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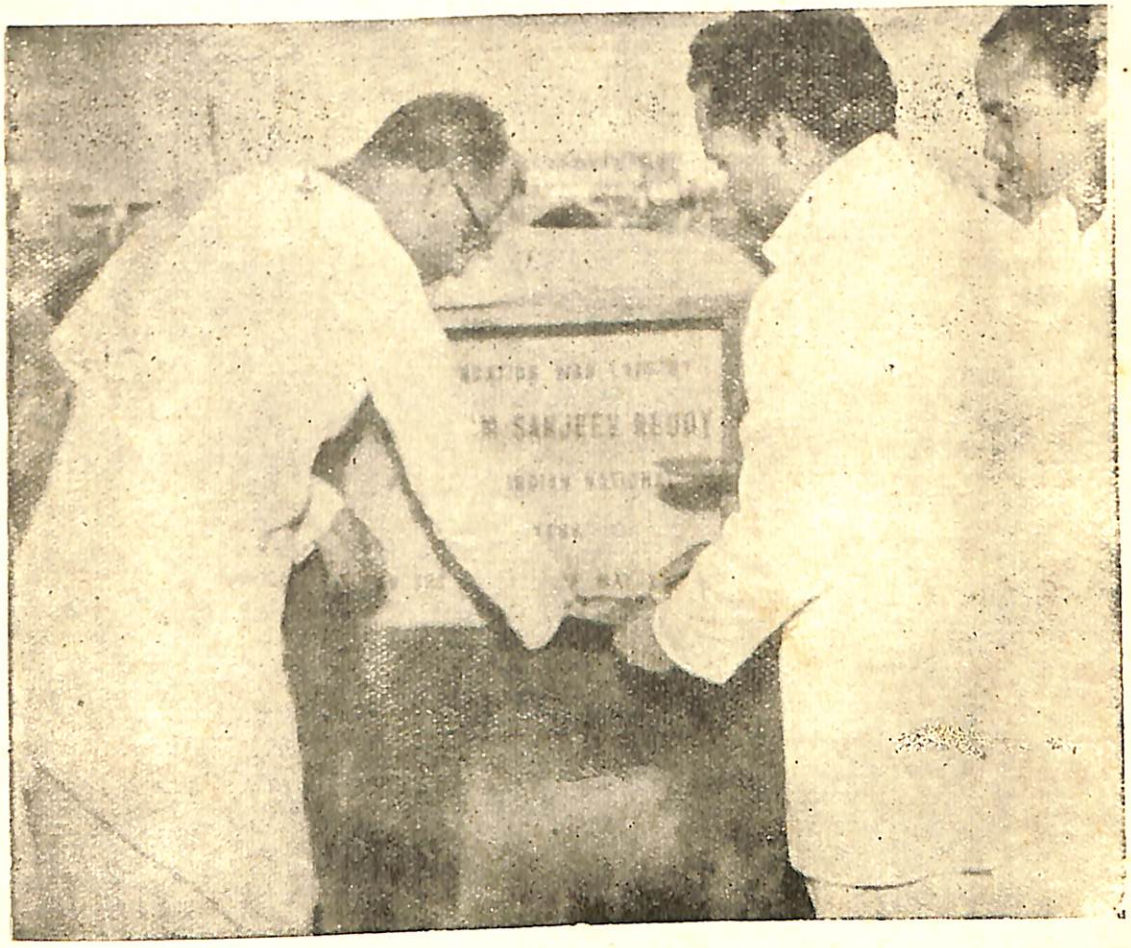
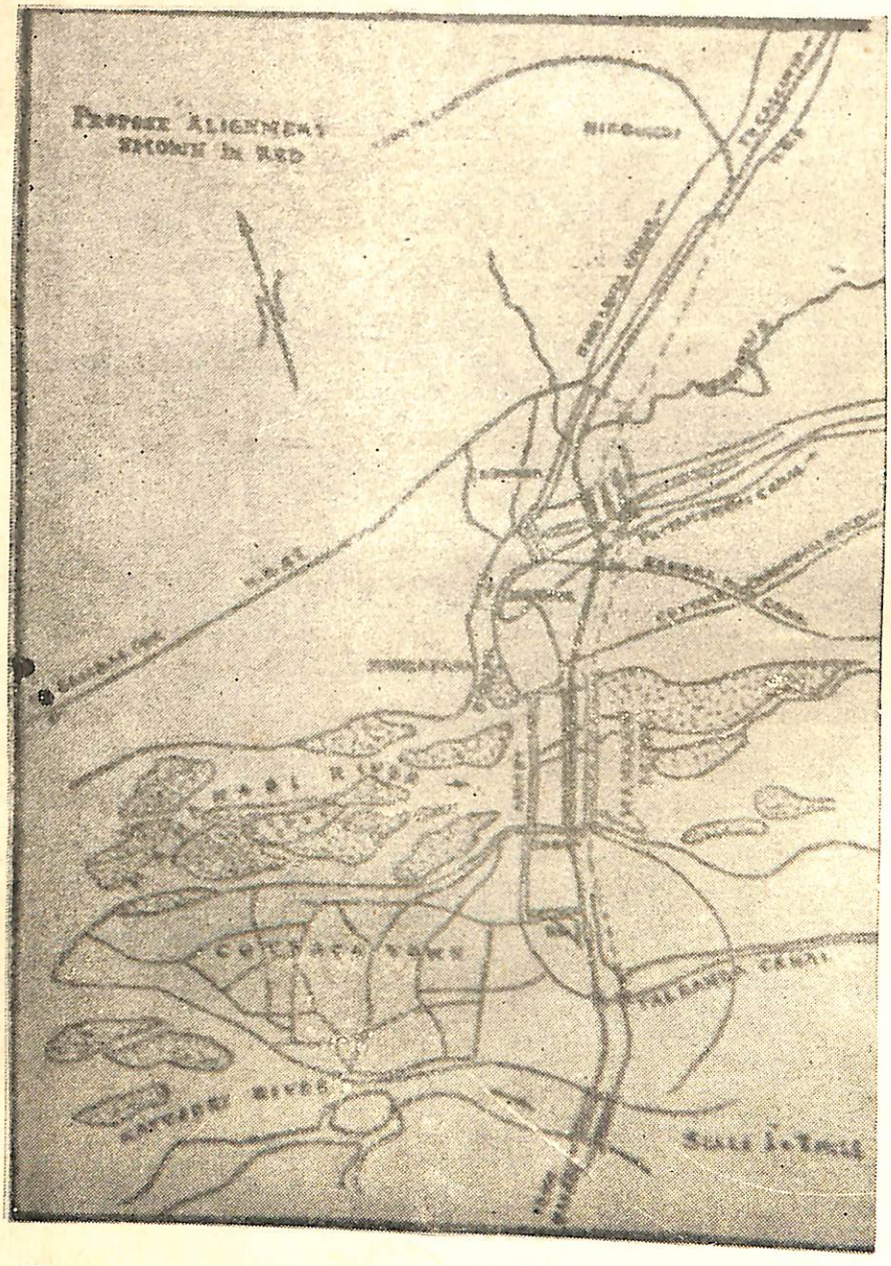


Shri Sanjeev Reddi laying the foundation stone of a building of the Orissa Textile Marketing Organisation in Bhubaneswar



The proposed bridge over the Mahanadi and the Birupa

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HIGHWAYS IN ORISSA

Shri K. K. Kartha

Chief Engineer, Road & Buildings Orissa

The Road communication in Orissa was in an undeveloped condition prior to 1948. There was no plan for any developmental work in the State so far as communications were concerned. It is only after the Nagpur conference of Chief Engineers that an attempt was made to develop roads in a planned manner by categorisation.

According to he Nagpur Plan, Orissa should have 7270 miles of Major category roads by the end of Second Five Year Plan, whereas the actual mileage would be only 5758 miles. This big gap is the result of inadequacy of funds and limitation on planned ceiling. Considering that the State was in a very backward condition prior to this plan, Orissa should have received special consideration. But unfortunately there was limitation of funds and the maximum that could be achieved within the limited ceiling alone could be attempted while keeping to the net work of the plan. As such a good deal of work remains yet to be done even in terms of the recommendation of the Nagpur plan,

National Road Development Plan

Now, again a fresh plan in the shape of 20 year National Road Development plan has been worked out and according to this Orissa should have 9192 miles of major category roads and 6742 miles of minor category roads by the end of 1981 to keep pace with other States of India. By the end of the Third Five Year Plan, therefore, the States should proportionately have 6617 miles of major category roads and 2350 miles of minor category roads. But with the funds available, it is not possible to achieve this target and the bottle-neck of finance plays its havoc here also. The result is that the State will have density of communication at about 0·2 to ·25 instead of .3 to .35 as envisaged in the National Development plan by the end of Third Plan. With finances as promissed, priorities have however been fixed to achieve the following aspects : (1) to connect all the district head-quarters to the Capital with all-weather roads, and (2) to connect all subdivisional headquarters, industrial centres, mining centres etc. to their respective district headquarters.

Even in this limited programme, there are about 280 bridges to be constructed, which in themselves will absorb a major slice of the ceiling.

So far as communication in the State is concerned, it is classified as follows :

1. National Highways,
2. State Highways,
3. Major District Roads, and
4. Other District Roads.

National Highways comprise of :

1. N. H. 5—from Bangriposi in Mayurbhanj to Andhra border, via. Cuttack and Berhampur.

2. N. H. 6—From Bangriposi to Loharchitti in Sambalpur District,

3. N. H. 42—From Choudwar to Sambalpur,

4. N. H. 43—From Orissa border near Sunki to M. P. border beyound Kotpad, and

5. New N. H. for 20 year plan connecting Jaleswar to Bengal border.

State Highways :—These are 11 in number and connect places as below :—

1. S. H. 1—From Khurda to Amat, via. Phulbani,

2. S. H. 2—From Baragarh to Boriguma, via. Bolangir,

3. S. H. 3—From Amat to Sohella,

4. S. H. 4—From Koraput to Mandasa, via. Rayagada, Gunupur and Parlakhimendi,

5. S. H. 5—From Somtelpeta to Baliguda,

6. S. H. 6—From Bhawanipatna to Muniguda,

7. S. H. 7—From Berhampur to Bisipara,

8. S. H. 7*a*—From Kalinga to Nuagaon,

9. S. H. 8—From Bhubaneswar to Puri,

10. S. H. 9—From Bhadrak to Chadbali,

11. S. H. 10*a*—From Samalpur to Barbil, and

12. S. H. 10*a*—From Barkot to Dargin,

13. S. H. 10*b*—From Remili to Bhadrasahi, and

14. S. H. 11—From Panikoili to Champua.

When all the State Highways are completed with the bridges on them, the Headquarters of Districts will be connected by all-weather roads to the Capital.

