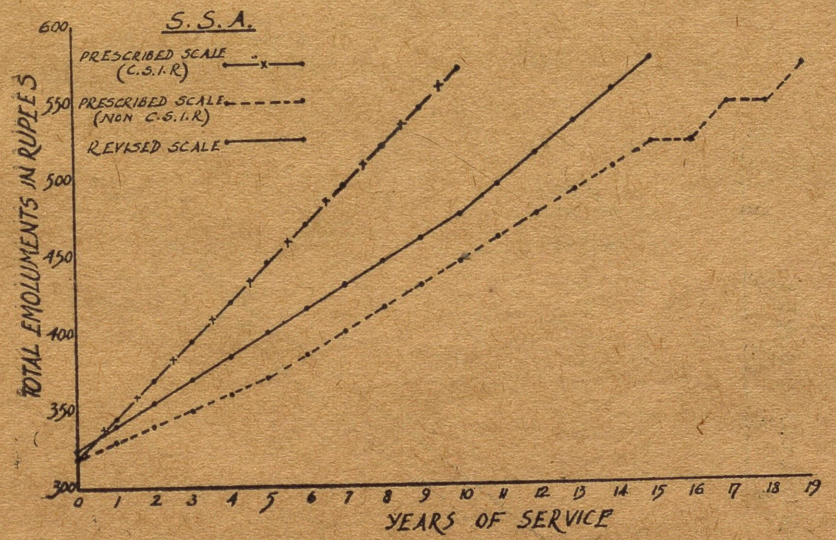
† Based on Table 16 columns (e) & (f) :
Ratio of benefit Revised/Ratio of benefit Prescribed.

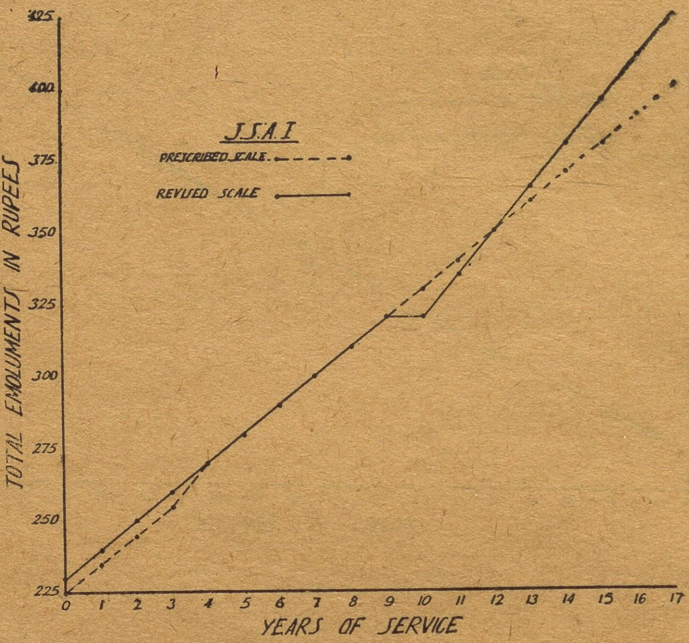

S. S. O. Gr. I
PRESCRIBED SCALE
REVISED SCALE
TOTAL EMOLUMENTS IN RUPEES
1250
1150
1050
950
850
750
650
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
YEARS OF SERVICE

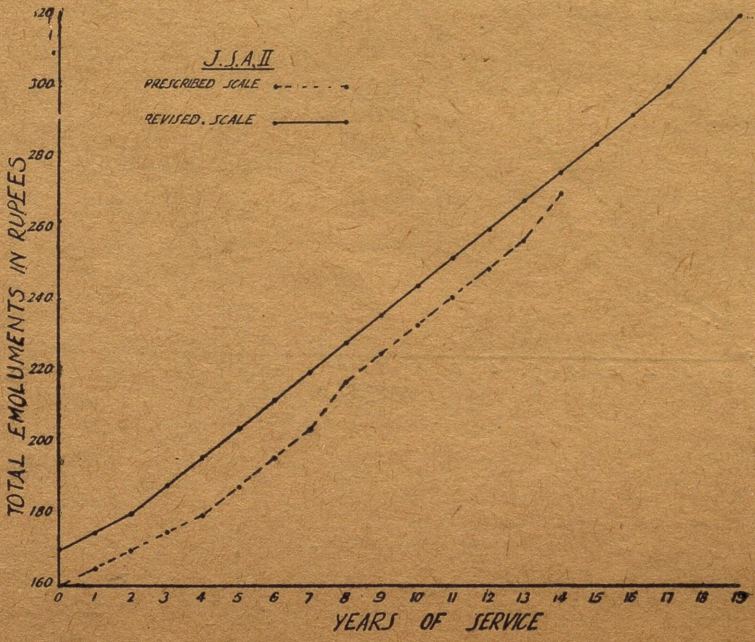

P. Sc. O.
PRESCRIBED SCALE
REVISED SCALE
TOTAL EMOLUMENTS IN RUPEES
1600
1500
1400
1300
1200
1100
1000
0 1 2 3 4 5 6 7 8 9 10
YEARS OF SERVICE

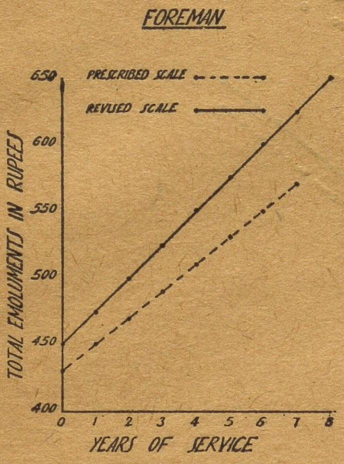

S. S. O. Gr. II
PRESCRIBED SCALE
REVISED SCALE
TOTAL EMOLUMENTS IN RUREES
1000
900
800
700
600
500
400
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
YEARS OF SERVICE

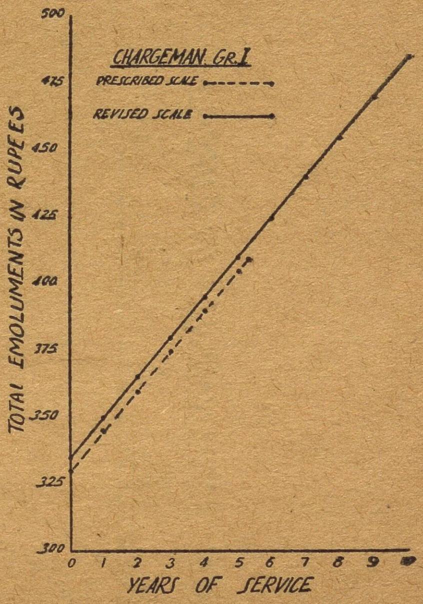

J.S.O.
PRESCRIBED SCALE
REVISED SCALE
TOTAL EMOLUMENTS IN RUPEES
900
800
700
600
500
400
300
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
YEARS OF SERVICE

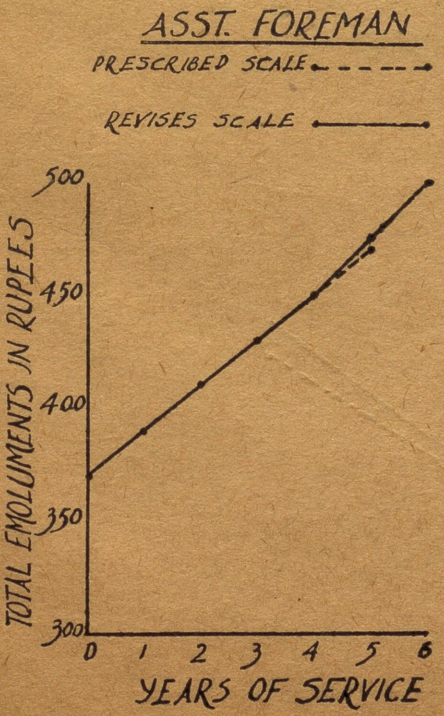

S.S.A.
PRESCRIBED SCALE (C.S.I.R)
PRESCRIBED SCALE (NON C.S.I.R)
REVISED SCALE
TOTAL EMOLUMENTS IN RUPEES
600
550
500
450
400
350
300
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
YEARS OF SERVICE

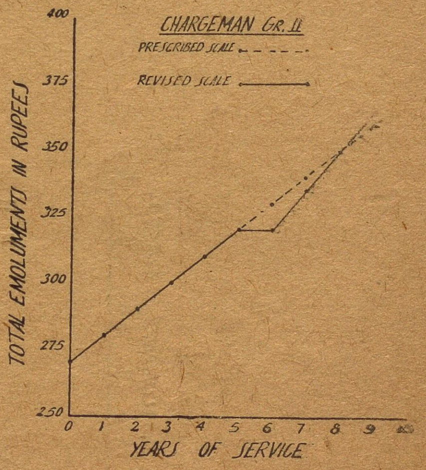

J.S.A.I
PRESCRIBED SCALE
REVISED SCALE
TOTAL EMOLUMENTS IN RUPEES
425
400
375
350
325
300
275
250
225
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
YEARS OF SERVICE

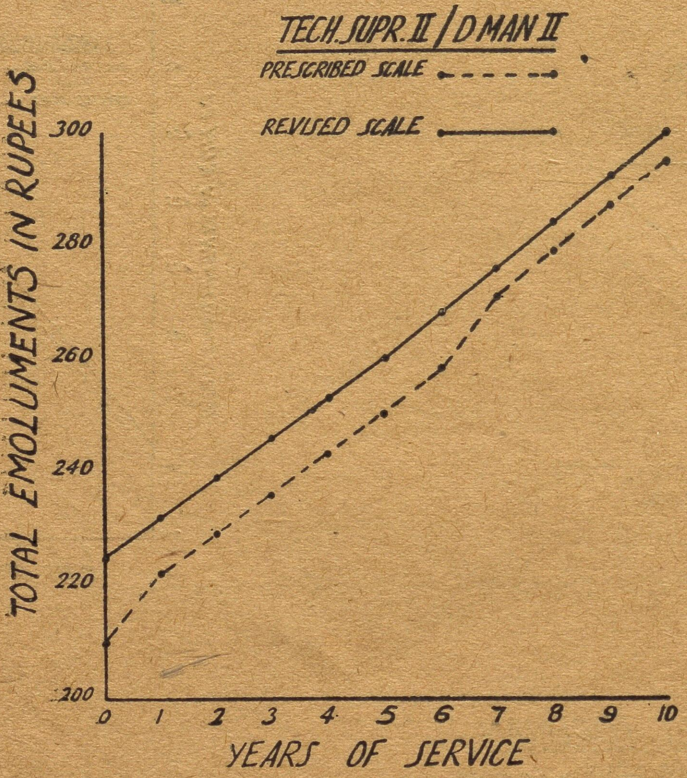

J.S.A.II
PRESCRIBED SCALE
REVISED. SCALE
TOTAL EMOLUMENTS IN RUPEES
320
300
280
260
240
220
200
180
160
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
YEARS OF SERVICE

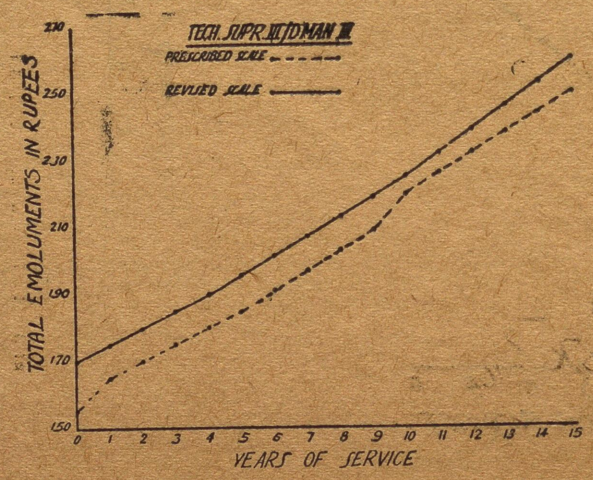

FOREMAN
PRESCRIBED SCALE
REVISED SCALE
TOTAL EMOLUMENTS IN RUPEES
400
450
500
550
600
650
0 1 2 3 4 5 6 7 8
YEARS OF SERVICE

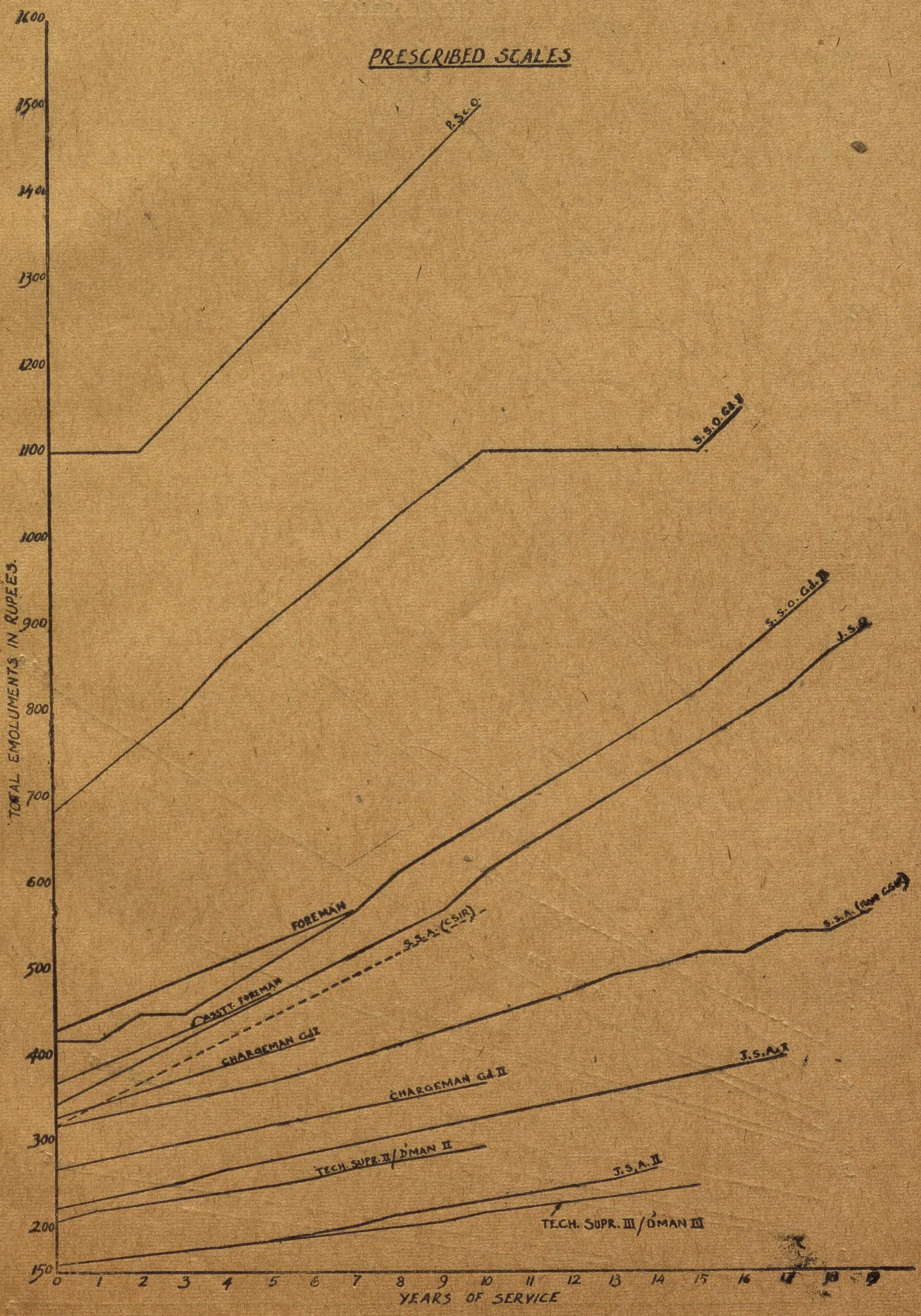

CHARGEMAN GR.I
PRESCRIBED SCALE
REVISED SCALE
TOTAL EMOLUMENTS IN RUPEES
300
325
350
375
400
425
450
475
500
0 1 2 3 4 5 6 7 8 9
YEARS OF SERVICE


ASST. FOREMAN
PRESCRIBED SCALE
REVISES SCALE
TOTAL EMOLUMENTS IN RUPEES
300
350
400
450
500
0 1 2 3 4 5 6
YEARS OF SERVICE

