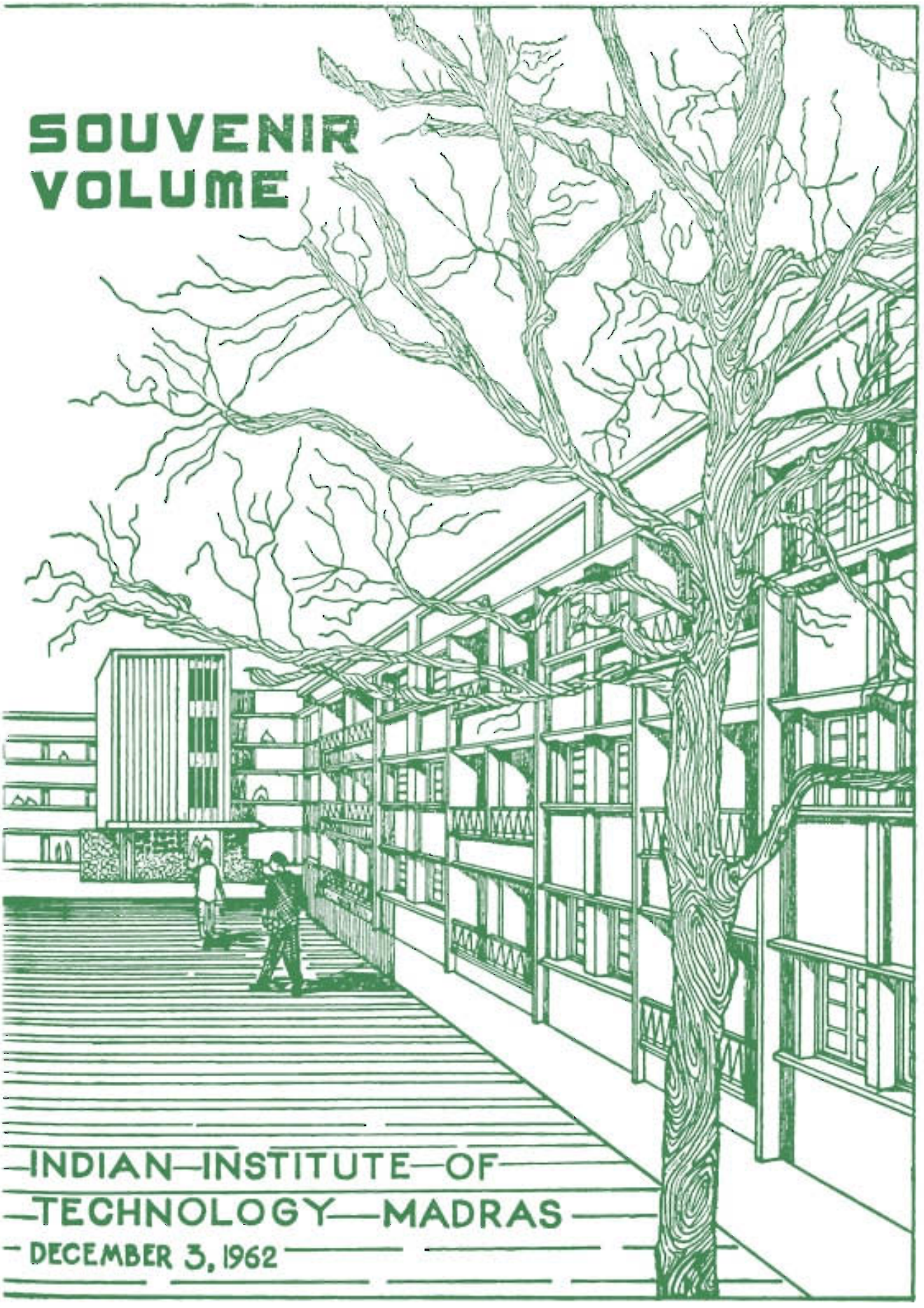
SOUVENIR VOLUME



INDIAN INSTITUTE OF TECHNOLOGY MADRAS

DECEMBER 3, 1962

SOUVENIR VOLUME

to commemorate the visit of

HIS EXCELLENCY Dr. HEINRICH LUEBKE

President of the Federal Republic of Germany

to the

INDIAN INSTITUTE OF TECHNOLOGY, MADRAS

on

DECEMBER 3, 1962

to lay the

FOUNDATION STONE

Edited by the Editorial Board, Souvenir Volume (Prof. R. Krishnamurti, Convener; Shri R. Natarajan, I.A.S., Dr. M. S. Vairanapillai, Dr. V. Anantharaman, Dr. N. Klein, Members), published by the Indian Institute of Technology, Madras-36, and printed by The Diocesan Press, Vepery, Madras-7.