Out of the rest of the roads under the P. W. D., most of them are Major District Roads and a few Other District Roads. As it stands now, the various mileages covered by the above categories in the State are (1) National Highways—852 miles, (2) State Highways—1362 miles, (3) Major District Roads—3544 miles and (4) Other District Roads—886 miles. These are the roads under the P. W. D.

Of the National Highways in the State the National Highways 5 forms a vital link between Orissa and Andhra on one hand and Orissa and Bengal on the other. For an all-weather communication between West Bengal and Orissa, the major bridges failing in the route in Orissa are (1) Kuakhai, (2) Katjuri, (3) Mahanadi, (4) Birupa, (5) Brahmini, (6) Kharsua, (7) Baitarani and (8) Subarnarekha.

Of the above; bridges over Kuakhai and Katjuri are completed at a cost of about Rs. 70 lakhs. Work on Mahanadi and Birupa has commenced and is expected to cost a little over Rs. 2 crores. Of the rest, tenders have already been called for Brahimini and work will start soon. The estimated cost is Rs. 42 lakhs. The bridge over Baitarani and Kharsua are being investigated and are to be taken up soon. The approximate cost is Rs. 70 lakhs. The bridge in the Subarnarekha on National Highway 6 is nearning completion. The Mahanadi bridge by itself is probably the longest bridge in India and if considered as one unit with Birupa and Katjuri flanking on either side, it is perhaps unique in itself.

When these bridges are built, through land communication will be established between Bhubaneswar and Calcutta. It is presumed that the bridge over Rup-Narayan in West Bengal will be built soon. Calcutta by this roadway will not be more than 275 miles from Bhubaneswar. It is expected that before the close of the Third Five Year Plan all these bridges will be completed and the through route established. That will be the proud day for the State and particularly for the P. W. D. on whose shoulders the mantle of construction rests.

KHARIF PRODUCTION CAMPAIGN

The Government of India introduced a scheme for award of Community prizes at District and State levels for the first time during the Rabi Production Campaign, 1958-59 as an incentive to the cultivators to increase production over large areas. The purpose of this incentive was largely achieved and a large number of States and districts participating the last Rabi Campaign won the awards by registering increases in food production of more than 50% during 1958-59 over the average production of the preceding three years. The scheme was, therefore, continued during the two successive Campaigns —Khariff and Rabi of 1959-60. It has now been decided to continue the scheme on the usual basis during the next Khariff Campaign as well.

The scheme for the award of Community Prizes for increasing agricultural production reads as follows :—

Objective

While the All-India Crop Competition Scheme which was received from the 1958-59 Rabi Season would act as an incentive for maximising per acre yields by the individual farmers, it has its own limitations in stepping up food production in the country. The units of lands entered into competitions being rather small from ½ to 1 acre only depending upon the crop the excess production is only from a small piece of land and not from the entire holding of the competitor. The cumulative e effect of such individual efforts on small pieces of lands, although perceptible, is rather inadequate, considering the immediate requirement of the country in regard to food. Therefore, in order to increase the level of production in the country as a whole it is essential that larger units of areas such as the entire village, tahsil, district, etc. should be encouraged to concentrate their efforts on increasing production in every piece of cultivable land. This would mean supplementing individual efforts in the All-India Crop Competition Scheme with Group efforts in a given unit for maximising production.

The President of India who has evinced considerable interest in the

crop competitions ever since these were started in 1949 had also suggested in one of his letters to the Minister for Food and Agriculture that in addition to awards to individuals for producing highest yields on small bits of lands, awards should be given for raising the general average of production in particular areas. If such awards are instituted for different units like Districts, State etc., each unit striving to produce more food, the cumulative effect would be additional production in the country.

These suggestions were discussed in Conferences of the State representatives on State Plans for Rabi Production Campaign on the 18th August, 1958 and 15th October, 1959. The Conferences favoured the proposals for giving Community awards to villages or other convenient units which come to a certain predetermined level of performance.

States to be included for the award:—To start with the scheme was confined to the nine States viz., Punjab, Rajasthan, Uttar Pradesh, Bihar, Madhya Pradesh, Bombay, Mysore, Andhra Pradesh and Delhi were the Rabi Production Campaign, was launched during the year 1958-59. The scheme was expanded to cover the remaining States as well during the successive Kharif and Rabi Production Campaigns mounted in 1959-60.

It has been decided to continue it during the next Kharif Campaign as well.

Levels at which the award will be given:—It is felt that award of Community prizes at village and Block or tahsil levels may not be feasible at this stage as it is likely to present certain insurmountable difficulties in regard to the assssment of the excess total production over a prescribed base line. The first pre-requisite for such an assessment would be an elaborate agency for estimating additional production due to group efforts in each village if it is taken as an unit. Besides, the size of the villages and facilities available for production in them vary and it would be difficult to make a realistic assessment of village effort for qualifying for community award. On the other hand, through the scientific crop-cutting experiments conducted to determine the total production of major food crops at the State and District levels, it is easy to measure rather accurately the additional production at each of these levels. The community awards are, therefore, suggested at the District and State levels only for the present.

Award of prizes:—The award will be directly related to the percentage increase in total production of food crops. All those districts or States where the total production of food-grains exceeds by 15 per cent or more over the average of the last three years will qualify for a community award. Each district which is entitled to the award will receive Rs. 10,000/- while each State Rs. 50,000/-. In addition to the above, in each State the highest producing district would be awarded "RAJYA KALASH" and similarly the State achieving the highest percentage increase in production in the country will be awarded the "ALL INDIA RASHTRA KALASH " silver trophies filled with typical grain of that particular area and the name of the district or State inscribed on it. The "RASHTRA KALASH" and "RAJYA KALASH" will rotate from year to year and will be won by the best State and the best district in each state respectively.

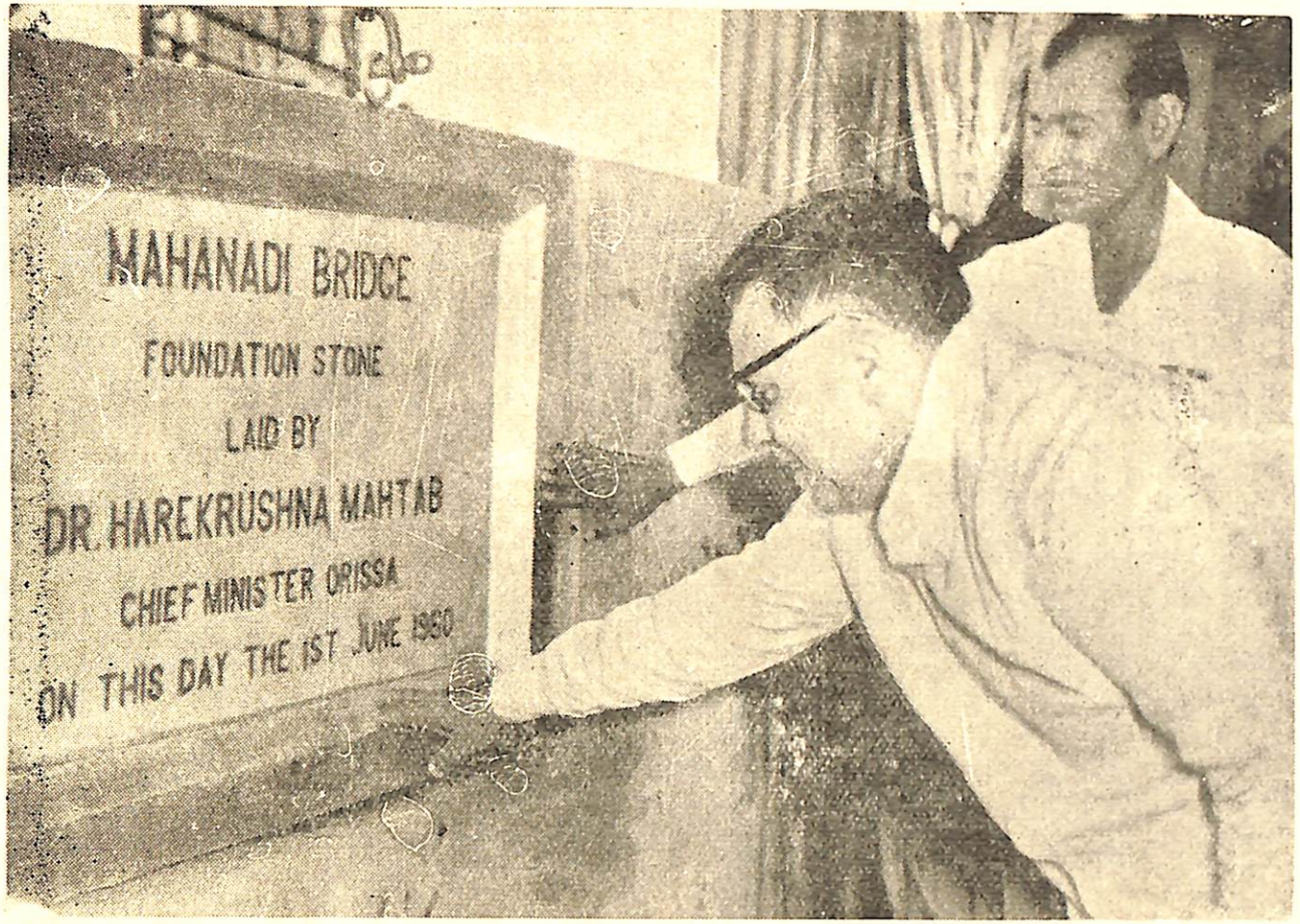
Distribution of Prizes:—The award will be given to the State Planning Board and District Development/ Planning Committees who may determine how that money should be spent on community needs in suitable areas including the villages which had contributed most for securing the increased production. The award of "RASHTRA KALASH" and "RAJYA KALAS" together with the cash prizes would be made in appropriate ceremonies in which all those who have helped to contribute to the maximum production would be honoured. Similarly, workers in the States who have done significant work for increasing the production would receive special commendation.

Procedure for determining the total production:—At present district-wise estimates of production of all the important food crops are derermined by the crop-cutting method. These crop-cutting experiments provide an objective method, for obtaining accurate estimates of yield and are conducted by the revenue agency of different States under the technical guidance of the National Sample Survey in the Ministry of Finance. The district-wise forecasts of production are compiled at the State headquarters and reported to the Central Ministry of Food and Agriculture. The Directorate of Economics and Statistics in the Department of Agriculture compile and process these figures and issue annual estimates of production of this basis.