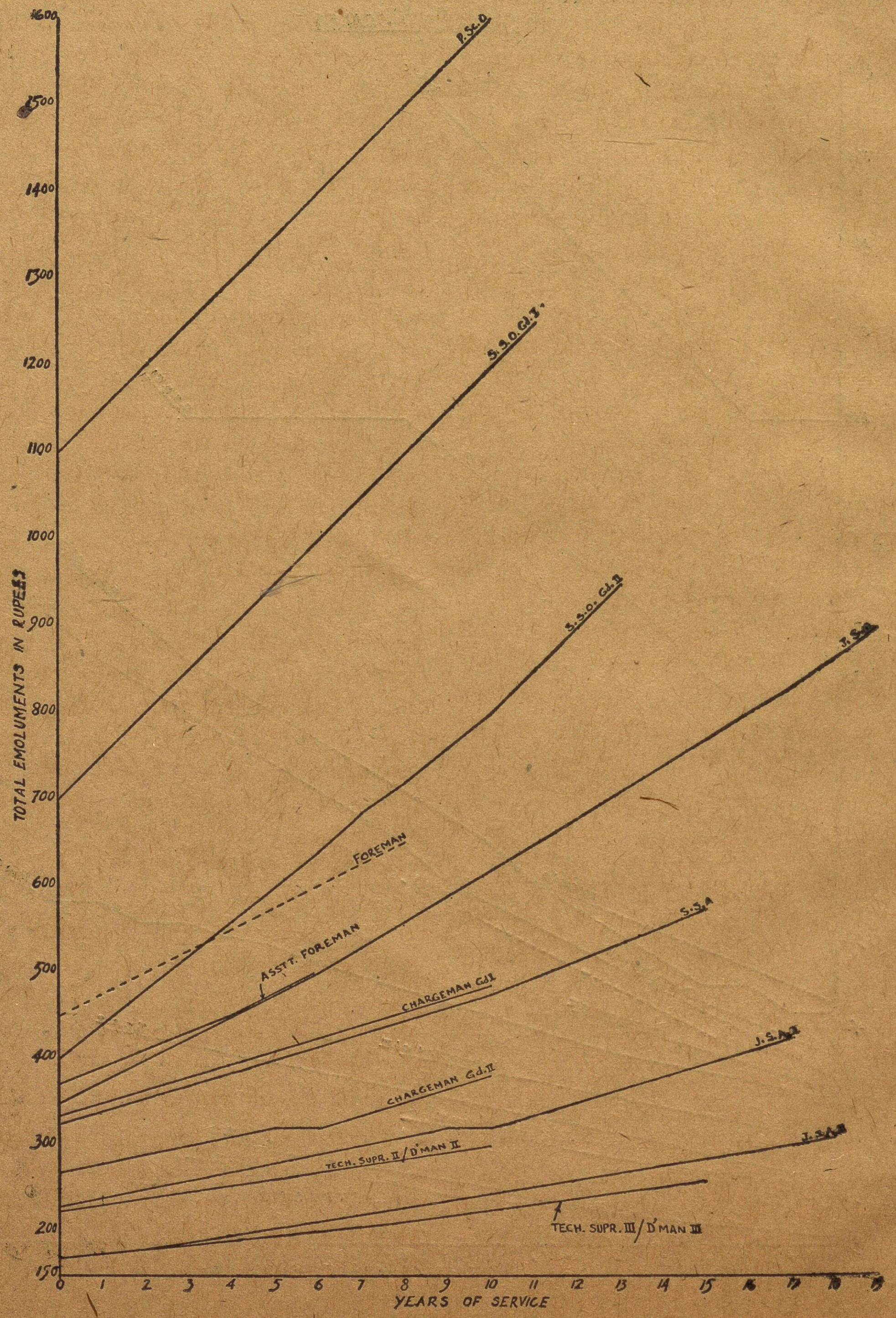

CHARGEMAN GR. II
PRESCRIBED SCALE
REVISED SCALE
TOTAL EMOLUMENTS IN RUPEES
250
275
300
325
350
375
400
0 1 2 3 4 5 6 7 8 9
YEARS OF SERVICE


TECH. SUPR. II / D MAN II
PRESCRIBED SCALE
REVISED SCALE
TOTAL EMOLUMENTS IN RUPEES
300
280
260
240
220
200
0
1
2
3
4
5
6
7
8
9
10
YEARS OF SERVICE


TECH. SUPR. III / D MAN III
PRESCRIBED SCALE
REVISED SCALE
TOTAL EMOLUMENTS IN RUPEES
270
250
230
210
190
170
150
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
YEARS OF SERVICE


PRESCRIBED SCALES
P.Sc.O.
S.S.O. Gd. I
S.S.O. Gd. II
J.S.O.
FOREMAN
S.S.A. (C.S.I.R.)
ASSTT. FOREMAN
CHARGEMAN Gd. I
S.S.A. (Non C.S.I.R.)
CHARGEMAN Gd. II
J.S.A. I
TECH. SUPR. II / D'MAN II
J.S.A. II
TECH. SUPR. III / D'MAN III
TOTAL EMOLUMENTS IN RUPEES.
YEARS OF SERVICE
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
150
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

REVISED SCALES



in monetary benefits that may accrue to the individual consequent to the revision of scales of pay. The difference between the AME and the emoluments at minimum of the scales [(columns (e) & (f) of the Table 15)] gives an idea of the extent to which the individual benefits monetarily (BOM) over the entire range of the scale (if this figure is multiplied by 12 and the number of years of the relevant time scale). This figure gives an idea of the average increase in emoluments over the basic pay at the minimum. It will be observed that though there are some improvements in some cases, *In respect of Junior Scientific Officers, Junior Scientific Asstt. and Assistant foreman the benefits over the minimum have remained stationary.* In the case of Senior Scientific Assistant, there is slight improvement in the Non-"CSIR" Organisations, in the CSIR Organisations they actually suffer a loss. *For the other Non-Gazetted grades, the improvement is of the order of few rupees which over the entire period on time scale is not even equal to the average bonus earned by a worker in the Private sector in a short period of two years !*

(d) Comparison of Scales

The ratio of the AME in the prescribed and the revised scales multiplied by 100 gives an idea of the percentage improvement if any in the revised scales of pay over the prescribed scales of pay. The ratio of the benefits (BOM) for the existing and revised scales of pay multiplied by 100, give a comprehensive idea of any percentage improvement in the revised scales, taking into consideration all aspects, viz, the minimum, the increments, the time and the maximum. These figures have been given in Table 16.

It will be observed that except for the Senior Scientific Officer Gde. II *the percentage increase in the emoluments is hardly significant* (0-10% Column (a)—Table 16 refers). For Senior Scientific Officer Gde. II it is 26% showing a significant monetary benefit. On the other hand in the case of Senior Scientific Asstt. in the CSIR it shows a reverse trend of 10% loss in the revised scale.

The over-all comprehensive improvements in the scales (Ratios of BOM) indicate again a significant improvement (78%) in all respects for the SSO Gde. II and Chargeman Gde. I. But for others the percentage improvement in the scale is not at all significant. Here again for the SSA of the CSIR there is a marked loss of 30%.

In the case of Technical Supervisors Gde. II & III there is no comprehensive benefit but on the other hand there is a deterioration to the extent of 47% & 12% respectively. For the Junior Scientific Officer, Junior Scientific Asstt. Gde. I and Asstt. Foreman, the grades remain stationary. As regards other grades, while there is comprehensive benefit to the extent of 22% for the SSO Gde. I *there hardly is any significant improvement in the other Non-Gazetted grades !*

The analytical and figurative presentation of these points has been done in Tables 1 to 16 below :

III. The determining factors affecting the Pay Scales of Scientific staff

(a) Categorisation of Scientific Workers

The Pay Commission has erroneously applied the backgrounds of administrative/industrial cadres to the scientific cadre, more so, in the so-called the "Non-Gazetted cadre" (lower income group) which has indeed made the profession at the lower level highly unattractive. It would, therefore, be necessary that before we discuss the pay structure of scientific and technical workers, we have to enquire into the type of work which they are expected to perform in order to gain the necessary background. In terms of the nature and type of work carried out by the scientific and technical workers, they may be categorised into four categories, viz :—

(i) teaching scientists,
(ii) research and development scientists,
(iii) operative scientists, and
(iv) the information scientists.

We could add to this the auxiliary technical staff required to aid the scientists. Under any employing agency be it the Government, Quasi-Government or Universities, *The job of the scientist and technologist should be confined to any one of the above categories.*

(b) Classification For Scientific Cadres

The existing system of *classification* in various Government Establishments is with the particular bias to the administrative cadres. *The criteria depend mainly on the administrative ability and responsibility* attached to the scientist ; for instance—the distinction between an LDC or Head-Clerk or Section Officer, the distinction between Secretary, the Deputy Secretary and the Joint Secretary, the distinction between the Assistant Director, Deputy Director and Director ; the distinction between Tahsildar, SDO and Collector ,etc., will generally be related to the two aspects which have been mentioned above. The choice of personnel for different assignments will be in relation to the qualitative require ments requiring specific ability in respect of administrative ability and the responsibility attached to it. *In the case of scientific cadres these two aspects alone do not play the major part,* though these factors may bear some relation to the emoluments in the hierarchy.

The more *important factor* in the profession of the science and technology *should be the technical ability or capacity of* the individual to contribute to the scientific efforts. Thus, a higher rate of pay need not be related to the higher responsibility attached to the assignment but should be in relation to the scientific and technical ability required for the post vis-a-vis that of the individual. Since scientific and technological personnel are to be employed in over increasing number by virtue of their technical ability alone, the administrative aspects of technical jobs should be kept to the minimum as otherwise it would lead to employment of scientific personnel for administrative jobs causing thereby a national loss of the already limited man power of resources.

It may be that some type of scientific work, may appear to be a repetitive type, yet by itself it cannot be a routine work in the sense as applied to skilled technicians or artisans. His work essentially requires specialised experience and training in terms of experimental techniques and his individuality for the critical evaluation-an application of experimental techniques. A special type of developed imagination based on regular scientific background constitutes here what is taken as initiative in other services.

Keeping the above factors in view, it can be concluded that *there is no justification for a large number of grades when we deal with scientific and technical posts.* Under any one of these categories of scientists, we should have a minimum number of grades and these grades must not be patterned on conventional lines since the scientific work is based on free discussion and unhampered criticism. A sense of equality and fraternity amongst fellow scientific workers is very essential. To borrow a phrase from scientific library "*a team spirit has to be developed for any fruitful operation of a project*". *Too much stratification will not create proper atmosphere, which is conducive for the purpose of efficient scientific work.* There can also be no justification normally for employing the same yardstick for classification as Gazetted and Non-Gazetted in the case of scientific posts as is obtained in the case of administrative cadres.

(c) Basic Qualifications for Scientific work

The types of qualified and scientific and technological personnel from Universities and Technological Institutions generally bolong to the following groups :—

Scientific	*Technological*
1. Bachelor Degree in Science.	1. Certificate course in any field of Engg. or Technology.
2. Master's Degree in Science.	2. Dipioma in any field of Engg. or Technology.
3. Doctorate Degree in Science.	3. Degree in any field of Engineering.
4. Any one of the above followed by an advanced training in any specialised field.	4. Degree in any field of Technology.
	5. Post-Graduate Degree in any field of Engg. & Technology.
	6. Professional Degree in any field of Engg. & Technology like AMIE etc.
	Note: In addition to the above, the individual may also have an advanced training in any specialised field.

(d) Qualification vis-a-vis Experience

It is well known that mere performance in examinations does not lead to correct assessment of the candidate's capacity for any of the scientific or technological assignments. It has been the experience in advance countries that academic performance of the scientists as rated by examination system, *bears no relation with his capacity to carryout research or deliver goods in a scientific career.* The qualities required of an efficient worker in the scientific profession can only be judged under actual working conditions. *It should, therefore, be normally be essential to have a type of probationary period during which the candidate's fitness can be suitably assessed and the worker is fitted to an appropriate assignment depending upon his capacity, aptitude and initiative.*

(e) Long-range Approach

This involves a directive influence at his selection stage at the High School or Intermediate level, better planning of education methods to suit the needs of science and technology as obtained in the country, provide adequate education institutions to cope-up large number of persons required in the field, to provide adequate facilities for practical training mendatory if necessary on all available industrial undertakings both belonging to the private and public sectors for affording such training facilities and lastly setting up or introduction of places or systems for higher education and specialisation. It also involves the provision of facilities to the workers to settle down or switch-over to the job for which he has been found to have necessary aptitude and interest.

(f) Probation

The individual with a Degree in science from University or a suitable Diploma from a Technological institution may be absorbed on Fellowship Scheme or in a capacity operationally equivalent to profession apprenticeship as obtainable in several related professions. It will be evident that the "fresher" from the University or Technological Institution will not be of any use from the profession point of view till such time as he has been suitably groomed to fit himself in the profession in any specific area of work. Further, there may be a number of institutions wherein individual scientific workers may gradually be acquiring the necessary experience though they may not be having the stamp from a University. The work of such individuals tempered with experience they have gained need not necessarily be of a routine type and cannot be compared to that of technician or of a clerk. It is desirable that a proper assessment is made of such individuals with regard to their contributions to scientific efforts and employ them suitably to obtain the maximum advantage of their experience and in such cases *they should be assured of a reasonable career so that they do not suffer for having chosen the scientific profession.*

(g) The Single Scale

It would be preferable to have for the scientific workers only a single scale. Arguments advanced against a single scale are lack of incentives and the tendency for loosing a grip on showing initiative. A graded system involves the question or proportion of posts within the cadre comprising of different grades for instance if 'a', 'b' and 'c' are three grades in a cadre then the question of an individual going up from (c) to (b) and then to (a) would depend entirely on the availability of posts in the grades (b) and (a), no matter how high an individual may be rated on the basis of his merits and capacity. *The system prevents the employing agency from rewarding where merit is recognised for the simple reasons that a post in the higher grade is not available.* On the other hand, a single scale system, this question will not arise. For any reasonable checks, efficiency bars at proportionate intervals can be placed. Recognition of merit and award for incentives and higher academic qualifications ensured by suitable provisioning for advance inciements. This single scale should start at a point which would attract the scientific talent and it should also ensure that an individual worker with an average ability in the profession gets the reasonable return in the course of his career if he does not prove himself to be meritorious.

(h) Job analysis vis-a-vis Scientific Work

It is well known that the administrative and the industrial cadres have now been in existence in the country for quite a long time and the job analysis in respect of these cadres to determine what is expected of them has been well established and any revision in their terms and conditions of service would take into consideration only the economic aspects of both the employers and employees. But in the case of workers in the *scientific and technological profession no such analysis has yet been done with* the result that it has still not been determined to what and how much is to be expected from the workers in different grades. Any recommendations, therefore, with regard to the pay scales and other terms of service and working conditions in respect of the workers in this field would obviously be without any scientific basis. Thus, we see today, the phenomena where similar work of equal importance is being carried out in different institutions and departments by scientific workers who are paid differently. This brings out to the conclusion that the scientific workers where they are paid low are being exploited.

We are in a position now to outline the prominent facets which were ignored by the Pay Commission with respect to pay fixation of scientific workers as well as keeping Scientific Policy Resolution in view.

IV. The Pay Commission Report

Unfortunately, the Pay Commission recommendations apparently do not appear to have taken these aspects into consideration at all. In fact, it was expected that the Pay Commission would go into the details of the Scientific Policy Resolution in an objective manner and suggest ways and means of implementing various aspects emphasised in this resolution as far as these concern the pay scales and other service and working conditions of scientific workers. Nodoubt, the Pay Commission did make some mention of the scientific and technological work, but here too, it would appear that to the Commission scientific workers or scientists as they are called mean only those who are either at the helm of affairs or are placed in what is generally called the Gazetted ranks. *The Pay Commission obviously has not considered the rank and file of workers in scientific profession as scientific workers or the scientists.* With the industrial advancement of the country and the consequent demands on the scientific profession, it is natural that the profession would employ a large number of workers at the lower and what is generally termed as Non-Gazetted cadre. In the recommendations, the Pay Commission have not viewed this cadre as belonging to specialised workers distinct from those in the administrative or industrial cadres. The Pay Commission Report, therefore, have been based on the same backgrounds as was obtained for the administrative and industrial cadres. This is not correct.

In the light of the above evidence the Association of Scientific Workers of India deems it necessary to express themselves on shortcomings of Commission recommendations and take a recommendatory stand to cover up these gross lapses.