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Messages

I am happy to know that the President of the Federal Republic of Germany, who is our honoured guest in India, is laying the foundation stone of the Indian Institute of Technology in Madras. The establishment of this Institute has been made possible by the generous financial and other assistance of the Federal German Republic. It is a visible demonstration of German friendship for India and I have no doubt that our young men will profit by the guidance of German teachers in collaboration with their Indian colleagues. My best wishes for the success and continued development of the Institute.

DR. S. RADHAKRISHNAN
President of India

That the Federal President, Dr. Heinrich Luebke will also visit the Indian Institute of Technology at Madras while in India, gives me real pleasure, as I have only the most pleasant and grateful memories of my visit there. The collaboration of German and Indian Professors there seems to me to have built up an institution which should certainly bring about a development and revival of the technical abilities of the Indian people. You have my best wishes.

DR. THEODOR HEUSS
Former President
Federal Republic of Germany

It is a special pleasure for me to transmit my congratulations to the Indian Institute of Technology at Madras for today's ceremonies. In 1956, on the occasion of the visit of Prime Minister Nehru to the Federal Republic, an agreement was reached between us for the foundation of this Institute. Unfortunately, the ceremony today is overshadowed by the events on India's Northern frontier. I hope that these differences may soon be satisfactorily settled and so do the German people whose sympathies are with the Indian people. May the students and staff be given the opportunity to pursue peacefully those tasks which our two Governments set themselves in founding this Institute. I wish with all my heart that the Institute of Technology may become a symbol for the friendly relations between our two peoples.

DR. KONRAD ADENAUER
Chancellor
Federal Republic of Germany

I am glad to know that H.E. Dr. Heinrich Luebke, President of the Federal Republic of Germany, will lay the foundation stone of the Indian Institute of Technology on 3rd December. We are sincerely grateful to the German Federal Republic for their invaluable assistance in establishing this Institute. Association with the German people in the great work of economic development of our country must be a source of inspiration for us. In spite of the unspeakable destruction as a result of the last war, they were able to build up their country within a very short time, and make it one of the most advanced countries of the world. I hope those who are connected with the Institute will follow their example and will strive their utmost, with intelligent, honest and hard work to harness all that modern technology has to offer to the welfare of our people. I wish your function success.

DR. ZAKIR HUSSAIN
Vice-President of India

I am pleased to note that the Indian Institute of Technology, Madras, which was established only 3 years ago, has made rapid progress in the achievement of the purpose for which it was started. The need for such an Institute is all the greater now when the situation in the country demands the extension of programmes for training of technical personnel. I am glad that the foundation stone of this Institute is being laid by our distinguished guest, the President of the Federal Republic of Germany, Dr. Heinrich Luebke. I wish the Institute all success.

SHRI JAWAHARLAL NEHRU
Prime Minister of India

The visit of the President of the Federal Republic of Germany to your country takes place at a time when the Indian Institute of Technology nears its completion. Indian and German professors, lecturers and technicians have been working together for several years at this Institute to give the coming Indian generation that knowledge which will enable it to build up and supervise production centres.

The co-operation between our two peoples in the sphere of scientific-technical education evolved at the Indian Institute of Technology should also be an example for our future endeavours whenever it is a question of contributing to the economic development of other nations by promoting technical knowledge and experience. I herewith transmit to the Indian Institute of Technology my sincerest congratulations for this day. May this Institute provide many young Indians with the technical as well as the intellectual knowledge indispensable to solving the great developmental tasks of the country.

PROF. LUDWIG ERHARD
Minister of Economics
Federal Republic of Germany

Today is a landmark in the development of relations between our two peoples in the scientific and cultural sphere. On this day, on the occasion of the State visit of the President of the Federal Republic of Germany a memorial tablet will be unveiled, testifying to coming generations the mutually constructive work of our two peoples. On this memorable day I would like to express my heartiest congratulations. May this educational institution contribute towards training the engineers, so urgently required for the economic development of your country. Even though pleasure on this significant day is dimmed by the events in the North of your country, be assured that during these critical hours, the Federal Republic of Germany, as India's friend, shares her troubles and needs. To the Board of the Institute of Technology, its Indian and German professors, to its lecturers and staff members as well as to all its students I would like to send my best wishes for future mutual work.

DR. GERHARD SCHROEDER
Minister of Foreign Affairs
Federal Republic of Germany

Today, at the unveiling of this memorial tablet at the Indian Institute of Technology on the occasion of the visit of the President of the Federal Republic of Germany, the erection of this educational establishment is almost completed. This Institute, built by our Indian friends with the contribution of the Federal Republic, is of special importance. It has been established in a state which is not only concerned with pointing out its own problems and solving them, but which also, in spite of the great tasks awaiting in her own country, gives a shining example by delegating experts for work in other developing countries. Thus, through the initiative and application of the Indian students, the work of this Institute—the largest project promoted by the Federal Republic of Germany within the frame-work of technical collaboration—will not only contribute to the development of one, but of many countries. It is therefore a special pleasure for me to transmit to the Indian Institute of Technology my best wishes for the future.