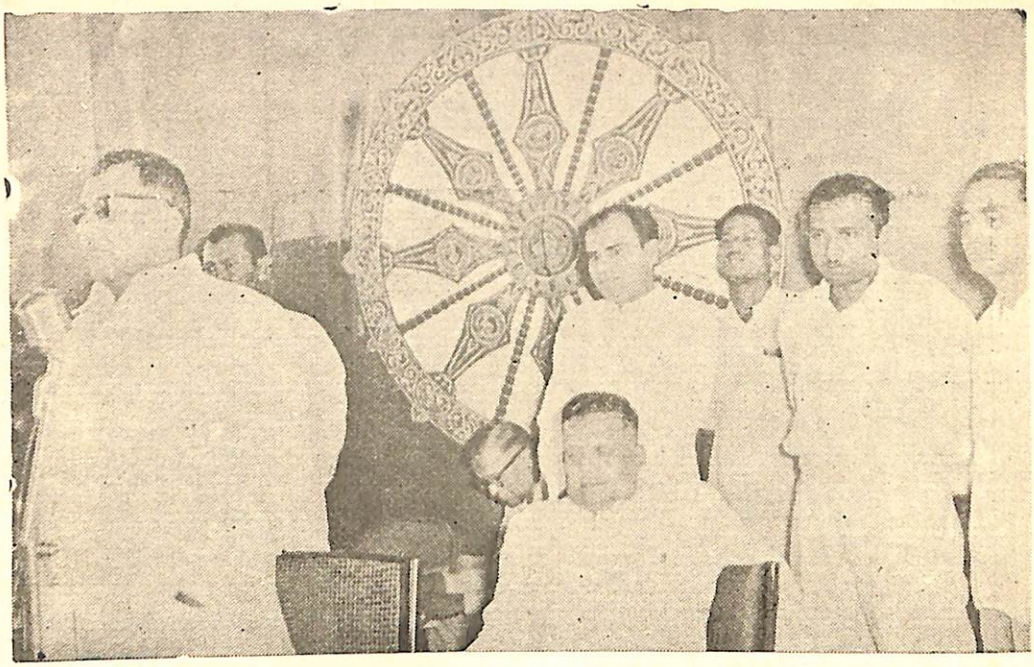
The assessment of production of foodgrains for the purpose of determining the increase achieved by

different districts in a State as well as the State as a whole as compared to the three years' average will be based on the district-wise estimates of out-turn reported to the Directorate of Economics and Statistics. The decision of the Ministry of Food and Agriculture in respect of the award of prizes will be final and no appeal will lie against it.

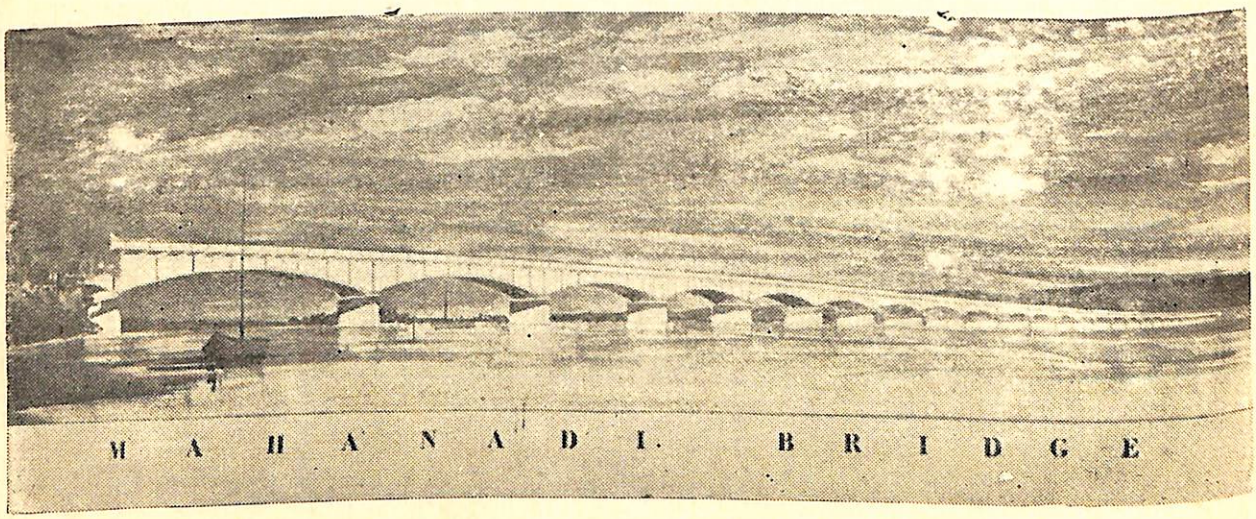
The expenditure on the award of community prizes will, as usual, be borne entirely by the Government of India.



Chief Minister, Dr. Harekrushna Mahtab. laying the foundation stone of the bridge over the Mahanadi



Chief Minister addressing the gathering after laying the foundation stone of the Mahanadi bridge



An artist's sketch of the proposed Mahanadi bridge

TECHNICAL FEATURES OF HIRAKUD DAM

M. S. Thirumale Iyengar

Hirakud has established the nucleus for intensive research into chief construction materials and methods combined with efficiency and speed in construction, observes Shri Thirumale Iyengar till recently Chief Engineer of the Hirakud Dam Project. This article briefly describes some of the main features of this project, which was transferred to the Orissa Government on April 1, 1960.

Though many are familiar with the main features and scope of the Hirakud Dam Project, some of its salient features would bear repetition.

As the name indicates, the Hirakud Dam centres on and around the "Hirakud Island" in the Mahanadi River. Here, the river was flowing in four channels between two hills, three miles apart.

The dam is essentially an earthen barrier across the main river with the requisite sections of concrete and masonry for the spillways, transitions, power, penstock and turbine locations, flanked by earthen dykes nearly 13 miles long in five sections spanning the hills. Thus, it is a 16 mile long dam, 200 ft. high at the deepest earth and masonry sections, and, perhaps, the longest earth structure in the world. The volume of earth that has gone into the main dam and dykes is 30 million cubic yards by far the largest that has ever been put in any single dam in India.

Compared with the other earth dams in the world, Hirakud ranks within the first ten. It is also one of the largest reservoirs in its class for combined power, irrigation and flood control potential.

Technical Features

It has also some noteworthy features. A battery of 64 gated river technical bed level sluices of size 12′-0″ × 20′-4″ each, in a spillway length of 2160′ operated from a gallery of size 11′-0″ × 23′-0″ is located in the belly of the concrete structure. Further, it is capped by 34 radial crest gates of size 51′-0″ × 20′-0″ each.

The bed level sluices, which operate under a maximum head of 120′, can pass down nearly a million cusecs of water under full reservoir conditions, while the sluices and the crest gates

together have the colossal discharge capacity of a million and half cusecs in an emergency. The seven power penstock pipes embedded in the masonry section of the dam are of 25′ diameter each.

Some of the huge bulk-head gates of size 41'-4" × 24'-6" at the entrance to these sluices were manufactured at the Hirakud Project workshops. Not only these, the workshop at site manufacutred six sets of draft tube steel stoplog gates of size 25'-6" × 18'-1". It also fabricated a few hundred high voltage transmission line towers and is now fabricating the 132 KV towers for linking Chiplima with Hirakud, which are 16 miles apart.

One of the unusual features in the canal systems of this project is the provision of field water courses to cover the entire commanded area of 3·8 lakh acres. Excavation of these minor water course is usually the work of farmers themselves, but this has been done by Government in order to speed up the development of irrigation under the project. The cost of the field channels will be recovered from the beneficiaries.

Power Production

Since the first generation of electricity at the end of 1956, there has been a quick utilisation of the power produced at the dam, and today the consumption of power by the steel, aluminium, ferro-manganese, and a number of other industries is over 500 million K. W. There is no doubt that all the power produced at Hirakud will be utilised by the middle of 1961.

The Hirakud electrical system has been integrated with the Hindustan Steel Project thermal station at Rourkela, which has a capacity of 75 M. W.

Two more generating units totalling to 75 M. W. are also being installed at the main dam power house.

Complexity of Task

Building such a huge water conservation project was certainly no simple task. Lot of spade work had to be done before the progress became steady and rapid.

The most important factors that brought about this satisfactory state of affairs were an optimum arrangement in the programme for increased efficiency, selection of the most advantageous methods of construction, and use of manpower, materials and available machines to the best advantage for obtaining speed in construction.

Possessing initiative and resourcefulness the Indian engineers worked like a team and did a magnificent job which brought credit to themselves

and the country. Mechanised operations, foundation grouting and other construction techniques all specialised jobs were successfully tackled by our engineers.

On the electrical side, the Indian engineers and technicians erected hundreds of miles of high voltage transmission lines, and a huge switch-yard and power units.

The Hirakud Project has trained and turned out experts in the line who can carry out similar difficult jobs elsewhere with confidence and ease.

New Methods

The construction of the Hirakud Dam also inspired the need for fundamental research into the most important traditional building material, viz. rubble stone in mortar for high dams.

We have been building dams before for several centuries, not high ones, but of medium height, earth and masonry ones, which had all been built with mostly human labour.

Modern technological advances based on research and the use of mechanical equipment for doing various job components or ingredients, revolutionised dam building in many ways.

We, in India, have also now imbibed many of the modern ideas and techniques, consistent with our economy. We have large manpower, skilled in the art of placing construction materials and doing a good job of it—particularly masonry dam construction.

Hand-placed rubble stone masonry has been in vouge for centuries, and is cheaper by about 25% than concrete. Further, the rate of placement of rubble stone mortar can be and has been speeded up at our dams to a very high degree—2000 to 3000 cyds per day is possible depending on the area available for manual labour operations.

A dam in a narrow gorge like the Bhakra will not lend itself to a speedy rubble stone in mortar placement. But other dams we have built and completed, and some under construction, like the Nagar junasagar dam, across the Krishna river, lend themselves to fast hand-placed rubble stone in mortar construction.

Except for the process of hand-placement, layer by layer, by hundreds of skilled artisans, the rest of the operations are mechanised to the maximum extent. Quarrying, with modern drills and blasting methods, transport of the rubble, lifting the material and delivery of the stone at the work level are carried out by mechanical means. Mortar required for the work is mixed in power-driven mixing

plants, transported by trains to the work spot, lifted and delivered into the hands of the artisans.

Quality Control

Quality control of mortar, stone and every ingredient used, according to the modern scientific standards, is also enforced in this method.

There are two series of operations for quality control. The procurement and use of ingredients, rubble stone and sand mortar, sand cement or sand lime surki or surki cement or sand combination form the first series. The tests on these are easily done.

The record series of operations comprise the placement of stone, embedding it in mortar and bringing it to certain specifications. This series of operations is done by hand, by skilled artisans.

While the finished concrete can be tested for strength etc. by taking samples which are small sized, the finished rubble stone masonry does not lend itself to that kind of sampling and test. So it was necessary to prove the strength and other essential characteristics of rubble stone in a scientific manner.