V. Recommendations

The general approach in making the recommendations is two-fold, viz: (i) to remove the gross error with respect to pay scales embodied in the Pay Commission Report resulting due to arbitrary system of pay fixations and (ii) to streamline the question of pay with the long-range integration of scientific machinery in the frame work of the Scientific Policy Resolution of Govt. of India, as well as gearing up the scientific machinery as a really efficient system of services cut and dried to fit up in multifarious facets of the activities of the State. With this aim in view the recommendations cover two aspects. *In its full form the implemention of the recommendations, if adopted, are designed to be a two phase programme.* The first phase is adoption of recommended scales. *Within 3-5 years of the first phase it will be feasible to pass on to the second phase of recommendations which will bring the fully grown scientific services in all their imaginable aspects in the field.*

Taking an integrated view point of what hcs been stated earlier and the statistical data given **ad supra,** *a case obviously exists for some modifications in the recommendations of the Pay Commission as they states to the pay structure of the Scientific workers. As an immediate measure of implementation the follo-wing pay scales are recommended for adoption.* :—

Table 14

Category	Prescribed Scale	Revised Scale	Modification Sought
P. Sc. O./Asstt. Director	1000—50—1500	1100—50—1600	No change
SSO Gr. I.	600—40—1000—1000—1050—1050—1100—1100—1150	700—80—1250	
SSO Gr. II.	350—350—380—380—30—770—40—850	400—40—800 50—950	
J.S.O.	275—25—500—30—800	350—25—500 30—830—35—900	350—35—700—40—900 (15 Yrs,)
S.S.A.			
(i) Non-CSIR	250—10—300—15—450—25/2—500	325—15—475—20—575	350—20—550—25—650
(ii) C.S.I.R.	250—25—500		
JSA I.	160—10—330	210—10—290 15—425	250—10—270—15—450
JSA II.	100—5—120—8—200	150—5—160—8— 280—10—300	160—8—240—10—300
Foreman	360—20—500	450—25—650	450—25—650 (no change)
Asstt. Foreman	300—20—400	370—20—450 25—500	370—20—450—25—525
Chargeman Gr. I.	260—15—350	335—15—485	
Chargeman Gr. II.	200—10—300	250—10—290—15—380	250—15—400
Tech. Sup. Gr. II.	150—7—185—8—225	205—7-240—8—280	160—5—165—7—200—8—240—10—300
Tech. Sup. Gr. III.	100—5—125—6—155—6—185	150—5—175—6 205—7—240	

In this event, it is also recommended that for a three tier cadre both in the Gazetted and Non-Gazetted grades the ratio of posts should be 1 : 2 : 1 and for the four tier cadre of the technical grades, it should be 1 : 2 : 2 : 1. This only would provide reasonable chances to the individuals to go up the grades and thus avoid stagnation which is highly detrimental to any creative scientific effort.

As regards the rules framed by the Pay Commission for the fixation of the pay in the new scales, the association accepts these rules without any reservations in order not to add further administrative problems in this regard.

I. Phase : Introduction of pay scales

In Table 14 the suggested scales of pays for immediate introduction are given. This table compares the present scales obtainable as per old scales/revised scales (recommended by the Commission) with the scales recommended for adoption in this resolution. Very minor changes are sought for, and keeping utilitarian aspects in view it should not be difficult at all to adopt these recommended scales immediately as it involves insignificant drain on exchequer. The real emphasis is on integration *of scales at various levels so that the second phase can be introduced in 3-5 years of first phase integration.*

II. Phase : Streamlined approach for Scientific Service

Once the I phase of the recommendations is adopted, within 3-5 years of it the II phase should be introduced. *The approach here is to give fullest expression to the intentions of legislature with respect to science and their avowed scientific policy.* Moreover, based on analysis of scientific manpowers, manning problems and data available at present this is most realistic approach towards formation of a most stable and efficient scientific service. This phase of the present recommendations is designed to fall in 3 broad categories as outlined underneath. Each category is designated a 'stage' from the view point of career and the justifications for pay scales for each stage are enunciated along with.

(*a*) *Stage I.* Pay Scale=Rs. 200-200-225-15-300-20-400-EB-25-600-EB-30-750.

This will cover the entire range of the present 'Non-Gazetted cadre' of scientific workers.

This stage of pay scales (Rs. 200-750 with two efficiency bars) is intended to meet the *influx* of scientific man-powers in three essential steps, viz: (a) recruitment, (b) training and specialisation and (c) actual out turn (in the form of field control, production, guidance, teaching, etc.)

Stage I will absorb the scientific workers with essential basic qualification and will in fact be a clearing house between man-power-production centres (Universities and Institutions) and absorption of personnel in a *career.* The starting stage is not only justified at Rs. 200 on the grounds of offering a reasonable incentive for personnel to be attracted towards scientific careers, but also because it will be directing the quality of men produced and trained at institutions of learning.

Experience in technologically advanced countries shows that for attaining maximum efficiency, recruitment at this stage should be at a lower age group, catching them young with preparatory Educational stamp. Once in the grade (the step of probation) the aptitude and incentive of the workers should become a deciding factor at the first efficiency bar viz., at Rs. 400 where on the basis of training/specialisation acquired the personnel should be moved upto the area of higher responsibility / incentive / out-turn. Coupled with departmental encouragements in the form of advanced training in research management, project initiation, etc., this field will take up the workers to the third step, viz., E. B. at 600. With reasonable initiative, capacity of imagination and creative impulse revealed by the workers he should thus have a fair chance to move upto the maximum of the I Stage of the scientific career, namely. at Rs. 750. A well designed system of accelerated increments will meet the ends of justification for really talented.

(*b*) *Stage II.* Pay Scale—(i) Rs. 400-40-800-50-950,

(ii) Rs. 700-50-1250.

Proportion to next senior grade.
JSO to SSO II : 3 : 1.
SSO II to SSO I : 2 : 1.

This will cover the present scales of SSO Grade II (Rs. 400-950) and SSO Grade I (Rs. 700-1250).

While making recommendations for scales of this stage, we wish to emphasise that the two steps (i and ii) in it should be designed in time scale basis instead of post basis. As a time scale, the first step at the time scale of Rs. 700 should be an efficiency bar and a really suitable erson should have a reasonable opportunity to move automatically in the next step ending at Rs. 1250.

On the nature of scientific aptitude required for this *stage of scientific workers we intend to call it the composite scale.* In fact this stage is intended to cater for the higher staff of scientific workers who are essentially field or bench scientist but by virtue of their specialised training-cum-experience, integrity of profession, and aptitude assume directional ability and status. At the first step I these scientific workers not only initiate and plan projects but also progress it to completion and desired end.

In this scale (Step I), the individuals should be considered for absorption in the grade after a period of 5 to 6 years service, in accordance with rules at par with administrative Class I posts. The desiderata are, of course, based upon capacity of initiation and planning, intensive application of science of technology in projected channels. Entering this stage of scientific career on the basis of capabilities after 5-6 years 'probation' in Stage I, or on the basis of commensurate specialisation, the scientist will have incentive parallel to that obtainable in the field of central administrative and civil services with like progress in the career. For instance a scientist entering Stage II at Rs. 400 in the composite stage is comparable to fresh entrants in IAS, IPS, and other civil services and at the middle of his career he comes across a time scale comparable again obtainable in the said services. If he crosses this he attains a miximum of Rs. 1250 (on passing to Step II and the question of this has become purely a question of profes sional efficiency. If the bar is not crossed at the time of his retirement the scientist entering Stage II will be parallel to the scale of unit heads for instance a District Collector where District is an administrative unit.

The second Step II is intended to bring the scientist on the basis of his qualities and performance parallel to junior departmental heads, field operatives, sectional managers, etc. The main emphasis in composite scale is thus to bring out operative/field/experimental scientist to a high level of efficiency. In the second Step (II) on educational side the scientist assumes the level of reader and associate professor, on technological side, he is at par with supervisory cadres.

(c) *Stage III.* Step (I) 1100-50-1600 (covering the present level of P.Sc.O/Asstt. Director)

Step (II) Higher Selection Grade—Stage II Step (II) to Step (I) Stage (III) 8:1.

The above two stages are not the end of scientific career. There is a specific field of science application which assumes increased administrative capability, management, project direction, projected advancement and planning with respect to education and training. Here the scientist instead of applying science, starts administering science. In a stepwise advancing manner he assumes advice to the Government in his field of specialisation. The intermediate levels are of Departmental Directors, Project Directors, culminating in top level experts. In the final steps this leads to Director-Generals, Secretary's to Cabinet Ministry's, Service Chiefs, Advisers to State and Cabinet Govts., overall managers of enterprises like mineral oils, minerals, textiles, excise, multipurpose projects, explosives, statistics, etc.

The identity here is more akin to those available in the field of administration, legislation, etc., and in fact here the scientific activity merges with other facets of the state activity in broadest sense.

We have recommended pay scales only for the Step (I) of this stage (Rs. 1100-1600). In education side the scientist here attains the level of full fledged Professor, in research side Research Director, in management (Public sector side) Plant Managers, etc. The sealing of Step (II) we have open to the Government and, of course, being a top level appointment this will be commensurate with qualifications, acumen, and experience of personnel concerned judged with their efficiency to deliver goods in the field of activities concerned.

V. Conclusion

The implementation of Scientific Policy Resolution requires a manifold approach in different phases. The related aspects of this resolution are :—

(a) the improvements in relation to teaching of scientific and technological subjects,

(b) training of scientific and technical personnel,

(c) popularisation of science and scientific methods,

(d) creating such conditions for the workers in the field as could attract fresh talents to the profession and give to those in the profession a sense of service and security and keeping them away being lured to other more lucrative profession.

It is imperative that the pace of technological advance is speeded up and this fact has been brought-out in our five year plans. It is also known that the scientific and technological workers have to contribute largely to this end. It, therefore, becomes desirable to make the scientific and technical career an honourable one to which the scientists and technologists will be proud to belong.

ASWI : Trade Union To Association Pattern

Preamble

The Association of Scientific Workers of India was registered under the Trade Union Act in the year 1947 with Shri Jawaharlal Nehru as the Founder President. The Association was formed for fulfilling two broad objectives laid down in the Constitution, viz., those pertaining to the economic and service conditions of the scientific workers and the other laying stress on the development of science and scientific efforts in the country. Over a period of 13 years, the Association has been passing through the doldrums. During the year 1960, the Central Executive Committee of the ASWI under the active Chairmanship of Professor M.S. Thacker has considered the reasons for the ASWI being weak and the palliative measures essential for strengthening it. The salient features which have come up for discussion are—

(a) The poor strength of the Association, viz., 1300 as compared to the number of scientific workers in the country approximately 30,000,

(b) The misapprehension in the Government circles regarding the activities of the ASWI in the Trade Union pattern which is apparently standing in the way of the Association being recognised,

(c) The apathy which has resulted in large number of scientists particularly in the higher strata remaining outside the purview of the Association and the desirable correctives meeting these difficulties.

It was suggested that the ASWI could be de-registered as a Trade Union and registered again under the Societies Act so that it is converted to a Society pattern. The various aspects related to these questions have been discussed at the Central Executive level during the year (3rd, 4th and 5th CEC minutes refer). During the 5th CEC Meeting, the CEC decided to recommend to the Council for its consideration that the Association could be de-registered as a Trade Union and registered as a Professional Society under the Societies Act provided—

(a) the objectives and aims of the Society continued to remain as laid down in the present Constitution of the ASWI,

(b) the Association does not lose its existing rights,

(c) the office-bearers of the Association are protected and are free from victimisation,

(d) this move facilitates the recognition of the Assocn. by the employing agencies, particularly the Govt. and the Quasi-Govt. organizations,

(e) steps are taken to ensure that the Association increases its strength in terms of membership and its representative character.

The CEC has throughout kept in view the question that the ASWI will retain its right to be the representative body in regard to the professional aspects of the scientific workers and the question of conversion should be considered in the normal and constitutional manner, if the related issues such as *recognition* and response for increase in membership are forthcoming.

Resolution

The CEC recommends to the Council that the ASWI be de-registered as a Trade

(*Continued on page* 34)

Minutes of the 7th CEC Meeting of the Association of Scientific Workers of India, held on 2-1-61 at 10-30 A.M. in Room No. 209, Mechanical Engineering Department, University of Roorkee, Roorkee.

Members Present:

Prof. M. S. Thacker (President), Dr. M. S. Iyenger, Dr. S. Ganguly, Sri Baldev Singh, Dr. D. K. Roy, Sri A. Rahman, Sri H. Gopalkrishnan, Sri A. Rajagopalan, Sri S. B. Bhagali, Sri H. C. Pathak, Sri T. S. Seshodia, Sri C. B. Joshi, Sri Zacharia George, Sri S. Ramaswamy Iyer, Sri K. M. Murad, Sri S. Chandra (Members), Sri J. N. Misra (Treasurer), Sri D. V. Varma (Jt. Secy.), Sri S. Ramabadran (Gen. Secy. Pubn.), Sri M. R. Raman (Gen. Secy. Org.)

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

1. Confirmation of the minutes of the previous meeting

The minutes of the previous meeting were read out by the Secretary and were confirmed.

2. Report of the General Secy. (Org.)

3. Report of the General Secy. (Pubn.)

The reports of the General Secretaries to the Council and General Body Meetings were read out and approved.

4. Report of the Treasurer

The report of the Treasurer for the year 1960 inclusive of audited statement of accounts and the Balance Sheet for the financial year ending 31st March, 1960, the statement of actual income and expenditure during the period 1-4-60 to 15-12-60 the estimates of income and expenditure during the period 16-12-60 to 31-3-61 together with the Budget Proposals for the financial year 1-4-61 to 31-3-62 were considered by the Executive Committee and approved for consideration by the Council.

5. Proposals / Resolutions

The following Resolutions / Proposals were received from the Branches denoted :—

Title	*Sponsor*
1. ASWI : Trade Union to Association Pattern ..	C. E. C.
2. Creation of an All-India Scientific Service ..	Hyderabad Br.
3. Constitution of a single organisation of Scientific Workers consisting of different Units of ASWI in the CSIR ..	do.
4. Leave Travel Concessions for Central Govt. employees ..	do.
5. Disarmament and the Under-Developed countries	do.
6. Recommendations of the Pay Commission and Scientific Workers in the CSIR ..	do. Roorkee, Lucknow, Delhi.
7. Conditions of Service of Staff of C&M Organisation of Southern Railway	Southern Rly. Chemists and Metallurgists Staff Assocn.

8. Scientific workers not confirmed in Service .. Hyderabad Br.
9. Arbitration .. do.
10. Railway Travel Concession for ASWI office-bearers and members .. do.
11. Free Railway Pass for Government employees proceeding on regular leave .. .. F.D.S.W.
12. Dearness Allowance for pay above Rs. 300/- .. do.
13. Rate of recovery of House Rent for Government accommodation .. do.

The CEC noted that the General Secretary had drawn up a Note on pay-scales for consideration by Professor M. S. Thacker and Professor D. S. Kothari. The CEC desired that the action on the Note may be finalised at the earliest since the item was of particular importance concerning the service conditions of the members. It was also decided that the Item No. 6 on "Recommendations of the Pay Commission and Scientific Workers in the CSIR", etc., should also be considered along with the note on pay-scales drawn up by the General Secy. (Org). It was also decided that for necessary action on items No, 2, 4, 5, 7, 8, 9, 11, 12 and 13, it would not be necessary for recommending these resolutions for consideration by the Council.

In the light of the action already taken by the Council in the year 1960, viz., "Recommendation for formation of the structure of ASWI on a Federation Pattern", the CEC decided that further action on Item No. 3 vests with the Committee and in the light of the same, this organizational problem should be expedited.

Travel Concession (Item No. 10)— It was decided to withhold this resolution.

ASWI : Trade Union to Association Pattern—The CEC considered this question in detail and decided to recommend the same to the Council for its consideration.

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

M. R. Raman,
(*Gen. Secy.*) *Org.*

Minutes of the Council Meeting of the Association of Scientific Workers of India held on 2-1-61 at 2.00 PM in Room No. 209, Mechanical Engg. Deptt. University of Roorkee, Roorkee.

Members Present :

Prof. M. S. Thacker (President), Sri Baldev Singh (Hyd), Mr. A. Rahman (Mysore) Sri H. Gopalkrishnan (Hyd), Sri P. S. Subrahmanyan (Jabalpur), Sri H. C. Pathak (Khamaria) Sri A. Rajagopalan (Khamaria), Sri T. S. Seshodia (Bahadrabad) Sri S. Chandra (Bahadrabad), Dr. M. S. Iyengar (Jealgora), Sri S. B. Bhagali (Kirkee), Dr. B. S. R. Sastry (Hyd.), Dr. Ganguly (Calcutta), Members Saravsri S. Ramaswami Iyer (Kanpur), R. N. Tandon (Kanpur), K. L. Maheshwari (Kanpur), Sri D. V. Varma (Jt. Secy.), Sri J. N. Miara (Treasurer), Sri S. Ramabadran (Gen. Secy. Pubn.) and Sri M. R. Raman, Gen. Secy. (Org.).

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

1. **Confirmation of the minutes of the last Council Meeting held at Bombay**

The minutes were read out and confirmed.

2. **Introduction of the Delegates**

All the Delegates present introduced themselves to the Chairman.

3. **Reports of the General Secretaries**

The annual reports of the General Secretaries (Refer page Nos. 1 & 6) were discussed in detail by the members of the Council in the light of the amendments/suggestions of the CEC. The particular question regarding fall in membership income and the need for better organisational relationship between the Centre and Branches was considered and it was hoped that the changes in the organisational pattern in the ensuing years may improve this question. The reports were adopted and recommended to the General Body.

4. Report of the Treasurer

The annual report of the Treasurer (Refer page No. 9) inclusive of the Auditor's report for the period ending 31st March, 1960, the Income and Expenditure accounts for the period 1-4-60 to 15-12-60, the Estimates for the period 16-12-60 to 31-3-61 were considered and adopted.

5. Reports from Branches

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

6. Proposals/Resolutions

The note on pay-scales as recommended by the CEC was considered and the Council directed the CEC (for the ensuing year) to expedite action on the same.

The Resolution No. 1 regarding "Conversion of ASWI from Trade Union to Association Pattern" was discussed in detail. The views of all the representatives from the Branches which were present at the Council Meeting were heard and clarifications that were sought were suitably replied to by the General Secretary (Org.) and the President. It was impressed upon all present that conversion from the trade union to the Association Pattern was with the particular view to increase the membership and to seek the recognition of the Government. One of the items that was discussed in detail was the question of structure for the ASWI. The two points that were made clear were—(a) the organisational pattern, viz., unitary or federal structure is not affected by the ASWI converting to the Societies Pattern and (b) the ASWI can continue to be affiliating organisation, even of institutions registered under the trade union act.

The President particularly emphasised these questions and once again reiterated that the Association need not de-register under the trade union act until and unless it is assured of benefits arising out of the same. *The Council unanimously decided to de-register from the trade union act* and to register itself under the Societies Act. The following amendments to the Constitution were moved by the General Secy. (Org.) seconded by the General Secy. (Pubn.) and unanimously adopted :—

Amendments to the Constitution of the ASWI consequent to "Conversion of ASWI from a Trade Union Pattern to Society Pattern."

1. Heading

For "Association of Scientific Workers of India (Registered under the Trade Union Act, 1926)"

Read "Association of Scientific Workers of India (Registered under the Indian Societies Act—)"

2. Name and Registration—Clause 1,

"in lieu of the existing 2nd sentence"

Read "It shall be registered as a Professional Society"

3. Office—Clause 2

For "Registrar of Trade Union"

Read "Registrar of Societies"

4. **Separate Funds—Clause 21**
   Lines 3 & 4
   Delete "within the limitations of the Indian Trade Union Act, 1926"

5. **Trade Dispute—Clause 42**
   For "Trade Dispute"
   Read "Economic and Service conditions problems"
   Clause 42—Delete Clause 42 "In case of trade dispute arising"
   Read "cases pertaining to Economic and Service conditions"
   Clause 42*A* & *B*—Delete Clause 42 A & 42B.

6. **Clause 79**—Delete Clause 79

7. **Clause 80**—Delete existing Clause 80 and
   Read "The separate funds (vide rule 21) of the Association shall be used for the promotion of civic and welfare interests of its members and will be operated by the Assocn. in the manner and subject to the relevant clauses of the Indian Societies Act. Such funds shall have no connection with the General Funds."

8. **Clause 84**
   Delete existing Clause 84
   Read "The Accounts of the Association shall be audited annually by a qualified professional individual preferably a Chartered Accountant. The audited annual returns shall be submitted to the Registrar of Societies within the due date required by him."

9. **Clause 96. —Lines 6 & 7**
   Delete "the notice of dissolution shall be submitted to the Registrar of Trade Unions within a fortnight"
   Read "the notice of dissolution shall be submitted to the Registrar of Societies within a fortnight".

The Council directed the CEC for the year 1961 to ensure that an early action is taken on this resolution and also to see that necessary action is initiated regarding increase in membership in the light of this resolution and also for seeking recognition from the Government and other concerned employers.

7. **Relationship with World Federation of Scientific Workers**

In accordance with the previous practice, the Council decided to recommend regarding the Chairman for the Indian Regional Centre for the World Federation of Scientific Workers. The President Prof. M. S. Thacker and Dr. S. Ganguly suggested that there should be closer collaboration between the Indian Regional Centre and the ASWI and every effort should be made for this purpose at an organisational level. In the light of this, the Council decided to recommend to the World Federation that the President of the ASWI should by convention also be the Chairman of the Indian Regional Centre. Since the Committee of the Indian Regional Centre will be nominated by the Chairman subject to the approval of the World Federation Central Executive Committee, it was decided to recommend to the President of the Indian Regional Centre that the Secretary and the Treasurer of the Association should also be members of the Indian Regional Centre Committee if not office-bearers of the same. This practice if followed for a few years in the beginning will help a close collaboration between the two organisations in regard to all policy matters, etc. It was, however, emphasised that all organisational activities accounts and finance, etc., of the two organisations should be kept separate and not combined together.

8. **Office-Bearers / CEC for the year 1961**

The Council constituted the CEC for the year 1961 as below.

CEC for the year 1961

The CEC was constituted as under :—

1. Prof. M. S. Thacker ... President
2. Prof. P. C. Mahalanobis Vice-President
3. Dr. S. Husain Zaheer ... -do-
4. Dr. B. Mukerji ... -do-
5. Dr. D. S. Kothari ... -do-
6. Sri M. R. Raman ... General Secy. (Org.)
7. „ S. Ramabadran ... -do- (Pubn.)
8. „ D. V. Varma ... Jt. Secy.
9. „ Y. H. Rao ... -do-
10. „ L. V. Subramanian -do-
11. „ J. N. Misra ... Treasurer
12. Maj.-Gen. S.S. Sokhey (Delhi) ... Member
13. Dr. M. S. Iyengar (Jealgora) ... „
14. Dr. D. K. Roy (Calcutta) „
15. Dr. S. Ganguly „ ... Member
16. Mr. A. Rahman (Mysore) „
17. Sri H. Gopalkrishnan (Hyd.) ... „
18. Secretary Hyderabad Br. ... „
19. „ Bangalore Br. „
20. „ Mysore Br. „
21. „ Roorkee Br. „
22. „ Jealgora Br. „
23. „ Lucknow Br. „
24. „ Bahadrabad Br. „
25. „ Calcutta Unit „
26. „ CSIR Unit Delhi „
27. „ CLRI Unit Madras Member
28. „ CTRI Unit Rajahmundry „
29. „ F. D. S. W. „
30. „ ASW (Kanpur) „
31. „ ASW (Kirkee) „
32. „ ASW (Khamaria) „
33. „ UP PWD Res. Inst. Scientific Workers Assocn. Lucknow ... „
34. „ Southern Rly. Chemists & Metallurgists Staff Assocn., Madras „

Editorial Board

1. Prof. M. S. Thacker
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3. Dr. S. Husain Zaheer
4. Dr. D. K. Roy
5. Sri M. R. Raman
6. Dr. S. Ganguly
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8. Sri Baldev Singh
9. Sri M. L. Vaidya
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8. Dr. D. M. Bose
9. Dr. B. C. Guha
10. Maj.-Gen. S. S. Sokhey
11. Dr. D. S. Kothari

9. Arrangements for General Body Meeting

The General Sec. (Org.) pointed out to the Council regarding the arrangements made for holding the General Body Meeting. The President suggested that the General President of the Indian Science Congress Prof. N. Dhar should be asked to inaugurate the ASWI General Body Meeting this year and that he would speak to him in this connection.

10. Auditors for the year 1960-61

M/s Gupta & Co., Chartered Accountants. The Mall, Kanpur were appointed as Auditors for the year 1961.

11. Professor M. S. Thacker suggested that we should go to the Government for grants-in-aid direct and not through NISI. The Council approved this suggestion.

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

M. R. Raman,
General Secy. (Org.)

Minutes of the Annual General Body Meeting of the Association of Scientific Workers of India held on 3-1-1961 at 2-30 P.M. in Room No. 202, Mechanical Engg. Deptt., University of Roorkee, Roorkee.

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

1. Chief Guest

Professor N. R. Dhar, General President of the Indian Science Congress Association was the Chief Guest. The Chief Guest was welcomed by the President Prof. M. S Thacker and the General Secretaries.

2. Inaugural Address by Professor N. R. Dhar

Prof. N.R Dhar, President, Indian Science Congress Association was the Chief Guest. In the course of his inaugural address, he advised the younger scientists to adhere to truth and honesty and be prepared for struggling for the same if they have to achieve the objectives and aims of the Association. In this context, he pointed out the life of great scientists like PASTEUR, FARADAY and others who sacrificed their all in the cause of science are known not for their administrative achievements or for the wars they have won but they are known for the discoveries for alleviation of the suffering of man-kind.

3. Annual Reports

The reports of the General Secy. (Org.) & General Secretary (Pubn.) as per enclosure were adopted.

4. Office-bearers for the year 1961

The General Secretary (Org.) Sri M. R. Raman announced the name of the office-bearers and members of the CEC for the year 1961. (Refer to item 8 of the minutes of the Council Meeting)

5. Treasurer's Report/Budget for 1961

The Treasurer report inclusive of actual of income and expenditure accounts for the period 1-4-60 to 15-12-50, Estimates of Income & Expenditure for the period 16-12-60 to 31-3-61, Balance Sheet for the year ending 31st March, 1960 and Budget Proposals for the financial year 1-4-61 to 31-3-62 were adopted.

6. Proposals/Resolutions

The proposal on Pay-Scales as recommended by the Council was adopted unanimously.

Resolution on conversion of ASWI from Trade Union to the Society Pattern (passed by the Council) was also approved.

7. Presidential Address

The President, Prof. M.S. Thacker then addressed the Meeting. The Presidential address is given below.

8. Indian Regional Centre—World Federation of Scientific Workers

The General Body approved of the suggestion of the Council regarding the following proposal for nominating the Chairman of the Indian Regional Centre of the World Federation :

> "The President of the ASWI to be the Chairman of the Indian Regional Centre with a view to co-ordinate and also to expedite the activities of the Indian Regional Centre".

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

M. R. Raman,
General Secy. (Org.)

PRESIDENTIAL ADDRESS—PROF. M. S. THACKER

In the last year's meeting held in Bombay some of my colleagues persuaded me to accept the Presidentship of the Association and do what I can for the Association and science and scientific workers in the country. I was very happy to accept the Presidentship and tried to do something to make the Association a really dynamic body. The Association has been in existence, I think, for the last 13 years and I became the member of the Association from the year 1949. During the last 13 years we have not made much headway. I have tried to discuss the causes for the Association not being strong both in the CEC and Council Meetings. We have talked and discussed about the efforts to be made to make the Association strong and I talked to my senior colleagues but some did not respond and some of them expressed that they would come to the Association if it ceases to be a Trade Union. This question was considered carefully in the CEC and the Council Meetings and yesterday after the deliberations, the *Council decided that we may change-over the Association to a Society pattern.* We would do so but on changing-over from one pattern to another we should not lose the advantages of objectives of the Association. If the Association is to be strong, everyone knows the membership of the body has to be increased. The potentiality of getting members for our Association is available from the Universities, Government Departments and private sector. Under the present pattern of the Government, more and more scientific persons will be employed by the public sector and we should get more members from the Government sector. Even if the members of the Universities do not want to be direct members, their Teacher Association and Scientific Association may be affiliated to our bodies. The CEC also felt that if I address a personal letter to the Scientists all over the country, it may have some effect. I will do so and I would also request all the individuals present that in your individual capacities you should exert your influence to get more members so that the Association really becomes a strong body and also strong enough to be accepted by the Government.

The next step would be to make the Association recognised by the Government of India. Once we change-over to the Association Pattern, in my opinion, there won't be difficulties but still there will be a struggle to take the Ship to the Shore ! Processes may be easy or may be difficult. However, I will try my best to take up the recognition question with the Government this year.

The Council has also felt this year that for having a close relationship with the World Federation of Scientific Workers, the President of the Association of Scientific Workers of India should be the President of the Indian Regional Centre of WFSW. The Head of the centre should form a separate committee to carryout the activities and finances specifically meant for the Indian Regional Centre.

I would like to stress the main programme for the year 1961. Our efforts will be to strengthen the Association and to have its recognition. We have to also improve the finances of the Association and for that I would request the Branches to increase the membership and pay more to the Centre for keeping the organisational activities. I would like to also have a Symposium or Seminar but instead of taking purely scientific subjects, I would suggest that we have the "relationship of employers and employees" as a subject. This can be considered by the Executive Committee later.

I thank you for electing me as the President for the next year and I shall continue to do what I can to better the prospects of the Association.

(*Continued from page* 26)

Union and registered as a professional society under the Societies Act subject to the following :–

(i) the aims and objects of the society will be continued to be as laid down in the existing constitution of the ASWI,

(ii) the ASWI under the Society pattern does not lose its existing rights,

(iii) the above decision facilitate recognition of the ASWI and increase in membership.

Sponsor : *C. E. C.*

ARTICLES

MICRO-ELEMENTS IN HUMAN BODY

By

Yu. Bogomolov

What does the living tissue consist of ? What elements are contained in its cells ? And what compounds form the brain substance, the bone and the blood ?

Scientists furnish a rather general answer to these questions. About ten elements—carbon, hydrogen, oxygen, nitrogen, potassium, magnesium, sulphur and iron—constitute 99 per cent of the weight of plants and animals. These are the basic "building materials" of the nature. But there is something else. A thorough chemical analysis of the cell has shown that about 50 other elements are contained in the remaining one per cent. Since these latter are elements present in the organism, constitute thousandth, hundred thousandth and even a millionth part of the weight of the living substance—they are termed microelements.

Are the microelements of any importance to the living organism ? Scientists expecting a negative answer to this question began experiments. But, no matter how-logical this negative answer may have seemed at first glance, experiments and investigations proved the contrary, i. e., that the microelements exert a great influence on the vital activities of various organisms.

The results of the experiments on plants were amazing.

Manganese Sludge

Tests conducted with various microelements showed that microfertilisers cannot be replaced by the usual fertilisers (nitrogen, phosphorus and potassium). The manganese sludge or waste left over during the process of manganese-ore enrichment, deposits of which amount to many millions of tons, is found to be one of the most valuable and very interesting microfertilisers.

The role played by the microelements in human cells is no less. Entering the organism together with food, they go to form the ferments, hormones and other substances controlling vital processes in human body. They are also constituents of many vitamins important for the organism.

Many microelements exert a strong influence on the normal metabolism in various organisms. This helps attain a metabolism in some plants under which the bacteria and viruses causing plant diseases perish, thus making them immune to diseases.

The problem of the creation of such immunity to various diseases in animals and man was set next.

45 Micro-elements !

About 40 to 45 various microelements were revealed in the human body. Even the rarest radium is present in it, deposited in the brain substance. When it is difficult even to isolate all these 40-50 elements, one can imagine the difficulty in establishing the individual effect exercised by each one of them on the body.

Research work in this direction has just begun. Investigations were limited to copper, cobalt, manganese, zinc, molybdenum, iodine, strontium, vanadium and iron. In other words, out of 40 elements scientists have only worked with nine. All the rest are awaiting their turn. It is obvious that there are more "obscure." points in this question, than "lucid". However, some very important results of these investigations may already be mentioned here.

It appears, for instance, that copper not only participates in the make-up of proteins, but may even form the copper-protein compounds. Organic substances rich in copper have already been discovered in the blood erythrocytes, liver and milk. Experiments have demonstrated that fibrin, an important part of the blood, is a chemical "cobalt protein."

Another question posed was the quantity of the microelements present in the tissues and blood of the patients suffering, for instance from cancer, in comparison with those in the tissues of the healthy individuals.