At Hirakud a 4·5 to 6 million pound testing equipment has been fabricated and installed. A short length tunnel has been bored into a granite hill, and a fabricated steel structure, surmounted initially by four 500 ton jaks that kiek the roof and transmit the thrust to the specimen, has been installed in it.

Except the jacks, the rest of the structure was designed, fabricated and erected by our engineers. Here, 3'-0", 2'-6" and 2 cubes and cylinders of rubble stone in mortar and concrete are tested, and results show that rubble stone masonry is as good as concrete in its essential strength and other characteristics.

After these tests, we have substituted the concrete regions in the375' high Nagar junasagar dam with rubble stone in mortar. The Sharavathy dam is also being built of rubble stone in 'lime surki mortar'.

So, Hirakud has established the nucleus for intensive research into the one cheap construction material, without sacrificing efficiency and speed of construction. This method of construction also combines a meausre of mechanisation, with manual labour operation for balance.

The Hirakud testing station, I trust, will be fostered and developed into a useful and important research station.

REFORM IN INDIAN UNIVERSITIES

Asaf A. A. Fyzee

The aims of university education have often been discussed by eminent authors since the days of Cardinal Newman. Broadly speaking, there are four main objects: (*a*) to cultivate and improve the minds of the young, (*b*) to build up their character, (*c*) to fit them to serve their country, and (d) to create a centre of research and higher learning in an atmosphere of freedom.

A university is not a technical school; it does not manufacture civil servants or mechanics or professional men. But it does give a cretain training and balance to the intellect, it fills the minds of the students with an adequate bundles of facts and trains them to understand their significance and arrive at proper judgments. A university also attempts systematically and with a consciousness of its duty to build up the character of the students.

All over India today university men are conscious that in so far as discipline cannot be maintained, the universities have failed in one of their primary functions. It cannot too often be emphasized that if university students do not behave themselves, the fault lies with the universities and whatever the contributory causes it is the universities that will have to find the remedies.

Variety of Causes

The weakness of our universities is due to a variety of causes. First, there are enormous numbers of university students for whom the proper facilities of teaching, guidance and research are not available. Secondly, language constitutes and will continue to constitute a formidable barrier. Our knowledge of English is poor and to that extent we are not in a position to use this potent instrument for the critical appraisal of a subject. Thirdly, there is on the national scale a lack of co-ordination regarding universities.

Each state is free to go its own way and the Centre cannot enforce rigidly a particular policy. Admitting that this is perhaps the lesser of two evils it is a source of great weakness at the present stage of national development. A notable example is the position of Hindi; another is the three-year

degree course. Each university has a different programme and we can only hope that in such diversity there are not the germs of ultimate chaos.

Now-a-days it has become the fashion to decry university education. Everyone seems to know the defects, but no one has suggested the one sovereign remedy for all our ills. Criticism of this character is so widespread that it is worthwhile to examine the question broadly and to discover the principal reforms which should be introduced in Indian universities. Is the position really so hopeless? Perhaps it is necessary to add the caution that a general sense of panic is the one thing to be avoided.

For an analysis of this problem we shall begin with 1947. As India gained independence, there was a widespread belief that in *Swaraj* we had acquired the magic wand and that all our fond dreams would come true. But educationists and their critics soon realised that criticism was easier than reform; that the unerring instinct to introduce the proper remedies for our weaknesses was very uncommon and that therefore reform was a painfully slow business, fraught with enormous difficulties.

Problem Of Growing Numbers

The very first difficulty, and the one with which I shall begin, was the problem created by growing numbers. At each stage, primary and secondary and higher, demand has outstripped supply, and almost everywhere we hear complaints of shortage of teachers, shortage of accommodation and shortage of funds. The latter two, important as they are, cannot be compared with the most unyielding problem of shortage of teachers. You can manage with smaller funds; you can teach in ramshackle houses, not satisfactorily, indeed, but somehow. But when you are faced with shortage of teachers, and there is no remedy at hand, then matters come to a standstill.

The long-term remedy for shortage of teachers is undoubtedly to improve the prospects of university teachers and to train them, and also to see that provision is made for technical schools and colleges which would absorb a certain proportion of the school population. Canalisation of students in the different technological spheres useful to the nation is one of the most important tasks awaiting educationists and planners, and this will also tend to decrease pressure upon the universities.

The immediate remedies however are drastic but require courage. First, not to admit more than such numbers as can really be taught. This is a

primary requirement of sound education. It is generally recommended that in colleges not more than sixty students should be admitted to a class. Even this is too large a number. In times of stress the number may be increased to 80, but beyound that we must realise that class work in the normal sense is not possible, and the quality of instruction imparted cannot be satisfactory. It is no use having classes of 100 and over and deceive ourselves that this is university instruction.

Tutorial System

With larger classes some kind of tutorial work becomes imperative, for there are a number of academic problems that can only be discussed with the student across the table, and as far as it is humanly possible, such opportunities should be afforded to the student. Discussion of individual problems, criticism of essays and papers, reviews of books or articles—this is the most important part of education, and a student gains an individual insight into the subject when he has the opportunity to discuss it either with an experienced teacher or even a tutor, who is well-read and has kept abreast with the current work on the topic.

There can be no doubt whatever that while the problems of number have no easy solution, if we can bring student and teacher more together, we shall be able to see the beginnings of a solution. The solution proposed is that if it is impossible to have a large number of regular teachers, such as professors, readers and lecturers, at least let us have tutors or fellows who are senior graduates and who will be able to discuss particular topics with the students.

In all universities the magic touch of the great teachers is one of the most inspiring experiences for the student. With increase in numbers, instead of a real, live and stimulating lecture, we have nothing but a factory manufactured discourse catering for the needs of the multitude in a mechanical fashion. Or else, notes are dictated, which are repeated from year to year, conveying little to the student, and not reflecting the intellectual temper of the teacher. My first proposal is that we should try to introduce the tutorial system immediately wherever large classes are held. Even if senior teachers are not available, fellows and tutors may well undertake this work.

Problem Of Discipline

Discipline is the next question that must be dealt with. Here we have a matter of fundamental importance, for the desire to play truant and break laws is ingrained in man. Indiscipline

has become the order of the day in a number of universities in India. The matter is causing anxiety to all educationists, and Professor Humayun Kabir has dealt with the problem in his *Letters on Discipline*. These letters constitute a major contribution to the subject of educational reform in India.

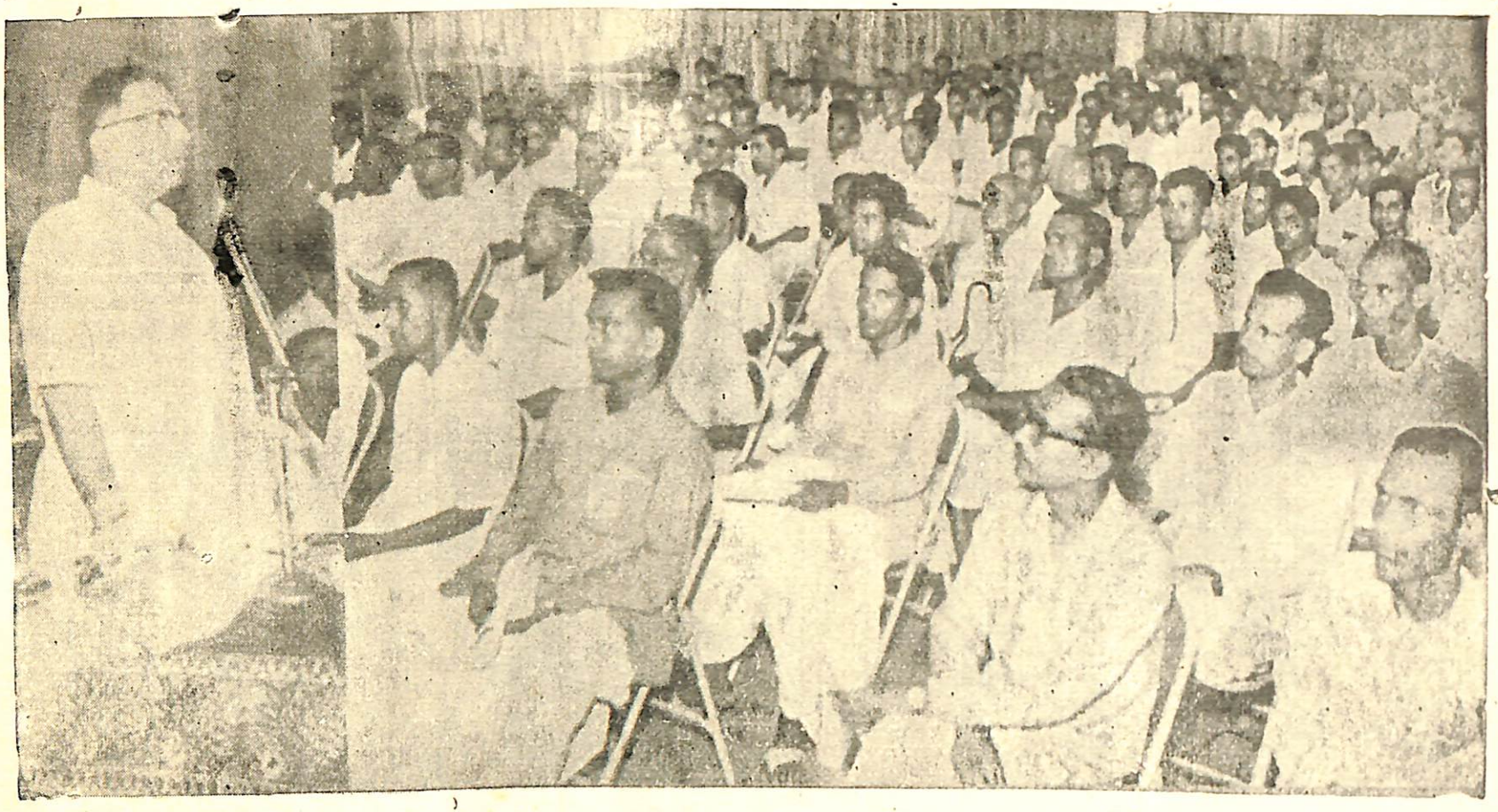
He rightly observes that the problem should be dealt with at the secondary stage, and around the problem of discipline he has given us a critical analysis of the reforms needed in our schools and colleges. Among his most important proposals are that the management of schools should be improved in the manner indicated by him that the administration of universities should be remodelled and that our examination system should be reshaped. The final examination is unduly emphasised in most of our schools and colleges. Regular work during the year is therefore neglected, unfair practices are sometimes adopted and cramming becomes a matter of habit.

For this the reforms suggested are : reducing the number of formal examinations, reserving marks for class work and regular application, introducing a system of weekly or monthly tests of an informal and healthy character, and removing the subjective element in examinations.