Treatment for Cancer

Some scientists consider that cancer may be successfully treated by hormones inhibiting the growth of cancer tumours. It is also known that the microelements have a very strong effect on the formation of such hormones. If the organism of a cancer patient lacks the microelements which promote the development of such hormones it may lose the power of self-protection. However, it may evidently be helped by administrating the deficient hormones.

Unfortunately, at present the complete chemical composition of cancer tumours remains unknown. This gap will be filled by the precise data of analyses. The microelements in which cancer tumours are deficient will be added to the patient's food, while those present in excess will be excluded from the diet, so as to restore the normal microelement balance in the blood and tissues. However, here another difficulty confronts the scientists—there is almost no data available on dietetics concerning the microelements.

There is no end of work for biochemists engaged in the study of the "all powerful" invisibles—the microelements. Undoubtedly, they will spare no effort to compel these microelements to serve mankind.

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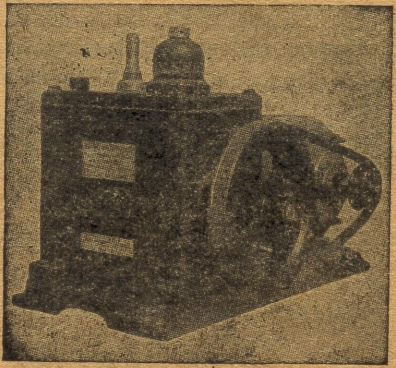

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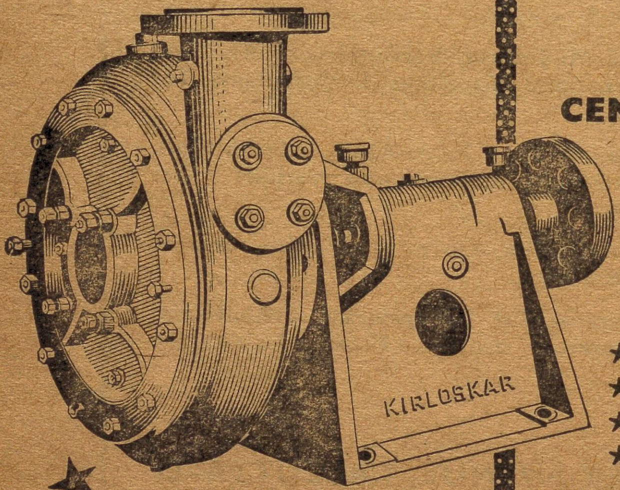

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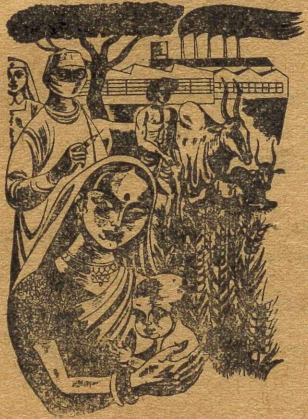

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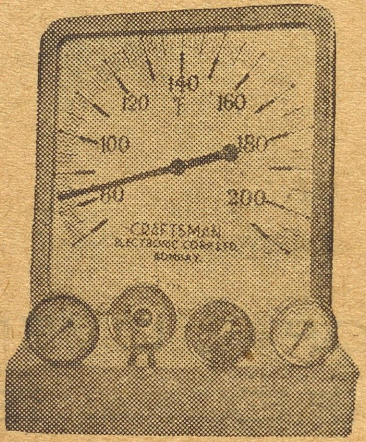

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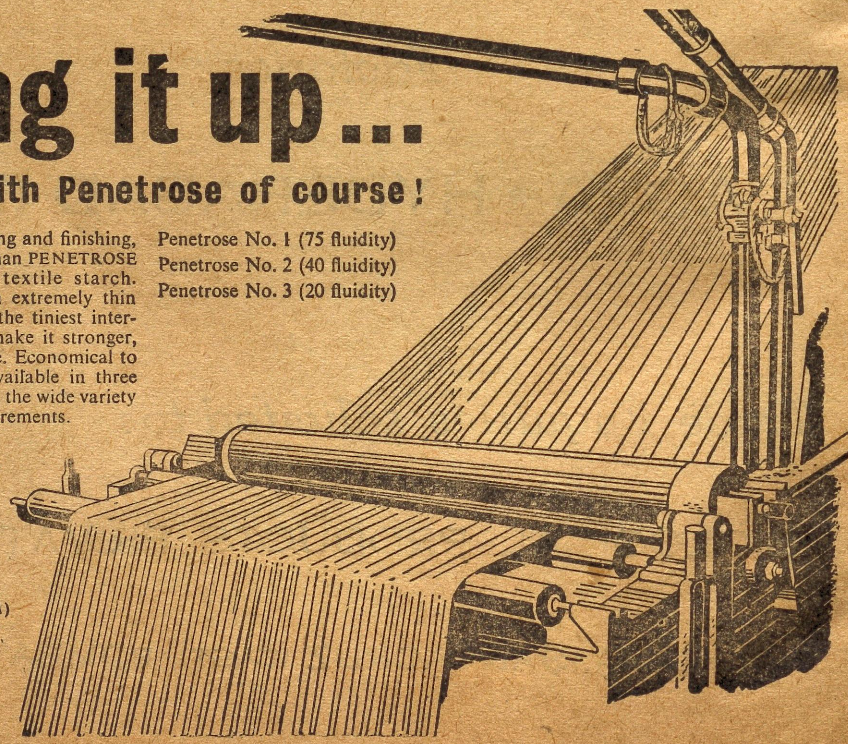

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VIJNAN KARMEE

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(Founder-President : Shri Jawaharlal Nehru)

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CONTENTS

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FORM IV

(See Rule 8)

1. Place of Publication	...	Kanpur.
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6. Names and addresses of individuals who own the newspaper and partners or shareholders holding more than one per cent of the total capital.		Association of Scientific Workers of India.

I, G. M. Verma hereby declare that particulars given above are true to the best of my knowledge and belief.

Date 27th February, 1962.

G. M. Verma
Publisher.

Editorial

In January and February, 1962 issues of V. K. we had endeavoured to emphasize the necessity and importance of creation of a 'scientific mind' rather than merely 'scientific expansionism'. In this concluding article, we will try to squarely deal this aspect from the point of view of not only the scientific worker but from that of tne society as a whole.

Propagation of science or the development of scientific attitude of mind fcr a mass of peeple cannot be achieved, if the social conditions of that mass are completely ignored. A proper incentive to this part of the mass engaged in scientific pursuit is as important as its free intermingling with the remaining part of the people. Still more important is the translation of sci-ntific research in an intelligible form to the layman in a language practical enough to draw appreciation of the importance of this type of attitude of mind and of the fruits that it will ultimately bear. This is different from the publication of, scientific work in scientific journals (which has its own value) which actually does not bring a scientist in close touch with the layman. Only in the latter case may a scientist feel the necessity of giving his best to the society, not only for the sake of money that he has to earn but for nis love of science and his affection towards the society in gereral. A research worker will then not clamour for a reduction of working hours; instead he will like to have freedom to work for more and more hours. If this conditions of service warrant, a reduction of number of hours required to look-after his family for their absolute/basic necessities and his other social obligations, this development of the instinct of scientific research will ensure more work out of him.

In the irony of things, it has to be admitted that we are kind, generous, unselfish, sympathetic and public spirited largly because (at least in the initial stages of our life) it suits us and satisfies our longing for self-approbation to be so. It is a fact that most of us ultimately spend our lives in doing either what we have to do, driven by necessity or what we wish to do, driven by our inclination. The spirit of scientific research by inclination has inspired the highest human thought and action. This tempo of serving society through science has to continue and be seeded permanently into the nation at large and the young sapling of the scientists in particular so that the concept of science as way of life meets with a measurable amount of success. This in turn requires creation of certain amenities and improvement in the general status of the working scientists. Once such elementary thinking is put into practice, a beginning would have been made in the matter of creating incentive for the young scientists to take to science as a way of life and not merely as a way of living.

In the fitness of the things, therefore improvement in conditions of service (coupled with other measures already stated) of the scientific worker is not only necessary from the point of view of the worker but also from the point of view of employer as well as the development of the national prosperity as a whole. This is so both from the angle of short term planning (i. e. in getting quick and better results of scientific research) and that of long term planning (i. e. in developing the scientific attitude of mind in a larger number in future generations). It is, in this context, that ASWI feels that it has taken the cause not of an isolated class of people but through it, the cause of the nation as a whole. It would, therefore, like that the employers and the national leadership take ASWI into confidence in this perspective and help it in building a prosperous nation. We the scientific workers on our part assure all those who come up to espouse our cause that while clamouring for better social and economic conditions we never let this larger issue fade from our vision.

It is with deep regret that the Association of Scientific Workers of India have to record the sad and sudden demise of Professor B. C. GUHA on 20th March, 1962. Professor Guha was one of the Founders of the ASWI and was very closely associated in active capacity as the General Secretary, Vice-President and President in the initial stages. This year, he was elected as the Vice-President of the Association at the Annual Meeting held at Cuttack. It is unfortunate that the Association will not be in a position to have the benefit of advise and help of one of the very active members in its fold. His contribution to Science, Scientific work and the Scientific Workers of this country will, however, remain as a permanent record of his dedication to the cause.

Science News

KEEPING COOL IN THE FURNACE

How to keep a man cool in a furnace is a problem that has appropriately been thrown into the Climate and Working Efficiency Research Unit at Oxford. Men have to go into furnaces for repair work while the furnaces are still warm. Existing protective suite used are bulky and cannot be ventilated. The Oxford Unit has devised one that can. It's made of foam plastic which makes it light, and it is fitted with perforated plastic pipes connected to an air supply. A man put to work in this suit was able to stick to the job for two hours at temperatures that would grill a sausage.

× × ×

Automatic Control of Knitting Quality

A most important and far-reaching advance is about to take place in the art of knitting as a result of inoroduction of scientific systems of "Postive Feed" for automatic control of the knitting process. This is the prediction of Mr. W. A. Dutton, Director of Research at the Hosiery and Allied Trades Research Association who spoke on the subject to a group of industrial scientists in London.

"Positive Feed" is the supply of a controlled amount of yarn to a knitting machine for each revolution or movement. Knitting variations are then virtually eliminated and this results in less wastage of manpower and materials. There will be benefits too for the consumer. The already high quality of British knitted garments such as stockings and jumpers will be further improved as more uniform characteristics will lead to better fabric appearance, less risk of shrinkage, and more regular sizes. But the main advantages will be in manufacturing as a result of smoother throughputs, fewer rejects, and easier sampling methods.

The control of loop length will bring certain economic advantages. At present abnormally long or short articles within a batch may have to be sold as "imperfects" at a reduced price. A further point is that any "imperfects" made may upset the production sehedule as they have to be replaced by satisfactory articles and in any case constant supervision is always necessary.

At the recent International Knitting Machinery Exhibition in Manchester HATRA showed how the "Positive Feed" system can be applied to different kinds of knitting machines. Very considrable interest was shown by industrial visitors from all over the world. Already in his country about 400 Positive Feed units have been installed by manufacturers of men's half-hose, 350-400 by manufactures of ladies circular house (i.e. seamless stockngs) and in addition 20-30 Positive Feed fabrickmakers are in use. Most of the units installed so far are being evaluated by knitters, but as existing manufacturing machinery becomes due for replacement it is almost certain to be replaced by complete Positive Feed systems.

Variations in length and the production of "Corporation" have always been problems in the knitting industry. The story of how those problems are now being overcome is a striking example of how "fundamental as opposed to "applied" research may, in time, assist industry to improve efficiency. When HATRA was founded in 1949 it began fundamental studies on fabric geometry. Studies of the knitted loops gradually led to the development of manual quality control instruments such as the HATRA Yarn-Speed Meter.

It was established that the best way of obtaining the same amount of yarn in each loop would be by automatic control relating the yarn feed to the machine speed. A stroboscopic method was developed, which, although technically sound, proved too expensive for commercial use, as did an electronic method of control. The scientists at HATRA then investigated mechanical systems of Positive Feed, and by 1956 were well on the way to producing an economical and practical system, their fundamental studies of yarn and fabric—geometry having given them a deeper understanding of the problem than had been available to earlier workers.

What is "Positive Feed" ?

The principle of "Positive Feed" can be applied to existing machines and incorporated in new designs. In each instance, the mechanism is designed to feed a pre-determined amount of yarn to the needless for each revolution of the machine or, in the case of flat machines, for each traverse of the thread carrier. Basically the yarn is fed to the machine by means of rollers. These rollers are mechanically linked to the speed of the machine and because of this length of yarn per course, or row, remains constant whatever the speed of the machine. To accommodate the different course lengths which may be necessary for various fabric fabric qualities, changes in yarn feed are achieved either by altering the diameter of the feed rollers or by altering their speed. Where the speed of the rollers is altered by changing a pair of small gears in the driving assembly, each pair of gears used corresponds to a different course and loop length.

Because the loop length is governed by the length of yarn fed by the rollers, the HATRA Positive Feed System has certain important advantages over the standard types of knitting machine. On a Positive Feed machine a definite length of yarn is fed for each course and this is divided out into loops of equal size by the number of needles. Thus when a needle is forming a loop there is only a fixed amount of yarn available whatever the setting of the stitch cam may be.

The HATRA Positive Feed System has already been fitted to a number of machines and negotiations are proceeding with a number of manufacturers on the fitting of a Positive Feed System to many other types of machine.

The advice of HATRA is readily available to member firms, who are considering the introduction of a Positive Feed System. The HATRA Positive Feed System does not, of course, control yarn or finishing variables, but here also the Association's experience and knowledge is at the service of member firms.

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Space vehicles to be used for fundamantal geophysical studies

The report of the Radio Research Board describes the minitrack facilities recently opened at Winkfield and operated in association with NAS as "a valuable asset to space research at the Station and to the national effort in this field".

Preparations are also in hand to collaborate with Canada and the USA in investigations on the ionosphere from above, by means of satellites in orbit at the appropriate heights; the so called "top side" sounding experiments.

In addition an experiment has been initiated in which use will be made of an apparatus to be launched by rocket in order to explore the radio-wave field above low frequency transmitter on the ground, and so obtain information about the lowest region of the ionosphere.

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Powder Extinguisher Used on Aircraft Fires

A recent series of tests on burning aircraft and aircraft components has demonstrated the superiority of the Ternary Eutectic Chloride fire extinguishing powder developed by the U I.A.E....over the normally used foam extinguisher. This power is now being manufactured under licence by John Kerr & Co. (Manchester) Ltd.

The tests were carried out as a previous accident involving an aircraft indicated that the foam extinguishers were not completely efficient when the magnesium wheels had caught fire. In the tests, aircraft and componenets, particularly the wheels, were deliberately set on fire and when the fires were well under way the products under test were used to extinguish them.

In these tests where the foam extinguisher was used first there was little effect on the magnesium wheels which continued to burn until the powder extinguisher was used. Where only the powder extinguisher was used the fire was completely stopped in an impressively short time.

The general conclusicn of the tests was that the U.K.A.E.A. Ternary Eutectic Chloride Powder is entirely satisfactory for extinguishing magnesium fires in particular and aircaft fires in general.

Further information may be obtained from the Patents Licensing Officer, U.K. Atomic Energy Authority, 11, Charles II Street, London SW.1.

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Radioiso topes Keep Aircraft Flying

A known defect in the undercarriage of R. A.F. aircraft was recently examined by gamma radiography to decide the seriousness of the defect in individual craft and to obtain a rota for the corrective work necessary.

The defect was caused by the shearing of a grub screw which locked the piston to the sliding tube of the main leg. As a result the piston was able to unscrew and separate from the tube. This had led to complete disintegration of the leg in several cases.

To inspect the fault by the normal method of stripping down the complete leg would have taken 43 man hours per aircraft. The gamma radiography method (using an Iridium 192 source) devised by the Non Destructive Testing Squadron at Swanton Morley, cut this time to only 3 man hours per aircraft.

Although radiography could not determine whether the grub screw had sheared or not, the separation of the piston from the tube could be obtained and this measurement was used as the criterian in deciding when modification should be made to the leg. In all over 400 aircraft were examined; 174 were found defective; six of the defective draft would have required only a heavy landing for possible disintegration of the leg. Later strip examination made while modifactions were being carried out confirmed the radiographic results to be better than 90% accurate.

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BRL 1400 A New Penicilin

This new penicillin—it's known only by its code name, BRL—1400 was originally developed by Beecham Research Laboratories, near London. Its clinical traials in Britain haven't been completed but the Americans seem to be satisfied that it's a good thing and Beecham's have licensed an American pharmaceutical company to produce the drug. This new penicillin is active against penicillin-resistant staphylococci when it is taken by mouth. This is an advance, because although last year Beecham's brought out a penicillin which was active against these resistant bacteria, it had to be given by injection. Since then, intensive work has been carried out to find a penicillin equally active against resistant staphylococci but suitable for taking by mouth. BRL 1400 is the first result of these investigations. It's not the only preparation in existence, because there are three others now undergoing clinical trials in Britain. Until these trials are complete, no decision will be taken as to which of the four will be released for use in Britain. But it seems that Americans are content to have BRL 1400 now.

"I would make a case", wrote Charles Darwin, "against the enormous importance which we attribute to our greatest men. I think, second, third and fourth rate men of very high importance.

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Marconi claimed that his epoch making discoveries would have been impossible but for the work of a humble and known scientist named Tay. Think of what David Livingstone owed to the handful of Africans who were his companions on expedition after expedition. What would Paul have accomplished without, Silas, Timothy, Epaphrodutus, Aristarchus ? The superlative achievement of great men is rooted in the faithfulness of the unknown and the obscure.

Robert McCracken.

Articles

UNPARALLELED TRIUMPH OF HUMAN THOUGHT

By Prof. Georgy Pokrovsky, D. Sc. (Engineering)

As the leading nation in the sphere of astronautics during the whole period of its development, starting with the launching of intercontinental rockets and the world's first sputniks, the Soviet Union has gained a vast amount of experience, trained the personnel, and mustered the forces and means necessary to solve the most difficult problem of ensuring man's safety in space flight. Tremendous economic resources, a widely-deployed and harmoniously-developed front of science and technology and the moral and political unity and creative enthusiasm of Soviet people have led naturally to this new great victory, the escape of man from the grip of mother earth. The "space man" has been born. Historians of the near and distant future will speak of this with enthusiasm, but we the contemporaries of this event, are still unable to fully realise the whole magnificence of the feat.

To prepare ourselves for this it would be appropriate to recall some of the landmarks along man's road to this unheard of victory.

Less then four years have passed since the first sputniks were orbited around the Earth. However, in this historically infinitesimal period of time the humanity has covered such a tremendous road of scientific and technological progress and achieved such results which but four years ago would have seemed fantastic. The science has realised many new principles of space flight, created artificial earth satellites, sent a rocket to the moon, photographed the reverse side of the moon, launched artificial planets of the solar system, created orbital space ships safely returning to a pre-set area of the globe, and elaborated a system of launching an automatic interplanetary probe from a sputnik.

The numerous artificial earth satellites launched by American scientists in 1958 and in subsequent years have served to supplement and confirm the results obtained by the Soviet Union. Insofar as American efforts were aimed at space research for peaceful progressive purposes they have confirmed the expediency and good prospects for international scientific and technological co-operation and enriched world science with important data.

Explorations of outer space in recent years were a period of triumph for automation and telemechanics. Automatic instruments in space performed complex works and obediently fulfilled man's will, thanks to two-way radio communications extending over cosmic distances many times greater than ever covered on Earth.

Two Main Trends in Space Study and Exploration

Automation and telemechanics will undoubtedly go on playing an essential role in space study and exploration. However, some problems have already arisen in space research can no longer be solved by automation and telemechanics alone. A new and exceedingly important stage in the development of astronautics has been reached, which is connected with the penetration of man into outer space.

There is hardly any need to dwell at length on the great importance of this new stage. The whole historic development from the elementary living protozoa to the world-wide human collective was passed by living matter in the biosphere of the Earth. Now a new era is beginning when the life born and nurtured by mother Earth is leaving the terrestrial biosphere and is aspiring towards unexplored cosmic space where new stages of development lie in store for it.

However, besides those distant and as yet unclear prospects, there do exist much more modest but much more concrete problems, connected with man's penetration into space.

First of all, it must be said that all the requirements of space automation and telemechanics were elaborated by people in terrestrial conditions and on the basis of terrestrial experience. The explorers of outer space had no experience of space flight and their minds could not cope completely with all the aspects of space conditions. The case is comparable with the position of people studying seas and oceans who had never sailed in ships, or studying the atmosphere by people who had never flown in planes. Hence, manned space travel will substantially promote the expansion and effectiveness of space research, in particular in obtaining information of extreme importance for practical experience. We can expect, for example, in the next few years we shall be able to improve our knowledge of the upper atmosphere of the earth to an extent which will make possible long-term weather forecasts. In the future it may also be possible to discover effective methods of controlling the weather on a world-wide scale. We should also mention the tremendous importance attached by progressive mankind to man's struggle for the further expansion of his power over the forces of nature, for the exapnsion of our knowledge of nature and of the ways and means of em loying it to meet the steadily-growing material and spiritual requirements of humanity.

Tbe interest of the world public in manned space flight and the countless enthusiasts wishing to travel in outer space show that the emergence of man outside the con fines of our planet has become a definite requirement of foremost progressive people of our era. There can be no doubt that the country which shall be the first to satisfy that requirement will be apperciated by the world public and will receive the all out support of all progressive forces in world science. This is another very important consideraten justifying the purposeful efforts of preparing and realising manned space flight and in giving a good start to the new great epoch of man's transformation from an earth-bound living-being into a cosmic one.

Man in Space

Science and technology supplied the necessary scientific and technological prerequisites for manned space flight a comparatively long time ago. This was demonstrated by the many successful trips of space vehicles with test animals. These probes were placed in orbit; and after a more or less lengthy journey around the earth they were returned to designated areas. The test animals, particularly the dogs, substained the rigours of flight and suffered no harmful after-effects. This shows that scientists ensured the conditons for manned space flight some time ago. However, the highly-principled humane nature of ethics and science would not allow man to be thrown into space before sufficient data was accumulated confirming the safety of manned space travel and the reliability of return to earth. That is why, despite the existing ability to shoot a man into space and volunteers galore to take part in such a heroic venture, some time passed before the absolute reliability of all links of the huge technological system ensuring the flight was proved.

Thus, the work of preparing for manned space flight proceeded along to basic lines. On the one hand, all the technical means were elaborated and checked to ensure the complete safety, convenience and even comfort of the astronauts, on the other hand, the future space travellers were subjected to rigourous training to prepare them for the routine conditions of space flight and the various difficulties and surprises they might expect to encounter.

Let us consider some of the problems in greater detail.

At the outset of a space flight the carrier rocket accelerates the vehicle tremendously. As a result, all objects, including, of course, the passengers, are subjected to considerable overload. This makes it necessary to place the passengers in the best position to endure it. Furthermoe, the passenger cabin must be well isolated from vibrations and the loud noise of the engines.

Later, on the flight, when the vehicle enters its orbit and the motors are switched off, the overloads disappear together with weight. The state of zero-gravity commences which has been discussed extensively of late in many popular articles. This state, of course, is most unusual and harbours many surprises. On the whole, however, it presents no hazards to man and the difficulties arising from it are easily overcome. Later on, during re-entry when the space vehicle plunges at a high speed through the denser layers of the atomosphere and starts braking the deceleration, vibration, noise and loads reappears. At this stage of flight the measures mentioned above have to be reimposed to counter their effects.

Throughout the whole of the flight it is necessary to maintain a specific temperature, pressure, humidity air composition in the passenger cabin. This is done without any great difficulties, especially if the orbit is chosen so that the vehicle does not enter the shadow of the earth and receives the energy of the sun's rays continuously. The difficulties are greater, however, in protecting the cabin against overheating and disintegration on entering the denser layers of the atomosphere in the last stage of the flight. These difficulties, too, have been surmounted.

Much attention and creative thought have to be given to the elaboration of the braking system for the soft landing in a preset area. It was necessary to ensure the precision work of automatic systems governing the de-orbiting rocket motor and the braking and soft landing systems. Experiments with orbital space ships and, especially, the first manned vehicle have conformed that all these problems have also been successfully solved by scientists, engineers and workers.

The selection of the trajectory of space flight is also of considerable importance for the astronaut's safety. As was established in the previous stage of space research by Soviet scientists under S.N. Vernov and American scientists under van Allen, the Earth is girdled by streames of high-energy particles. These belts lie close to the plane of the Earth's equator at several thousands kilometres up from the surface. The hull of a space ship cabin cannot shield the passenger from the lethal effects of those particles. That is why manned space ships should not approach these belts. A space ship should either travel at a relatively low altitude or soar away hundreds of thousands of kilometres, preferably following the line of the Earth's axis, that is, the launching would have to be carried out from the arctic or antarctic.

Furthermore, man should embark on space flight in years of low solar activity, as at peak periods the Sun ejects powerful streams of high-energy particles into interplanetary space capable of reaching the space ship and harming its crew wherever they may happen to be. That is why in years of high solar activity space flights are inadvisable and even impossible.

The last peak of solar activity was in 1955-1958. Our luminary has calmed down and we have entered on several years favourable for the penetration of man into outer space. Doubtelessly the scientists will make the most of these conditions.

Besides the listed safety measures, appropriate training plays an important part in space flight preparations. Of special importance is regular training in withstanding big loads carried out in special cabins mounted in a huge powerful centrifugal machine, a high-speed merry-go-round, in short. Serious attention must also be given to the possibility of parachuting in emergency case during the last stage of flight. For this there exist well-known exercises in catapulting, i.e., the ejection of a passenger from a flight cabin.

To all these special training exercises are added physical culture and regimen ensuring physical stamina and fitness of the space traveller.

It should be stressed that all the preparations for space flight take place in an atmosphere of great creative enthusiasm of everyone concerned. There can be no doubt that this, too, is an important prerequisite for the successful and speedy solution of the most complicated scientific and technological problems.

TURNING WATER INTO FIRE

By Prof. David Frank-Kamenetsky

At the turn of the century the phantom of famine haunted mankind. It was estimated that the store of carbon fuel on the earth—hard coal, oil and gas-was very limited, and, most important, it was not being replenished.

The actual size of resources of this fuel has now been ascertained, and it came out that there are more such resources than was assumed. Nevertheless, these resources will suffice at the most for another several hundred years. And that is an infinitesimally small period in the life of mankind.

What is to be done ? How will our successors heat their towns, what type of energy will they turn into electric power ? The heat energy of the sun is so diffused that it is hard to concentrate it, and the energy of rivers is insufficient.

In fact' we do not even have very much of the concealed heat energy latent in what is know as fissionable materials, or atomic fuel, such as uranium and artificially produced plutonium. In any case, atomic power stations, though they do have great prospects, will not be able to solve the problem completely.

Where is fuel to be obtained ? In water, reply the scientists. What do we mean when we say "atomic energy from water"? We mean nuclear energy. The thing is that energy can be obtained not only by means of splitting uranium nucleus, but also by means of synthesis, fusion, of light element nuclei. So far this energy is "produced" only in the bowls of hot stars, particularly in the depths of the sun, which is the nearest star to us.

The sun may be regarded as an immense power station. It constantly sends into outer space terrific quantities of energy. This energy has a most direct bearing on our life, and we are in many ways indebted to it.

The atomic energy, which physicists and engineers are now investigating so intensively, is not connected directly with the energy of our main luminary. Yet, it has been discoverd that the internal source of solar energy is nuclear. And we are now endeavourihg to copy solar processes on the earth.

Emission of Energy

Right now we have a fairly good idea of what processes are taking place in the sun and in the stars similar to the sun. An atom, this tiniest particle of matter, consists, as is known, of a nucleus surrounded by electrons. The nuclei of some atoms have a greater store of energy than others. Therefore, nuclei of the first type can be turned into the nuclei of the second type, and this transformation is accompanied by emissions of vast quantities of energy. Such nuclear reactions are actually the source of solar or stellar energy.

What substance plays the part of nuclear fuel in stars ? Comparing data obtained in different ways, scientists came to the conclusion that the universe observable by our astronomic instruments consists mainly of hydrogen. Some are of the opinion that this superlight element in our part of the cosmos makes up for approximately 76 per cent of all matter.

What is a hydogen nucleus like ? It is a proton, which is the simplest nuclear particle. In certain conditions four protons can fuse into nucleus of helium, a heavier element, and in the process as much as about 28 MEV of energy is produced. Is this much or little? For comparison's sake I would like to say that when an atom of ordinary fuel, carbon, is burned, only about 4 electron-volts of energy are produced. Thus, the calorific capacity of nuclear fuel is millions of times greater than of ordinary fuel.

There is a close connection between the processes taking place in the stars and those which can be used for obtaining energy from terrestrial water. The reaction by which helium is formed passes through several stages, with two particles engaged in each stage. This chain reaction begins with the fusion of two hydogen nuclei into a nucleus of what is know as heavy hydrogen or deuterium. With the reaction continuing, one gramme of heavy hydrogen emits as much energy as is produced when 8-12 tons of hard coal are burned.

Inexhaustible Resources

Any body of water, a river, a sea or an ocean, contains quite a substantial quantity of heavy hydrogen. It has been established that approximately 5,000—6,000 molecules of ordinary water contain one molecule of heavy water which has deuterium, heavy hydrogen, combined with oxygen, instead of the usual combination of hydrogen and oxygen. Therefore, in order to produce one gramme of heavy hydrogen it is necessary to process about 25 kg of water.

Suppose that all the seas and ocean are filled with such highly calorific fuel as oil. Even in that case we would be 400 times poorer in latent enegy than if we have water as a suorce of fuel. Thus, it means that we have found inexhaustible resources of "firewood." When scientists start buring water efficiently at power stations, the energy produced from it will be ample for mankind for hundreds of millions of years.

It is true that we do not so far know how to burn water efficiently. The problem of controlled thermo-nuclear synthesis, i. e., the possibility of setting up thermo-nuclear electric power stations, is still unsolved.

The thing is that the temperatures necessary for carrying out thermo-nuclear reactions reach millions of degrees. Yet, this is not the main problem. The first practical problem arising in this case is that of, as one physicist put it, finding "a pot in which the soup can be cooked." What we mean here is the building of such a vessel which would be to hold out at a temperature of millions of degrees necessary for thermo-nuclear synthesis. How can such a vessel be built? A reply to this question was supplied by Soviet scientists.

The Magnetic Bottle

When subjected to high temperatures any substance turns, as is known, into the state of plasma. Plasma is an excellent conductor of electricity. Electricity passes through plasma easier than it does through metal, and in doing so it heats plasma still more.

However — this was proved by Faraday—any electric current creates around it a magnetic field, whose lines of force are situated around the conductor in concentric circles. The magnetic field appearing in plasma, through which an electric current runs, makes the particles of ionised gas leave their straight course and wind around the lines of force.

There is a very important feature here. No matter in what direction an electric current carries, an electron or a positively charged ion, may move, it always deviates towards the axis of the current. When the current is strong enough the plasma in a discharge tube stretches out into a narrow cord. This process is accompanied by a still greater heating of the plasma, yet the plasma remains divorced from the walls of the tube without heating them.

This is called the principle of a "magnetic bottle," which means the reaction of such a magnetic field which makes charged particles rotate along circular orbits and, compresing the plasma cord formed in the process, does not let it come in contact with its cool environment. This idea was set forth in 1960 by Academicians I. E. Tamm and A. D. Sakharov.

This conception of the soviet physicists was verified practically in the Atomic Energy Institute of the USSR Academy of Sciences, with Academician L. A. Artsimovich in charge of the experiments and Academician M. L. Leontovich in charge of theoretical research. After a series of very thorough and extensive investigations the correctness of this principle was confirmed.

At present, many contries are conducting research on the problem of controlled thermo-nuclear synthesis. This research has not yet entered the phase when corresponding thermo-nuclear power stations can be built. Yet, the problem will certainly be solved in the next few decades.

Scientists will turn water into fire, thus producing a small but a very effective sun on the earth. Controlling expertly its activities and adjusting the quality and quantity of the energy emitted by it, men will be able to disperse forever the fear that their successors may suffer from a lack of those sources of energy which help them in their progress.

A single pail of water can produce enough fog to cover more than 250 sq.km. to a thickness of about 20 meters.

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A gallon bottle will contain one gallon of ammonia gas as such. The same container filled with water will hold as much as more than 500 gallons of ammonia gas.

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The world is moving so fast these days that the man who says it can't be done is apt to be contradicted by someone doing it.