Some of these reforms have already been adopted by our universities, but it cannot be sufficiently emphasized that the secret of discipline is a well-contented mind. If the boy is satisfied with his work, if his leisure is well employed, and if he has love for his teachers, his school or college, acts of indiscipline would be rare. We often raise our hands in horror at the acts of hooliganism ommitted but unless we look for the deeper cause of the malaise, the real remedy will not be found. Unless we can establish a personal bond between teacher and student, and student and school, indiscipline cannot be avoided.

If a boy loves his teachers, he will never raise his hand against him, and he will obey him at any cost. Similarly, if he loves his school, college or university, he will not indulge in acts of destruction or indiscipline. Every activity therefore which can be introduced to bring student and teacher together should be encouraged. The tutorial system, games and sports, debating societies, small study groups, cultivation of hobbies, these are the real defences against indiscipline.

There are of course many causes that lead to indicipline such as frustration in university activities, unhealthy activities by politicians and



Chief Minister, Dr. Harekrushna Mahtab, inaugurating the sitting of the Council

has become the order of the day in a number of universities in India. The matter is causing anxiety to all educationists, and Professor Humayun Kabir has dealt with the problem in his *Letters on Discipline*. These letters constitute a major contribution to the subject of educational reform in India.

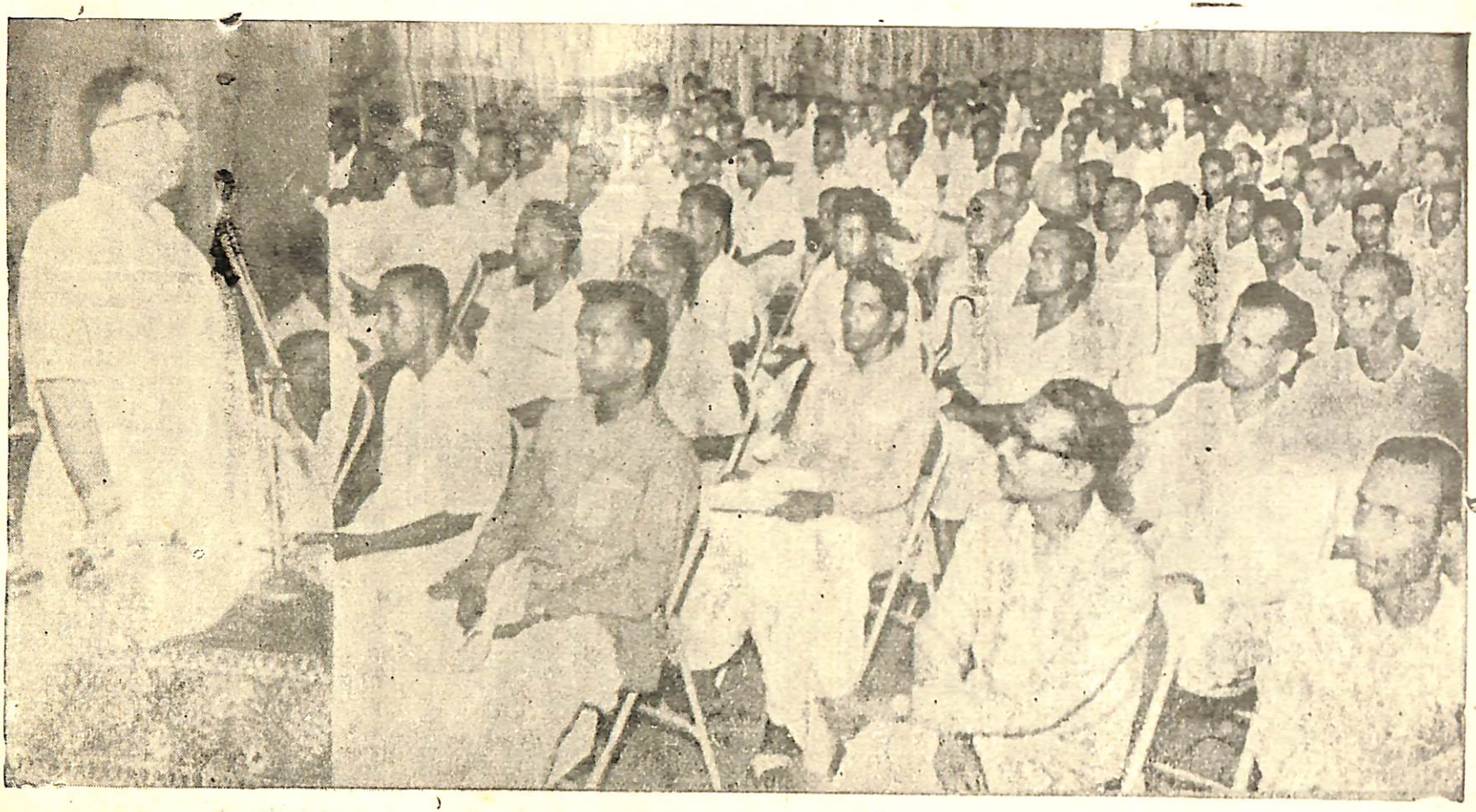
He rightly observes that the problem should be dealt with at the secondary stage, and around the problem of discipline he has given us a critical analysis of the reforms needed in our schools and colleges. Among his most important proposals are that the management of schools should be improved in the manner indicated by him that the administration of universities should be remodelled and that our examination system should be reshaped. The final examination is unduly emphasised in most of our schools and colleges. Regular work during the year is therefore neglected, unfair practices are sometimes adopted and cramming becomes a matter of habit.

For this the reforms suggested are : reducing the number of formal examinations, reserving marks for class work and regular application, introducing a system of weekly or monthly tests of an informal and healthy character, and removing the subjective element in examinations.

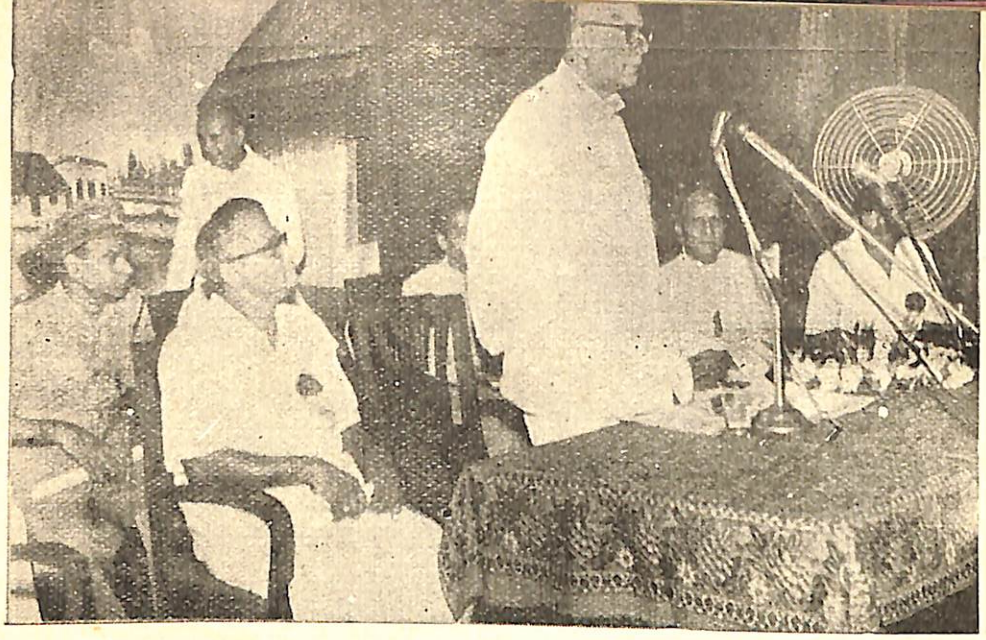
Some of these reforms have already been adopted by our universities, but it cannot be sufficiently emphasized that the secret of discipline is a well-contented mind. If the boy is satisfied with his work, if his leisure is well employed, and if he has love for his teachers, his school or college, acts of indiscipline would be rare. We often raise our hands in horror at the acts of hooliganism ommitted but unless we look for the deeper cause of the malaise, the real remedy will not be found. Unless we can establish a personal bond between teacher and student, and student and school, indiscipline cannot be avoided.

If a boy loves his teachers, he will never raise his hand against him, and he will obey him at any cost. Similarly, if he loves his school, college or university, he will not indulge in acts of destruction or indiscipline. Every activity therefore which can be introduced to bring student and teacher together should be encouraged. The tutorial system, games and sports, debating societies, small study groups, cultivation of hobbies, these are the real defences against indiscipline.

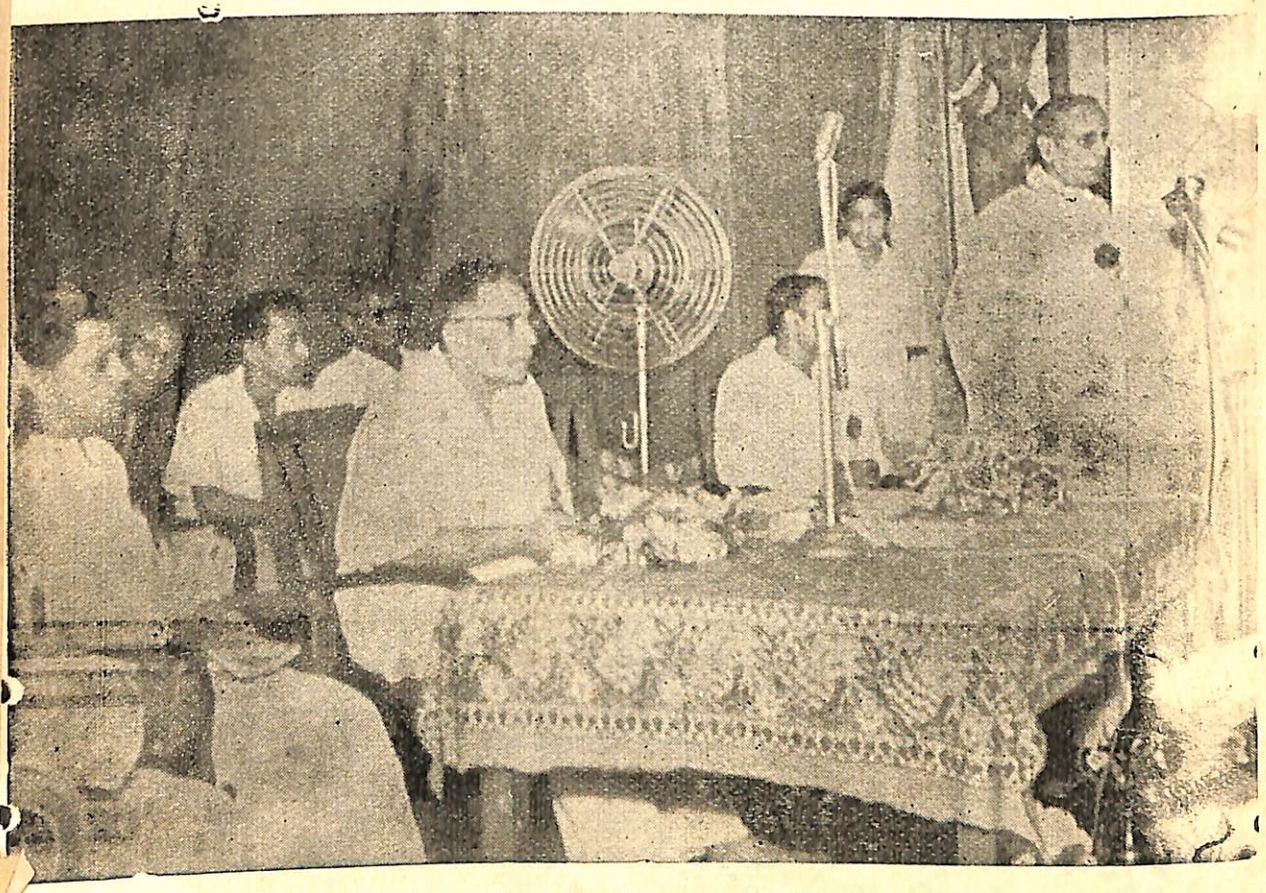
There are of course many causes that lead to indicipline such as frustration in university activities, unhealthy activities by politicians and