C. B.

W·F·S·W· News

Taxts of Telegrams of Address by Professor C. F. Powell, President of the W. F. S. W., to President De Gaulle, President Kennedy and Mr. Khrushchev, September, 1961

To President de Gaulle

As President of World Federation Scientific Workers which has consistently worked for agreement on general and complete disarmament and the cessation of nuclear tests for all time I wish to express profound concern at resumption of tests by USSR and proposed resumption by USA stop I have made known our views to Mr. Khrushchev and Mr. Kennedy stop On two occasions recently I have addressed to you profound concern of our Federation about testing of French nuclear weapons stop Continued testing of nuclear weapons by French Government is now cited as one reason for present resumption of Tests stop In name of humanity I wish therefore once again respectfully to urge French Government to desist from further tests.

To President Kennedy

As President of World Federation Scientific Workers which has consistently worked for agreement on general and complete disarmament and the cessation of nuclear tests for all time I wish to express profound concern at resumption of nuclear tests and in name of humanity respectfully urge United States Government not to resume further tests stop A similar telegram is being sent to Mr. Khrushchev.

To Mr. Khrushchev

As President of World Federation Scientific Workers which has consistently worked for agreement on general and complete disarmament and the cessation of nuclear tests for all time I wish to express profound concern at resumption of nuclear tests and in name of humanity respectfully urge Soviet Government to desist from further tests stop A similar telegram is being sent to Mr. Kennedy.

ASSOCIATION NEWS

C. E. C. MEETING

Minutes of the 1st CEC (1962) Meeting of the Association of Scientific Workers of India, held on 19th March, 1962 at 5-30 P. M. in the CSIR Conference Hall, New Delhi.

Members Present

Professor M. S. Thacker (President), Dr. S. Husain Zaheer (Hyd., Member), Sri G. M. Verma, General Secy. (Pub.), Sri Y. H. Rao (Jt. Secy.), Sri S. Ramabhadran (New Delhi, Member), Sri M. R. Raman (Kanpur, Member), Sri H. Gopalkrishnan (Hyderabad, Member), Dr. B. K Nayar, CSIR (Delhi, Member), Sri S. N. Roye (Jt. Secy. CFRI Branch, Member), Sri D. V. Varma (Kanpur, Observer), Sri J. N. Misra (Kanpur, Observer), Sri A. K. Singh (Kanpur, General Secy. Org.).

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

1. Confirmation of the minutes of the last CEC Meeting :

The minutes were read out and confirmed.

2. Report of the General Secy (Org.) :

The report of the General Secy (Org.) as per Appendix 'A' was read out and approved.

3. Report of the General Secy. (Pubn)

The report of the General Secy (Pub.) as per Appendix 'B' was read out and approved.

4. Report of the Treasurer :

The report of the Treasurer as per Appendix 'C' was read out and approved.

5. **Reports from the Branches**

(i) CFRI Branch, Jealgora—

Shri Roy presented the report of the CFRI Branch to the CEC in brief giving the activities of the Branch during the period ending 19th March, 1962. The activities of the Branch included a number of scientific lectures, discussions on many of the service problems and also a few tropical films of scientific interest. The President Prof. M. S. Thacker desired that the branches should make it a point to send their reports at least a week earlier to all the members of the Executive Committee so that he and other members of the Executive Committee come prepared for discussions and also draw attention of other brauches/units in regard to some of the salient and interesting features of the activities. Attention of the CEC was also drawn to the two resolutions which were sponsored by the CFRI Branch at the last Annual Meeting. The President pointed out that though he was in complete sympathy with the questions but the Govt. and the Finance were not agreeable to the question of consiering the departmental candidate at par with outside candidate in regard to extra increments. With regard to the question of reducing number of years in service, vis-a-vis eligibility for foreign scholarship, the President pointed out that meritorius cases were not ignored and instances are there when individuals with lesser number of years of service have been sponsored.

(ii) Hyderabad Branch :—

The Secy. Hyd. Branch Sri H. Gopalkrishnan presented the report. The alient features of the branch report include a number of scientific lectures, some social meets for the branch members as also a number of economic and service condition problems that were persued by the branch itself. The membership of the branch was increasing and the President was happy to note that activities of these branches were improving and he would like that attention of other branches to be drawn to such activities.

Conversion of ASWI Under the Societies Act

Arising out of the views expressed by the Legal Adviser, CSIR, CEC decided the following :—

(a) keeping in view the aims and objectives as laid down in the ASEI Constitution a present, a suitable re-drafting should be carriied out so that the spirit and substance of the aims and objectives were contained in the new draft. For this purpose, the General Secy. (Org.) and the Central Office were authorised to obtain necessary expert legal opinion for the purpose of drafting. In this context, it was felt by the CEC that no further time should be wasted on the legal quibling but every effort should be made to finalise this question quickly.

CEC also decided that the Branches should not confuse the question of their registering under the Service Associations rules with the question of the Central body. In fact, if the branches were converted into Service Associations in a smooth and satisfactory manner, the recognition for the branches may itself be forthcoming and the branches themselves would be able to exist and also improve their organization. The Service Associations formed by the existing branches particularly where CSIR Estts. are concerned, will all be affiliated to ASWI. The General Secy. was directed to take up the question with the CSIR branches and to coordinate this activity quickly.

Increase in Membership and Recognition of ASWI by the Govt.

The attention of the President was drawn to the fact that nearly two years have passed since the Assocn. had taken up this question at his suggestion about the Conversion of ASWI into Societies Act vis-a-vis increase in membership and recognition by the Govt. The members of the Executive Committee felt that during his regime this year, this question should be satisfactorily solved. The President entirely agreed with this but suggested that active steps should be taken to complete this question of conversion as quickly as possible so that in the next 4 to 6 months, not only the registration process be completed but also sufficient headway should be made in regard to the questien of increase in membership and persuing the basic question of recognition with the Govt. He promised to do his best in this regard. Tentatively, it was decided that the General Secy. (Org.) should make every effort to complete this process before the end of April or beginning of May so that the President would be able to issue the circular letter for increase in membership on his return from tour abroad in the 2nd week of May this year. The question of letter regarding recognition would also be sponsored by him concurrently.

ASWI Symposium

The Gen. Secy. (Org.) pointed out that not much headway had been made, so far, on this and the CEC decided on the suggestion of the President to appoint an one man Committee comprising of Dr. Zaheer. Dr. Zaheer agreed to take up the responsibility for organising the Symposium keeping in view the suggestion of the President that it should be arranged in a satisfactory manner and that it should be well attended by a representative gathering. Dr. Zaheer agreed to discuss this question with the President and finalise it early.

World Federation Symposium

The CEC was appraised of the report of the National Preparatory Committee for organising the Symposium in Moscow. The Sub-Committee had decided to send a small delegation of about 10 people and also to send a detailed report in regard to the subject of Symposium with reference to India. Regarding the financial aspects, the Secy. of the Committee had informed that he was awaiting further details from organizers of the Symposium abroad. It was tentatively decided by the Sub-Committee and recommended to the CEC, that a token travel fund should be raised by the ASWI to meet expenses of this delegation, to some extent. It was also decided that every effort should be made by the individuals of the delegation to pay their cost to the symposium would bear the cost of the delegation within their territory.

Any other points with the permission of the Chair

(a) The CEC tentatively decided to hold four more meetings of the CEC during the year 1962, as per programme given below :—

(i) towards the end of May

(ii) towards end of July either in Banglore or Hyderabad

(iii) towards the end of Sept. or beginning of October either in Delhi or Kanpur

(iv) towards the end of November or Dec. with particular reference to the Annual meetings.

(b) The President strongly exhorted to the members of the Executive Committee and all the branches office-bearers to give their consideration to the various question sponsored by the ASWI in an objective manner and without any bias.

As this will alone keep the Assocn. going and make it a strong. In this context, he drew. the attention to one of the affiliated orgn. viz : Federation of Defence Sci. Workers, who were doing the best for this Organisation and he hoped that all the members of the ASWI including the various branches/units will do their best to emulate the Defence Scientific Workers Assocn. not only for increase of membership but also with regard to the activities and sponsoring these activities in a responsible and desirable manner.

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

A. K. Singh
General Secretary (Org.)

APPENDIX 'A'

GENERAL SECRETARY'S REPORT

Conversion of AS VI From Trade Union to Society Pattern

(Minute No. 1 of the previous report & Minute No. 4 of 3rd (1961) CEC Meeting refer)

Subsequent to the filing of the application with the Registrar of Firms & Societies at Lucknow, the Dy. Registrar had informed that the clause in the Constitution relevant to 'Protection of Economic & Service Conditions' does not come within the purview of the Societies Act. This question was taken up with the Ministry of Law with the help of the Law adviser of the CSIR The information has since been received that the Objects and Constitution of the Association have to be amended if the Association has to confirm to the Society's Registration Act, 1860. The Bye-laws as such should not contain reference to the protection and economic and service condition but the aims and objects may be worded widely to include these as possible activities. The Associations representing ministerial staff, service officers, non-gazetted officers of the Govt. of India and the State Govt. have their sanction under statutory rights and depend for their effectiveness on recognition by the Government. They are not registered.

Increase in Membership/Recognition of ASWI by the Govt.

(Minute Nos. II & III of the previous report refer)

Further action on the above has been kept pending for decision on item 1 above.

Audit Report

(Minute No. IV of the previous report refers)

Since the Financial year is coming to a close, branches/units have been expedited for submitting their annual returns to enable the auditing for the year 1961-62 to be done earily.

Membership Vis-a-vis Center's Share

(Minute No. V of the previous report refers)

Reminders have been issued to the Branches/Units regarding contribution towards Centre's share. No satisfactory progress has been made in this regard.

Grant-in-Aid

(Item No. VI of previous repot refers)

The second instalment for a sum Rs.2,500/- has been received from the Govt. making a total grant of Rs. 5,000/- during the financial year. Considering the financial condition, as evident from the Treasurer's report and the application for grant-in-aid made in the beginning of the year, the Govt. of India has been approached again for a sum of Rs. 1700/- to clear the deficit and enable the payment of arrears for the printer's bill, Paper etc.

Indian Regional Center of WFSW

A Meeting of this committee has been called for to elect a new Committee for the ensuing year and also to finalise the accounts of the previous years and for discussion on the WFSW Symyosium.

CSIR S. W. A.

(Item IX of the previous report refers)

The concerned branches have been expedited. There still seems to be some confusion in this regard, in that the Branches are confusing this question of conversion of branches into an autanomous associations with the question of ASWI being registered as a Society. The two are seprate actions to be completed.

WFSW 1962 Symposium

(Item X of the previous report refers)

Replies were received from individuals who were contacted for participation in the world Federation Symposium. The Sub-Committee will be considering this at the next meeting to be held on the 19th March 1962 at Delhi. The World Federation has also been informed of the action taken by the National Preparatory Committee in regard to the Indian Delegation, Financial aspects and the Report pertaining to India.

ASWI Symposium

(Item XI of the previous report refers)

A Meeting of the Sub-Committee has been called for concurrently with the CEC Meeting to be held in New Delhi on the 19th March, 1962.

Actions on Resolutions

(a) *Grant of additional incr ments to Scientific Staff in Junior Grades*

(Item XIV (a) of the previous report refers)

The reply received from the Railway Board states that the matter is still under consideration in consultation with the Ministry of Scientific Research & Cultural Affairs, New Delhi.

Ministry of transport & Communication has beed expedited.

(b) *Fixation of Seniority of Scientific Staff*

(Item XIV (b) of the previous report refers)

Ministry of Defence has been expedited.

A. K. Singh
General Secretary (Org.)

APPENDIX 'B'

REPORT OF THE GENERAL SECRETARY (PUBLICATION)

Since taking-over in January this year, we have been able to bring-out 2 issues of the Journals January & February, 1962. The March issues of V.K. is in the Press. Consequent to the change in the office-bearers during this year, certain amount of re-allocation of duties have been carried out at the Centrol Office end. Sri U.B.Kanchan (Jt. Secretary) will be incharge of advertisements and mailing of V.K. Sri R.M. Chitnis (Jt. Secretary) will be responsible for proofs and also for liaison with the Press. The General Secy. (Pub.) will be responsible for the Editorial and compilation of the manuscripts/articles. The General Secy. (Org.) will be helping in some of the cloumns like 'Association News', 'WFSW News' and 'Worker's Forum'.

From a review of the financial aspects, it has been observed that the revenue from the advertisements has not been satisfactory during this year. Advertising parties have been expedited to send their dues for the year and it is anticipated that the advertisements will be to the tune of about Rs.3,500/- for the financial year as against about Rs. 4000/- during the previous years. It will be very helpful if the Branches particularly Hyderabad and Lucknow help in the advertisement position during the current year. The grant-in-aid from the Govt. of India has been only Rs.5,000/- as against Rs. 8000/-received last year. At the close of the financial year, the deficit will be to the tune of about Rs.1700/- due to the publication activities.

Maintenance of some of the columns consequent to the change of format has become difficult. Since we have specified the type of articles to be printed to the different columns, branches can help by way of specific contributions taking up different columns. In the January, 1962 issue of V.K a 'Note' has also been published asking for information from the middle class Industrialists with regard to the type of technical problems which hinder production in their cases. It is hoped that the Journal may be in a position to act as a froum to some of the difficulties to smaller Industrialists in regard to technical aspects of their work. Under the 'Students Column', a start has been made for bringing-out language Coaching Scheme. To start with German is being started with the help of the West German Embassy and we hope that the French and Russian courses will also be available for the benefit of our readers.

In regard to the technical appraisal of scientific work pertaining to other regions like USA, USSR, West Germany etc. relevant Information Offices have been approached. Effort has also been made to cover life history of the Scientists in the forthcoming issues of the V.K. Many more schemes are being thought about but execution of these schemes is mainly possible through the active help of members of the Association as a whole. In this context, other members of the General Executiue Committee, Branches/ Units and general membership can help in the successful running of the V.K.

G. M. VERMA
General Secretary (Pubn.)

APPENDIX 'C'
REPORT OF THE TREASURER

Statement of Actuals of Income & Expenditure for the period 1-4-61 to 15-3-62 is given below. It will be observed that excess of expenditure over income is of the order of Rs.1409.87nP. A further application has been submitted to the Govt. of India for grant-in-aid to the tune of Rs.1700/-. This should enable us to clear the loan of the Indian Regional Centre of the World Federation of Scientific Workers and outstanding bills from printers. Otherwise, the anticipated deficit for the financial year should be to the tune of Rs.4338.40nP.

The revenues from adverisements, from the Branches/Units by way of contribution to the Centre's share have not been satisfactory. The Branches/Units have been expedited for their contributions. For advertisements, an active cooperation from the members of Executive Committee/Branches/Units is essential if we are to get-over the financial difficulties in the ensuing year.

Actuals of Income & Expenditure For The Period 1-4-61 to 15-3-62

Expenditure

	Rs.nP
Stationery & Printing	24.51
T.A. & Conveyance	142.97
Postage & Telegrams	126.00
Bank charges	1.00
Affiliation fees to Indian Parliamentary & Scientific Committee	100.00
Registration fees under Societies Act	50.00
Miscellaneous Expenses	48.00
V.K. Printing	4521.50
" Establishment	824.00
" Stationery	254.62
" Postage	234.41
" T.A. & Conveyance	162.47
" Miscl. Expenses	38.33
" Bank charges	35.45
Payment towards liabilities of last year	
Audit Fees	70.00
Citizen Press	1655.50
Bholanath Paper House	1102.06
Dr.D.K.Roy	18.12
Sri M.R.Raman	21.62
" J.N. Misra	0.46
TOTAL	9431.02

Income

	Rs.nP
Membership Fees —	
(i) Direct	92.00
(ii) Branches	259.10
Advertisement revenue	2379.17
Publication grant from Govt. of India	5000.00
Sale of Journal	60.00
V.K. Miscl. Income (sale of printing paper)	230.88
Excess of expenditure over income	1409.87
TOTAL	9431.02

J.S.Yadav,
Treasurer

MORE SUPPORT FOR SCIENTIFIC RESEARCH IN SOUTH-EAST ASIA URGED AT HONG KONG

Better pay and status for scientists in Southeast Asia, more support for science education and the possible establishment of regional research institutions to work in such fields as oceanography and the problems of the humid tropics were among recommendations made recently at Hong Kong by representatives of twelve countries.

They produced these recommendations during the secod regional meeting on scientific research called by Unesco's Science cooperation Office for Southeast Asia. Dr. L. T. Ride, Vice chancellor of the University of Hong-Kong, served as chairman of the meeting.

Other countries represented were Australia, the Republic of China, India, Indonesia, Japan, Korea, Malaya, New Zealand, the Philippines, Singapore and Thailand. A similar meeting had been held in Bandung, Indonsia in 1959.