Chief Minister, Dr. Harekrushna Mahtab, inaugurating the sitting of the Council



Governor, Shri Y. N. Sukthankar, addressing the third sitt[illegible] the Orissa Branch Council of All-India Farmers' Forum



Development Minister, Shri Radhanath Rath, who is Chairman of Orissa Branch Council of the Forum, is addressing the meeting

economic axiety. It is difficult to discuss them all here, but if we can instil love and understanding in the heart of the student, we shall have gone a long way towards solving the problem.

Selection of Teachers

The next problem which I propose to discuss is the selection and training of professors and teachers in the University. We shall assume that the teachers are paid on the University Grants Commission's scale, and have been selected by expert committees in an objective manner, free from personal, communal or parochial prejudices, and their terms are fixed in accordance with the all-India scales approved by the Commission. But are the junior teachers in a university fit to teach the classes without any training or experience?

In the case of secondary schools we insist on trained teachers, but where universities are concerned, we let loose a young and brilliant graduate in a class of eighty or a hundred students, without any preliminary training. How to deal with large classes; how and where to begin; how to prepare adequately for the lectures; what is the value of dictating notes? These are questions which, in my view, could be dealt with better if some kind of training facilities are provided for the younger teachers.

One solution would be to appoint a young lecturer on probation and compel him to attend during his spare time, a brief course of instruction by an eminent and preferably retired educationist who would give him the benefit of his experience. It is clear that each subject lends itself to a particular method of teaching. Mathematics cannot be taught in the same manner as literature; nor can geology be dealt with the in same way as law. The particular subject has to be taught in a manner appropriate to its content, and yet there are certain broad principles which can be taught and learnt.

India is a country where a very large number of university teachers are needed and it is for consideration whether some training should not be provided for them. Apart from individual reading and training in a particular subject, I would recommend three classes of lecturers: (1) General principle of university teaching; (2) the preparation of lectures and methods of instruction; (3) how to deal with students.

Experience of Eminent Teachers

At the risk of being dubbed quixotic, I feel that an attempt should

be made to give the younger lectureres the benefit of the experience of eminent teachers. This experiment, even if it fails, is well worth a trial and its introduction in a few universities and colleges may lead to interesting results. The young lecturer should be induced to read a good deal on the teaching of his own subject; he should also study some broad principles of the theory of instruction in general and he should be given an opportunity to come in contact with the mind and personality of a great teacher and benefit by his experience. Whatever may be the practice in other countries, we cannot afford to allow our university students being taught by lecturers who suffer from inexperience and ignorance of the principles of teaching.

The fourth suggestion I would make is regarding the exchange of professors and students. This applies more in the case of students than in the case of teachers. In German universities, particularly in the case of Ph. D. students it is extremely easy for a student of one university to migrate for a time to another university and do some work under another professor.

Let us suppose there is a student working under a professor on a certain subject in the M. A. class of certain university, and the professor is convinced that there is another university where the student can profitably spend a year under another teacher. Facilities of this kind should be provided by the universities, and rules and regulations should not impede the intellectual progress of the student. Often there is the financial difficulty, a student in one university can hardly afford to go to another. In such cases, every effort must be made by the provision of stipends and scholarships to enable him to lead a fuller intellectual life and come under the influence of another first rate mind. This I consider to be one of the most needed reforms in our universities.

I remember some years ago the Rotary Club of Bombay offered a studentship to an Indian student for spending a year in an American university. Apart from other difficulties, such as those of syllabus, studies and examinations, it was found that in India the majority of universities did not allow an M. A. student to pursue his studies for some time at another university. The M. A. course is generally of two years' duration; no student was permitted to work at another university, say, for the first year, come back for the second year, and take his examination after the completion of his academic term.

Exchange of Professors

Apart from students, attention must also be given to the exchange of professors. In most universities today the teaching work is so heavy, that, after a few years, lecturers and readers would welcome a Sabbatical year of rest and study, during which they could do refresher courses. As most colleges and universities are unable to afford their teachers the luxury of a Sabbatical year, I suggest that an alternative scheme be formulated, whereby professors in a certain university could be exchanged with their counterparts in other parts of the country. This can be done most usefully in subjects like Economics.

To take an example, the Delhi and Bombay Universities have well established schools in the subject. It may be an advantage to exchange lecturers or readers on some topic of specialisation. Thus the students of one university will gain by coming in contact with a fresh teacher, and the teacher himself may like to work for a period under a professor who is a specialist in his chosen field.

Although not so favourable to the teachers as the Sabbatical year, this system would relieve the monotony of lecturing on the same syllabus to the same classes in the same atmosphere. The change may bring back to life a spark which may lead to fresh thought and an original approach to old problems. The financial problem could be solved by providing that each university should pay its own teacher as if he were doing his normal duty.

Place of Hobbies

The fifth suggestion relates to co-curricular activities. A number of universities realise the importance of debates, dramatics, musical clubs and athletics; but attention is not given to art as such. I think the time has come to give students the chance to do painting, classical music and the plastic arts. Apart from the regular university course in these subjects, if any, provision for developing one of the arts as a hobby should also be made. Our life in the modern world tends to become monotonus in the extreme; we have no time for the appreciation of beauty and art and for self-expression. If a university arts club could be promoted, it would greatly help students to develop their inborn talents, and they might begin to express themselves joyfully in song, dance, painting and sculpture.

The problem of hobbies is intimately connected with that of leisure, and the proper use of leisure is one of the important arts of

life. No one can be said to lead a full and balanced life until he has found the secret of employing his leisure usefully and joyfully. A university student is apt to forget that there are other things to do than cram his text books; a student far away from his home in a residential university may also have a sense of loneliness gnawing at this heart. It is therefore necessary to offer him a wide varierty of hobbies to rest his mind and give him that mental health which is so necessary for university life.

Some students have an excess of animal vigour and may like to play games; others may want to express their inner emotions through art and music, poetry and drama; some others may want to play about in a mechanical workshop or do carpentry or indulge in a manual craft like book-binding. It is up to the university authorities to give these students the widest opportunities in this respect.

METRIC UNITS FOR TRANSACTIONS

The State Government have notified that the use of metric weights will be compulsory in the municipal areas of Cuttack, Berham pur and Sambalpur with effect from October 1, 1960. The use of non-metric weights will be illegal with effect from that date. Further, the metric system has been introduced in the whole country with effect from April 1, 1960 and the Indian Railway have already changed over to the new system.

For a smooth change over to the new system it is desirable that the traders should try to familiarise themselves and their customers with the new system and utilise the units recommended in their transactions of trade from now.

The following metric weights have been recommended for use in retail as well as wholesale transations of various commodities:—

TABLE—I

Sl. No.	Commodity	Metric Units
(1)	Gold	1 gram (g)
(2)	Grocery Cardamoms, Pickles and Jams , dry mangoes	1 Kilogram (k g)
	Confectionary Biscuits, Sweetmeats	
	Textiles / textile Fibres Cotton yarn, damaged and second cloth (tents, rags, chindies etc.) raw silk, rayon, silk yarn, raw wool, wool manufacturers (when sold by weight)	
	Paints / Chemicals Paints (if sold by weight), indigo, liquid chlorine	

Hides, Skins, / Leather
Raw hides, leather (Hides and skins)

Metals
Silver, alluminium sheets, strips and circles, copper and brass wires and utensils.

Miscellaneous
Tea, meat, camphor tablets, senna leaves, mica.

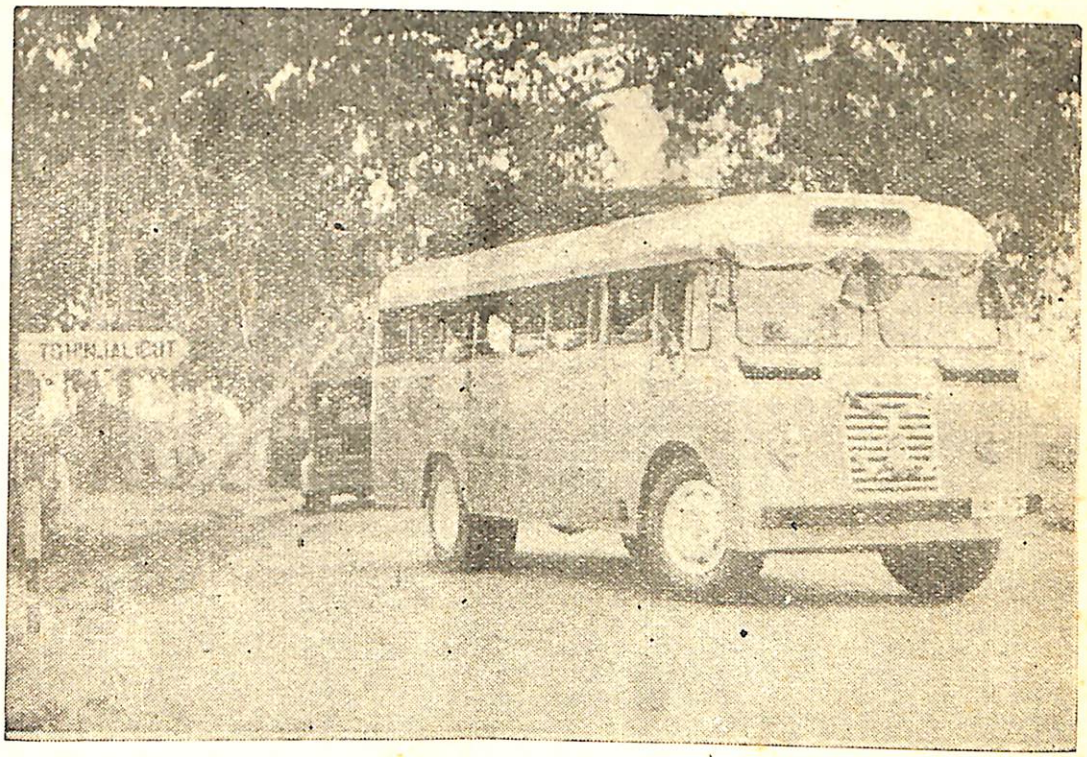
(3)	**Grain and Pulses** Rice, wheat, bajra, jowar, arhar, moong, masur, gram.	quintal (q) (100 Kilograms)
	Spices Black pepper, mustard, chillies, cloves, dhania, dalchini, malethi, turmeric, betelnuts, dry ginger	
	Plantation Products Coffee, rubber, cashewnuts, cashew kernels, tobacco (raw and manufactured)	1 quintal (1q) (100 kilograms)
	Forest Products Lac and lac products, gum benjamine and gum arbic, myrobalans, galnuts, soaphuts, avaram bark, konnam bark.	
	Textile / textile Fibres Raw cotton, raw jute, raw hemp coir yarn, jute twine	
	Oils, oilseeds / Oilcakes Vegetable oils like groundnut, linseed, castor, gingelly, mustard, coconut , etc., oil seeds like groundnut, gingelly, rapeseed, copra etc., groundnut cake, castor cake, sesamum cake, coconut cake.	
	Miscellaneous Sugarcane, vegetables, tamarind, garilc,	

	Non-Ferrous Metals Aluminium : ingots, bars, blocks, slabs, billets. Lead : ingots, Sheets and strips. Copper: ingots, blooms; slabs, cakes, tiles, bricks, billets, blisterbars and wirebars, rods, sections and pipes, plates, sheets, strips and circles.	1 quintal (q) (100 kilograms)
	Brass ingots, rods, sections. Pipes, sheets, strips, circles.	
	Zinc ingots, sheets, strips.	
	Tin blocks	
	Chemicals caustic soda, bleaching powder, glycerine, soaps, paper, salt.	
	Others Sugar, gur, ice, fish, etc.	
(4)	**Minerals** Iron ore, manganese ore, bauxite, coal.	One metric tonne (t) (100 kilograms)
	Iron & Steel pig iron and iron and steel manufactures, semis (Billets for rerolling etc).	
(5)	Cotton cloth (mill and handloom) silk and and rayon manufactures, woolen cloth.	1 metre (m)
(5*a*)	Jute cloth	100 meters
(6)	Jute carpets, coir mats and mattings, sheet glass etc.	One square metric (m2)
(7)	Timber	One cubic metre (m3)
(8)	Paints (when sold by measure), spirits.	One litre (1)
(9)	Jute bag	

TABLE—II

(1)	Foodgrains, cereals, pulses, spices etc.	1 kg.
(2)	Oil for cooking	1 kg. or 1 litre depending upon prevalent practice.
(3)	Ghee	1 kg. or number depending upon prevalent practice.
(4)	Fruits	1 kg. or number depending upon prevalent practice.
(5)	Vegetables, meat, fish, sweetmeats etc.	1 kg.
(6)	Tea, coffee, sugar, salt, etc.	1 kg.
(7)	Milk	1 liture
(8)	Bread	1 kg.
(9)	Cloth and related materials	1 metre
(10)	Prepackaged materials	Preferably in packages of sizes corresponding to the prescribed commercial weights and measures.

Chief Minister, Dr. Harekrushna Mahtab, is laying the foundation stone of a bridge over Patia Nullah near Purushottampur in Ganjam ditrict



The first Road Transport bus which moved over Sorada—Bodogodo—Serogodo—Hinjilikatu—Tarini Hill road in Ganjam district after it was inaugurated by Chief Minister, Dr. Harekrushna Mahtab. The Chief Minister and Transport Minister, Shri Brundaban Nayak travelled in this bus for a distance

Chief Minister, Dr. Harekrushna Mahtab laying the foundation Stone of a bridge over the Rushikulya river near Purushottampur in Ganjam district

The demarcated site for the new Rushikulya bridge near Purushottampur

News To Note

"SKELETAL HOUSE" FOR WORKERS

The Union Ministry of Works, Housing and Supply has laid down standards for a "skeletal house" for providing accommodation including basic amenities for industrial workers and slum dwellers. The "skeletal house" is intended to be a unit between a pucca house and an open developed plot. It will meet the requirements of the intermediate category of eligible industrial workers and slum dwellers who cannot afford to pay the rent of a pucca house, but are willing to pay a rent of Rs. 8/- per month and are averse to live in a self-built hut on an open developed plot.

Under the Subsidised Industrial Housing and the Slum Clearance Schemes of the Ministry, housing accommodation is to be arranged for industrial workers and slum dwellers in two ways: (1) Wherever practicable and where the rent-paying capacity of workers and slum dwellers is extremely low, the scheme provides for allotment of developed and demarcated plots with essential services, a pucca latrine and a bathing platform in addition to about Rs. 150/- worth of building material to enable the allottees to build their own houses on a self-help basis under the technical guidance of the State Governments. Under this arrangement, the standard cost per family is Rs. 900 to Rs. 1,250 and the subsidised rent is Rs. 2/- to Rs. 3/- per month.

The scheme envisages pucca houses for those who can afford to pay a higher rent. The minimum cost per family of a small single-story two-room house is Rs. 3,300 and the subsidised rent ranges from Rs. 12·50 to Rs. 10·50 depending on whether the subsidy is 50 per cent or 62½ per cent respectively.

Communication to States

In their communication to the States commending the construction of skeletal houses, the Ministry says that where single storey construction

is contemplated by any of the approved agencies under the Subsidised Industrial Housing and the Slum Clearance Schemes, it would be desirable that in the first instance pilot projects are undertaken to ascertain the utility and acceptability of the houses before undertaking large-scale construction.

Minimum Accommodation

The minimum accommodation in a skeletal house will be 232 sq. ft. enough for a two-room tenement. The construction agency will provide (*i*) a developed plot with external services such as roads, parks, drainage, water supply, sewerage, street lighting, horticulture etc., (*ii*) a *pucca* latrine (with a roof and door shutters) 12 sq. ft., (*iii*) a *pucca* bathing and washing platform 16 sq. ft. with a water tap wherever possible and (*iv*) the foundation, plinth and the roof supported by pillars to form a structurally stable skeleton for a small two-room house with a minimum floor area of 204 sq. ft. for the rooms.

The occupant will be expected to put up pannelling or some kind of filling in the space between the pillars, doors and windows, enclosure to the bathing platform and flooring.

Financial Assistance

Financial assistance for the time being will be based on the following overall ceiling costs, including the cost of land and development: (*i*) in cities other than Bombay and Calcutta Rs. 2,000/ and (*ii*) in Bombay and Caclutta Rs. 2,900/-. The standard rent per month of a skeletal house in cities other than Bombay and Calcutta will be Rs. 7/- or 8/- and in Bombay and Calcutta Rs. 10/- or 12/-. The specifications take into account local climatic conditions and use of local building materials. The houses are expected to have a life of about 40 years.

SURADA-BODOGODO-SHERGODO HINJILIGATU TARINI HILL ROAD

The road from Surada to Tarini Hill, via. Bodogodo, Shergodo and Hinjilikatu is not an all-weather one. Its condition was not good. The length of this road is about 45 miles. There was pressing demand from public to improve it. It was included in the Second Five Year Plan for improvement. The Government have approved a total estimated cost of Rs. 19·19 lakhs for the project. For facility of work it has been divided into four reaches: (1) Surada to Bodogodo, (2) Bodogodo to Shergodo, (3) Shergodo to Hinjilikatu and (4) Hinjilikatu to Tarini Hill.

Work in the first reach is nearing completion. Work on Second and

Third reaches are also in progress and attempt is being made to complete them early. Work on the fourth reach has also started this year. There are two bridges in this reach across Patia and Jayamangal Nallas. Work on these bridges and also on small culverts have been taken up. The foundation stone of these bridges has been laid by Dr. Harekrushna Mahtab, Chief Minister of Orissa on May 30, 1960.

The people of this area enthusiastically co-operating for completing the raod. They have given their valuable agricultural lands to the Government free of cost. They are also executing job works at a comparatively low rates. It is expected that this project will be completed comparatively in short time.

There is popular demand to connect Tarini Hill by road to Ganjam Bridge on Cuttack-Berhampur road. The total length of this portion of the road is 13 miles. It will run close to the right bank of the river Rushikulya. At present only five miles of this road from Ganjam Bridge to Portlampur has been metalled and the rest is only a cart track. The total cost to improve this road to all-weather standard will be about Rs. 8 lakhs. This project has not been included in the Second Five Year Road Development Programme.

RUSHIKULYA BRIDGE AT PURUSHOTTAMPUR

In Ganjam District, Berhampur, Aska, Purushottampur, Chatrapur and some others are important towns. Aska and Chatrapur are connected by road to Berhampur. But there is no direct route facility to Purushottampur. If one is to come from Purushottampur to Berhampur he has go all the way to Huma and then to Berhampur or from Purushottampur to Aska and then to Berhampur. As Berhampur is the main town of the district it is desirable that important towns and areas should be connected with it by all-weather roads. The construction of a bridge across Rushikulya near Purushottampur will remove these difficulties and the west vast agricultural area on the left side of the Rushikulya in Kodala and Chatrapur taluks will be directly connected with the main trading centre at Berhampur. This was felt long ago and now steps are being taken to begin work.

The total length of the bridge proper will be 964 feet. It has 12 spans of 80 feet each. The average height of pier above the river bed is 14·5 feet. It will have a foundation for three

piers and one abutment and well foundations for the rest of the piers and abutment. The cost per running foot is Rs. 1007/-.

The foundation stone of this bridge was laid by Dr. Harekrushna Mahtab, Chief Minister, Orissa on May 30, 1960.

ORISSA CHIEF IRON ORE PRODUCING STATE

The production of iron ore during March, 1960 was estimated at 830,000 tons, according to the Indian Bureau of Mines.

This brings the total output during January-March, 1960 to 2,553,000 tons which was higher by 31 per cent as compared to the output of 1,951,000 tons during the corresponding period of the preceeding year.

Orissa was the chief producing state with an output of 323,000 tons followed by Bihar with 235,000 tons. Mysore and Madhya Pradesh recorded an output of 112,000 tons and 78,000 tons respectively while the output from Bombay was 42,000 tons.

During the month despatches of iron ore for consumption in the iron and steel plants totalled 591,000 tons while the despatches to the export market were 185,000 tons.