Reports by representatives brought out steady progress in the organization of scientific research in Southeast Asia since the Bandung meeting. At Hong Kong, stress was placed on a shortage of scientific manpower arising from this progress and this led to recommendations for better pay to scientists and for closer attention to scince education in schools, the seedbed of future scientists.

The meeting asked Unesco's Science Cooperation Office for Southeast Asia, located at Djakarta, to study the possibility of establishing regional institution in fields of particular interest to Southeast Asia. Delegates from India, Indonesia and Singapore stated their governments would be interested in playing host to such centres.

Southeast Asia's thirst for Scientific information also led delegates to recommend that Unesco's centre should look into the possibility of starting regional scientific journals and convene a regional seminar on scientific documentation.

At the end of the meeting, the Australian delegate, Mr. Guy B. Gresford, Secretary of the Commonwealth Scientifie and Industrial Research Organization, announced that his government has invited Unesco to hold the next regional meeting on scintific research at Canberra.

LEARN GERMAN

A PRELIMINARY COURSE IN GERMAN LANGUAGE

We are thankful to Embassy of Federal Republic of Germany, New Delhi for supplying us with a preliminary course of German language. We are publishing 2-3 lessons per issue. A little amendment in the lectures as supplied by the Embassy is expected to be helpful to our readership. Excepting this little change wherever necessary, the lectures have been reproduced in the issues of V. K. as supplied. Hope our readers will appreciate our move in this respect.

—Editor.

I Lektion

Dear Friends,

Today we shall begin our German language course, and before getting down to work I would like to get you acquainted with our three friends, who shall accompany us on the way. May I introduce :

Prem Agarwal,	Student of mechanical engineering.
Krishna Roy,	Art student.
Walter Schmidt,	a German Engineer who works in one of the many industrial projects now being undertaken in India.

One day, Prem and Krishna went to Mr. Schmidt, asking him whether there would be an opportunity for him to teach them German, as Prem wanted to go to a German Technical University for further studies, and Krishna very much wanted to read German literature, i. e. the famous works of German Indologists and, of course, of Goethe and Thomas Mann too.

"Why of course, we certainly can do something about it", said Mr. Schmidt, although there is a long way to go before one can read Thomas Mann in original. And so Mr. Schmidt suggested they might start right then and began to explain to Prem and Krishna the German pronunciation.

Wishing you a very good start here are the rules of pronunciation :

	Vocals		in words
a	—short as in "but"	like :	nass, Mann,
	or long as in "father"	,,	Zahl, ahnen,
o	—short as in "dot"	,,	komm, von,
	or long as in "tableau"	,,	ohne, wohnen,
u	—short as in "bush"	,,	Kuss, Mutter,
	or long as in "root"	,,	Uhr, Ruhm,
i	—short as in "wind"	,,	Kind, hin,
	or long as in "tea"	,,	hier, Brief.

	Vocals	in words	
e	—short and open as in "etcetera"	like :	Bett, Speck,
	or long, and closed as the French è in cafè	,,	Ehre, sehen,
	very short as the in "father"	,,	Ratte, Sorge,

Modified vowels and diphthongs

	Vocals	in words	
ä	—short like a in "vary"	like :	Männer, Blätter,
ö	—like the French eu in "lieu" (this sound is produced with rounded lips)	,,	möglich, schön.
ü	—this sound is produced with rounded lips by saying i as in wind as if you want to say u in oush	,,	grün, trüb
ei	—like i in "ice"	,,	eilen, Eisen.
au	—like ou in "house"	,,	Haus, Maus.
eu	—like oy in "boy"	,,	treu, neun,
äu	—like oy in "boy"	,,	Häuser, Käufer.

Consonants and combinations of consonants :

f	—like f in "finger"	,,	Fall, Harfe.
V—f	—like Eva	,,	viel, Veilchen,
w	—like in "very"	,,	Welt, erwarten,
v—w	—like v in "over"	,,	November, Vulkan,
s	—soft as s in "these"	,,	Sand, blasen,
s	—hard as in "grass"	,,	Glas, fassen
z—(tz)	—as ts in "dots"	,,	Zug, Holz, Katze
sch	—like sh in "bush"	,,	schön, falsch
st	—at the beginning of a syllable like scht, otherwise s-t	,,	Stelle, Aster,
sp	—at the beginning of a syllable like shp, otherwise s-p	,,	Spur, Knospe,
c	—before e, i, ä, ö, ü, eu, äu, like "ts"	,,	Celsius, Cäsar.
c	—before a, o, u, au, like "k"	,,	Café, cubik,
ch	—after a, o, u, au, like "ch" in the Scottish "loch"	,,	lachen, Kuchen,
ch	—like k in "character"	,,	Choral, Christ
ch	—sch like "chef"	,,	Chauffeur,
chs	—ks like in "axis"	,,	Fuchs, wachsen,
ig	—in the suffix the g sounds like "ch"	,,	ewig, selig,
qu	—like "kv"	,,	Quelle, bequem.

Some more examples to rules of pronunciation : (From Hugo's German Grammar)

Abend	Wann	Haar	Lahm	Esel	Wenn	Wen
ah-bent*	vahnn	hahr	lahn	ay-zel*	venn	vain
evening	when	hair	lame	donkey	if	whom

essen	Beet	Mir	Sinn	Tinte	Ofen	Offen	Hohl
ess-en	bait	meer	sinn	tin-te	oh-fen	off-en	hole
eat	flower-bed	to me	sense	ink	stove	open	hollow

Boot	gut	Huhn	Null	Frau	laut	nein	Hand
boht	goot[1]	hoon[1]	nooll[2]	frow[3]	lowt[3]	nine	hahnt[2]
boat	good	fowl	zero	woman	loud	no	hand

Hände	Sohn	Söhne	Bruder	Brüder	Freund
hen-de	zohn or sohn	ser-ne	broo-der	brEE-der	froint
hands	son	sons	brother	brothers	friend

Haus	Häuser	Müller	Mühle	heute	Zentner
howss	hoy-zer	mill-er	mEE-le	hoy-te	tsent-ner
house	houses	miller	mill	to-day	hundred weight

ja	Jahr	Zahn	Salz	Katze	von	voll	Wein
yah	yahr	tsahn	sahlts	kahts-e	fon	foll	vine
yes	year	tooth	salt	cat	of	full	wine

Wasser	beugen	tun	Finger	Ring	Spiel
vahss-er	boyg-en	toon	fing-er	ring	shpeel
water	bend	do	finger	ring	game

Stadt	auch	Licht	Pfund	Besuch	Gefahr
shtahtt	owk[3]	likt	pfoont	be-**sook**	ge-**fahr**
town	also	light	pound	visit	danger

Versuch	Erzählung	empfehlen	der	toll	kein
fer-sook	er-tsay-loong	emp-fay-len	dair	toll	kine
trial	narration	recommend	the	mad	not any

singen	Nation	Patient	Lektion	Soldat
sing-en	nah-tse-**ohn**[5]	pah-tse-**ent**[5]	lek-tse-**ohn**[5]	sol-**daht**[5]
sing	nation	patient	lesson	soldier

1. long sound, 2. short sound; 3. ow always like ow in 'how'; 4.G as in 'go'; 5. in words of foreing origion, *the last syllable* is usually stressed.

* The part printed in **thick type** takes the emphasis: **ah**-bent, **ay**-zel.

2 Lektion

Dear Friends,

While our last lesson was much on the theoretical side, we shall try today to become familiar with some basic ideas regarding the German language. There will be a conversation between Prem Agarwal and Mr. Schmidt. It will help you if you go again through the rules of pronunciation explained in the first lesson. It will not be long and you will have no more difficulties with the pronunciation of the German language.

Guten Tag!

Prem: Mein Name ist Prem Agarwal. Ich bin Inder und lerne Deutsch. Ich gehe in die Schule.

Walter: Ich bin Deutscher und arbeite in Indien. Mein Name ist Walter Schmidt. Prem ist mein Freund.

Prem: Walter ist der Lehrer und ich bin der Schüler. Ich arbeite viel und ich bin fleissig.

Walter: Ja, das ist richtig: Prem ist nicht faul, er ist fleissig.

Prem: Wo ist Krishna? Kommt er nicht?

Walter: Nein, er kommt nicht. Er ist in Ferien. Aber wir lernen jetzt Deutsch. Ich frage und Sie antworten. Hier ist das Buch. Hier ist auch das Heft, der Füller und der Bleistift. Wir lernen die Regeln und wir üben die Grammatik.

Here now are the words and their translation, and please, always learn, besides the noun, the article and the plural, too, without fail.

gut	good	faul	lazy
der Tag/e	the day	das	that
mein	mine/my	er	he
der Name/n	name	wo	where
ist	is	der Herr/en	gentleman
ich	I	kommen	to come
bin	am	nein	no
der Inder	Indian	die Ferien	holidays/vacation
und	and	aber	but
lernen	to learn	wir	we
Deutsch	German	jetzt	now/at present
gehen	to go	fragen	to ask
in	in/to/into	Du/Sie	you
die Schule/n	school	antworten	to reply/to answer
Deutscher	German national		

arbeiten	to work		
Indien	India	hier	here
der Freund/e	friend	das Buch/Bücher	book
der Lehrer	teacher	auch	also/too
der Schüler	pupil	das Heft/e	copy book
viel	much/a lot	der Füller	fountain-pen
fleissig	dilligent	der Bleistift/e	pencil
ja	yes	die Regel/n	rule
richtig	correct/right	üben	to exercise
nicht	not	die Grammatik	grammar

(Please try to translate the above conversation in to English. For comparison see next Issue).

For those who are not tired yet here is a bit of the so important grammar :

The Article,

In German, three genders are distinguished : masculine, neuter and feminine. The grammatical gender, however, is used in a way different from that in English. It is not that only animate beings, can be masculine or feminine : even inanimate objects can be masculine, neuter or feminine. There is no explanation, and no infallible rule to tell us why "der Fuller" should be masculine, "das Buch" neuter and "die Schule" feminine. The only reliable method is to learn the noun together with its article.

	Singular	plural
masculine	der Schüler	die Schüler
neuter	das Heft	die Hefte
feminine	die Schule	die Schulen

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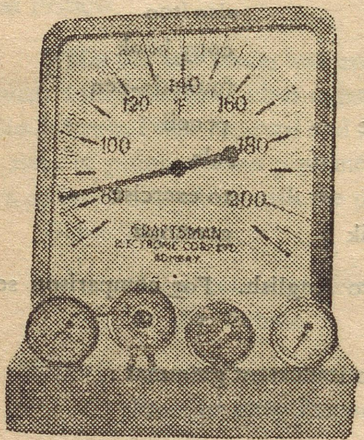

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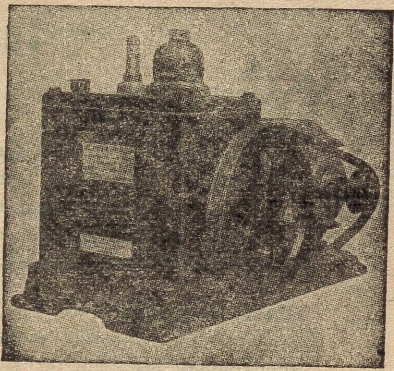

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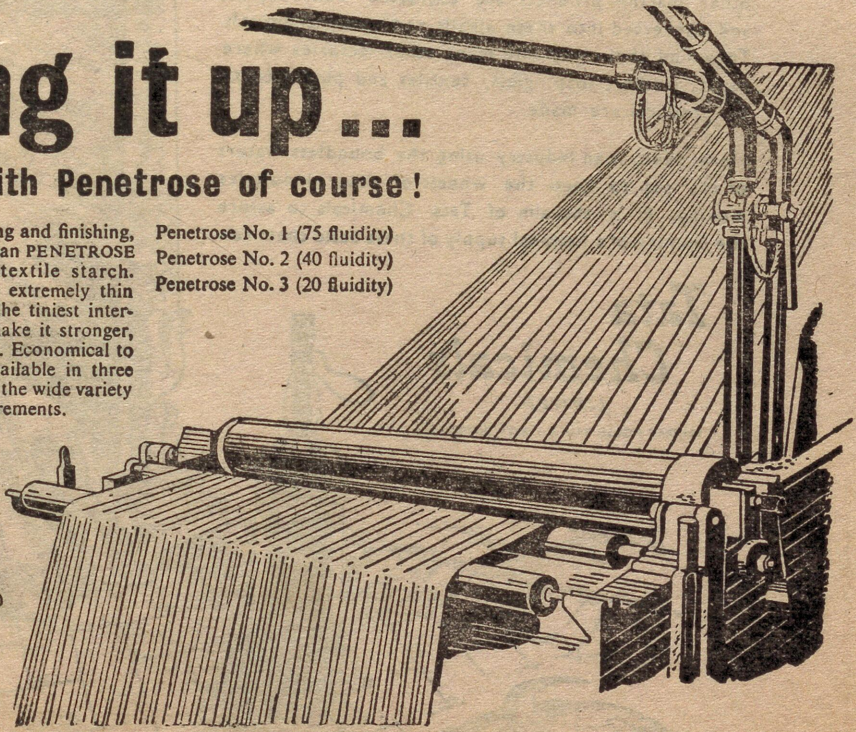

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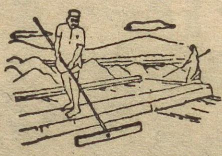
What salt means to you!



How long ago man discovered salt is lost in antiquity, but he learnt that it came from the rocks and the sea. As he realised the value of salt, he made it an article of currency and commerce.

Science has gone far since then, and today it has learned to make many and varied uses of salt. Can you imagine your common salt being turned into a number of heavy chemicals, such as soda ash, caustic soda, bicarbonate of soda, magnesium chloride, bleaching powder and bromides? Can you imagine getting along without salt in the twentieth-century?

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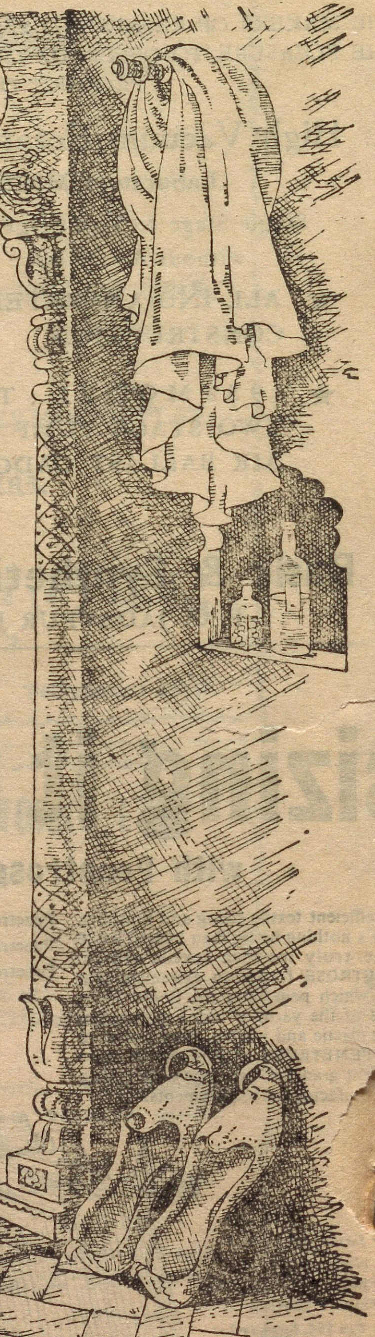

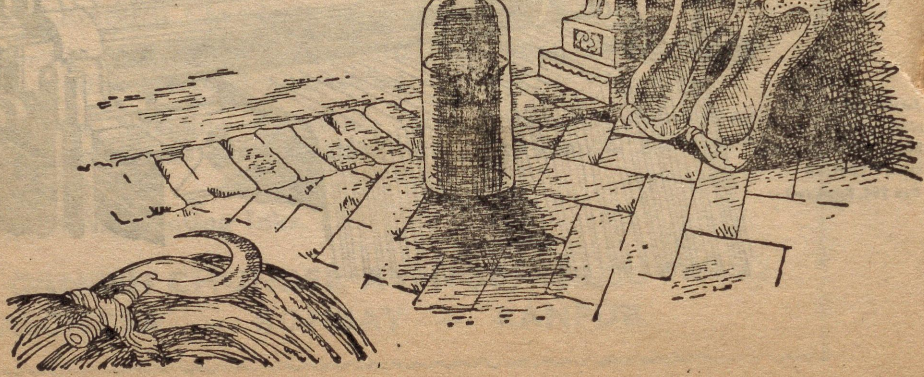

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