LIST OF RADIO INSPECTORS
AND
THEIR AREA OF OPERATION

District		Radio Inspector	Location of Workshop	Area of operation
CUTTACK	:	1. Shri Prahlad Ch. Das	Cuttack—	Cuttack Sub-Dvn. (South of Mahanadi).
		2. Shri Santosh Ku. Patnaik	Athgarh—	Cuttack Sub-Dvn. (North of Mahanadi) Narasinghpur Sub-Dvn.
		3. Shri Prakash Ch. Mohanty	Jajpur—	Jajpur Sub-Dvn.
		4. Shri P. K. Khadanga	Kendrapata—	Kandrapara Sub-Dvn.
PURI	:	1. Shri Birendra Ku. Roy	Puri—	Puri Sadar Sub-Dvn.
		2. Shri Udaynath Misra	Khurda—	Khurda & Bhubaneswar Sub-Dvn.
		3. Shri Bhimram Misra	Nayagarh—	Nayagarh Sub-Dvn.
BALASORE	:	1. Shri Brajaswar Das Mahapatra	Balasore—	Balasore & Nilgiri Sub-Dvn.
		2. Shri B.V. Gopal Krishna	Bhadrak —	Bhadrak Sub-Dvn.
GANJAM	:	1. Brajanarayan Baboo	Chatrapur—	Parlakimedi Sub-Dvn. Chatrapur Sub-Dvn. (excluding Polsora and Hinjili Blocks non-Block areas of Boirani and Purushottampur P. S.) Berhampur Sub-Dvn. (excluding Digapahandi Block).

	2. Shri Tara Prasad Rath	Bhanjanagar—	Ghumasar Suh-Dvn· Polsora & Hinjili Blocks, non-Block areas of Boirani and Purushottampur P. S. of Chatrapur Sub-Dvn. Digapahandi Block of Chatrapur Sub-Dvn.
DHENKANAL :	1. Shri Sourendra N. Praharaj	Dhenkanal—	Dhenkanal district.
SAMBALPUR :	1. Shri Nityanand Das	Sambalpur—	Sambalpur district.
SUNDERGARH :	1. Shri Purna Ch. Patnaik	Sundergarh—	Sundergarh district.
MAYURBHANJ :	1. Shri Devendra N. Mahapatra	Baripada—	Mayurbhanj district.
KEONJHAR :	1. Shri Bipin Chandra Patnaik	Keonjhargarh—	Keonjhar district.
KORAPUT :	1. Shri Kailas Ch. Mahapatra	Koraput—	Koraput District.
KALAHANDI :	1. Shri Abdul Khalil Khan	Bhawanipatna—	Kalahandi district.
BOLANGIR :	1. Shri Artatran Patnaik	Bolangir—	Bolangir district.
PHULBANI :	1. Shri Bimal Ku. Sahoo	Phulbani—	Baudh-Phulbani district.

THE BARMUL PASS—ITS HISTORICAL AND ECONOMIC IMPORTANCE

Sri Ashwini Kumar Dalua, M. A.

A tree is known by the fruits it bears. The Mahanadi is known for the 'Barmul' pass through which it flows.

The Mahanadi is, as its name implies, a great river, with a length of 533 miles. As soon as the river enters Orissa, leaving M. P. well back the Mahanadi widens gradually. It is now a river of great magitude, having a breadth of more than a mile in flood time in Sambalpur district. From Padmapur to Sambalpur, the bed of the Mahanadi is open and sandy with banks usually low, bare and unattractive entering a series of rocks which make the river though not un-navigable, yet difficult for operation of the boats. Further down, its course is broken by rapids in several places and interrupted by great rocks which have been described as "the terror of boatmen—standing up in midstream and realising the exact notion of Sylla and Charybdis." (1)

This sort of course is followed by the river almost without break till the gorge is reached. From Sonepur the Mahanadi pursues a tortuous course among ridges and rocky crags and rapids towards the east upto Dholpur. Piercing through the E. Ghats like a gigantic saw the Mahanadi flows eastward through a groge South-west of Tikerpara in Angul subdivision of Dhenkanal district, the river suddenly narrows down from its wide course and enters the gorge, sweeping along through the Barmul pass in the ex-state of Daspalla (now in Puri district.).

This gorge is called the Barmul gorge which takes its name from the village of Barmul in Daspalla on the right bank of the river. But it is more commonly known as the 'Satkosia Gond' (Gond in Oriya means gorge); the gorge being 14 miles or 7 kros long. Both sides of the gorge are fairly wooded with preciptious peaks of 1500 to 2500 ft. in height. The "Goaldeo" and the "Baigania" wihch stand out as the gate-keepers of the gorge at the southern extremity are 2506 and 2350 feet high respectively. The river

1. Sir Grant, C., Central Provinces Gazetteer, Nagpur, P—1870.

winds round these hills, crags and peaks which overhang its channel.

It is very difficult to note here the origin of this vast gorge. But there is absolutely no doubt that the river has been the sole responsible factor in carving out this gorge. Open eyes do not find any trace of the rift origin of the gorge. The fourteen-mile long gorge is the result of the vast eroding work of the river Mahanadi in its mountainous course. A fantastic myth narrates the formation of the gorge in the following manner—In Puranic days there was a famous sage named Sukanti. After practising much penance, the sage could satisfy Bhagirathi and persuade her to flow in Orissa as the Mahanadi or the Great River. But the river was checked by the hills on its way to the sea. So the people were not in a position to be benefited by the river. Sukanti once more engaged himself in penances. Lord Indra was pleased with him. He broke the hills which obstructed the river with the help of his 'bajra' (the renowned weapon of Lord Indra). Thus the river found its way through the hills in a gorge. (2)

The channel carved and by the voluminous water through the pass is of great depth. At one part the channel is so narrow (not more than 400 yards) that the water rises 70 ft. at time of flood. The natural beauty of the country along this gorge is exceedingly fine. Vast ranges of forest and timber-clad hills with their associated wild animals, though make the region a dangerous one, the calm and quiet surrounding punctuated by the thrilling dance of the peacock and the occasional sweet crowing of the wild cocks overwhelm the passers-by in joy. But to the utter displeasure of the beauty-seekers comes the piercing sound of the bullet and the consequent innocent and helpeless cry of the wild habitants of the jungle. Hundreds of hunters come here for a wild hunt and enjoy a fine time. During the rains the gorge seems to be a dangerous one with its voracious crocodiles ready for a gulp. But in the summer and winter seasons, the long expanse of water of the channel overhung by the wide blue sky above, and the green walls of the hills around looks like a lake stealing the mind of an on-looker. The gorge presents a contrast during the hot weather because, at either end of the gorge the river dwindles away to a few isolated currents running shallow between vast reaches of arid sand.

2. Mahapatra, B., Mahanadi (Oriya).

The Barmul pass has contributed much towards the political history of Orissa. Prior to the conquest of Orissa by the English in 1803, the Marathas were the ruling chief of the country. The conquest of Orissa by the English formed a part of the great campaign against the Marathas in Central India during the governor-generalship of Lord Wellesley. It was planned by Col. Harcourt to capture Cuttack first and to make his way through the Barmul pass, the key to Berar to cooperate with Lord Wellesley there. (3) The force under his command started from Ganjam and entered Cuttack on the 8th October, 1803. (4) From here a part of the force was despatched under Major Forbes to force the Barmul pass. Here the Marathas made a last stand against the British. On the 2nd November, 1803 Major Forbes forced the pass and routed the enemy force. (5) The Marathas escaped with difficulty across the hills. Immediately, the Raja of Boud submitted and the British entered into a treaty engagement with him on the 3rd March, 1804. (6) A treaty engagement was also executed by the then Raja Guru Charan Bhanj Deo of Daspalla to the E. I. Company. The Second clause of the treaty reads—"I hereby engage to preserve in safe keeping of the 'Ghattee' or pass called Barmool, and if at any time troops, on horse or foot, without the orders of the said Company's Government, endeavour to cross the said pass, I engage to prevent them so doing. In case any large body of troops should endeavour to force the pass, I will forward immediate intimation of the circumstance to the constituted authorities, and meanwhile, till such time as the Government troops shall arrive on the spot, I will oppose the forcing of the pass with my own forces". (7) Thus the English became the complete masters of Orissa and this

3. Hunter, W. W. A Statistical account of Bengal (Cuttack & Balasore districts), Volume—XVIII, P—197,1877. Trubner & Co. Londan.
4. Op. Cit; Hunter, W. W; P—198.
5. Ramsay—Cobden, L. E. B; Gazetteers of the Orissa Feudatory States, P—159,1910.
6. Ibid; P—159.
7. A Collection of Treaties, Engagements, and relating to India and neighbouring countries, Vol.—I compiled by C. V. Aitchison, P—115,1876. Reprinted at the Foreign office Press, Calcutta.

   Other reference—Toynbee, G. A. sketch of the history of Orissa from 1803 to 1828, P—5-6, Bengal Secretariate Press, Calcutta, 1873.

conquest facilitated them by joining the British Empire of India. The broken walls of a dilapidated building stand prominently even now in the Barmul village. This building might have been used as a rest house of the then troops guarding the pass.

The economic importance of the Barmul pass is manifold. The Mahanadi Valley Development Scheme consists of three dams at Hirakud, Tikarpara and Naraj. The first of these is complete now. Then comes the turn of Tikarapara Dam. which is proposed to be built at Barmul over the Mahanadi. The preliminary works of digging tunnels, wells etc. were started here long back in 1950. But due to lack of Government enthusiasm and fund the progress of work at Barmul was stopped for indefinite period. Moreover, it was known that unless the dam at Hirakud was complete, the work at Tikerpara could not be undertaken. As the result the tunnels have been providing with suitable residences for venomons serpents and other wild animals. However, the observatony at Barmul is engaged in recording the speed of the current and the depth of the water of the Mahanadi and observing weather elements. The bungalow helps the official tourists as a resting place.

The Barmul pass is the narrowest part of the river in its middle course. This will definitely favour the construction of the dam from economic point of view. Generation of hydro-electricity will be the principal aim of the Tikerpara Dam. Besides this, there will be enough scope for flood control, navigation and fisheries. The gorge with its deep water and natural beauty now attract holiday seekers and adventurous hunters. When the dam is built, the importance of the place as a pleasure resort will be increased four-fold. A fine game sanctury with various animals can be had here. Communication is the greatest drawback in a backward state like Orissa, for the industrial and economic development. A road has been constructed along the left bank of the river Mahanadi, and in Summer days, Government buses from Cuttack run upto the eastern extremity of the Barmul pass. When this road will be a metalled one, the importance of the gorge will increase. Thanks to the Government, the road-bridge on the Mahanadi is under construction now. Attention must be paid towards the development of the road running along the right bank of the Mahanadi. This is one of the oldest roads in Orissa, but its fate is sealed due to lack of care.

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