WALTER SCHEEL
Minister for Economic Cooperation
Federal Republic of Germany

I am very glad to know that the foundation stone of the Indian Institute of Technology, Madras, will be laid by His Excellency the President of the Federal Republic of Germany on the 3rd December, 1962. On this happy occasion, I send my greetings and good wishes to the management, the staff and the students.

The Indian Institute of Technology, Madras, is one of the four Higher Technological Institutes set up by the Government of India to meet the requirements of high grade engineers and technologists. Engineers and technologists are necessary for the successful implementation of the schemes of industrialization that are being taken up. The Institute is particularly fortunate in securing the collaboration of West Germany, one of the most highly industrially developed countries in the world today.

Our thanks are due to the Government of the Federal Republic of Germany for the very valuable assistance offered for the establishment of this Institute. The Institute has entered its fourth year of existence and it has shown remarkable progress since its inception. I understand the entire project costing about 8 crores of rupees will be completed by 1965-66.

I wish the Indian Institute of Technology all success.

BISHNURAM MEDHI
Governor of Madras

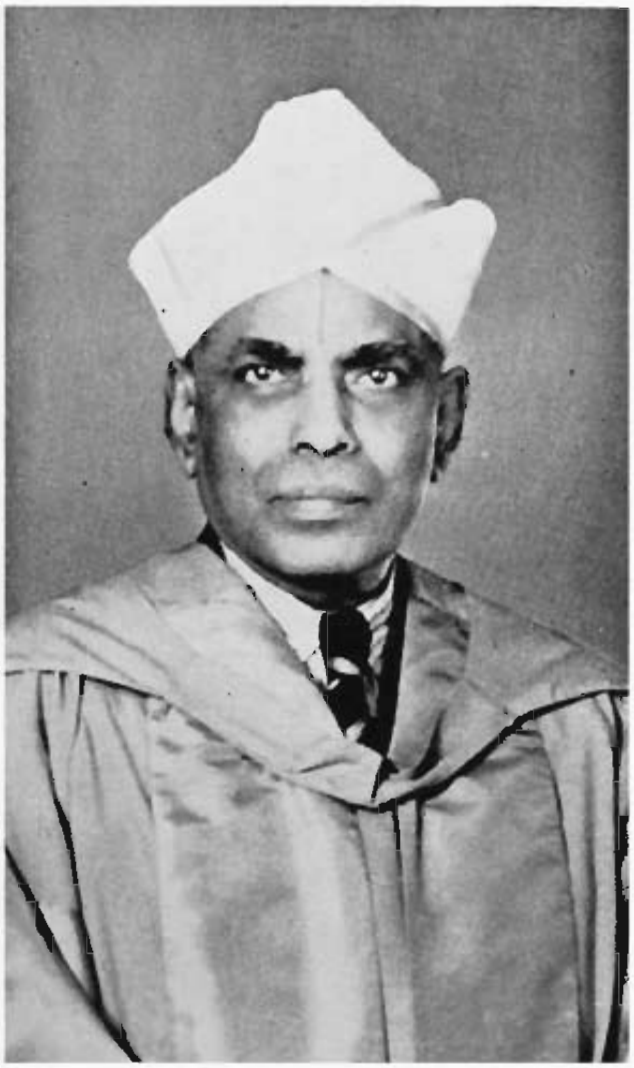
The Indian Institute of Technology at Guindy, Madras, is one of the four institutes of higher technological education inaugurated by the Government of India, and started functioning in 1959. The Institute has had the kind co-operation and assistance of the Federal Government of Germany and owes a good deal of its rapid development to the interest evinced by the West German Government. The visit of His Excellency the President of the Federal Republic of Germany was of great significance and it helped to bring closer together the ties of friendship and mutual co-operation between the two Governments. Having been associated from the beginning with the planning, the construction and the development of this Institute in particular, I should pay my tribute to the Director and his staff and to the Engineering Section for the valuable work that they have done. I am sure that this Institute will, ere long, function as a great centre for post-graduate education in the field of engineering and technology. I trust that this will be a lasting memorial to the spirit of friendship and co-operation evinced by the two Governments.

DR. A. L. MUDALIAR
Chairman, Board of Governors
Indian Institute of Technology
Madras

DR. HEINRICH LUEBKE

President of the Federal Republic of Germany

PROFESSOR B. SENGUPTO
Director



DR. A. L. MUDALIAR

Chairman, Board of Governors

Messages were also received from

The Chief Minister of Mysore.

The Chief Minister of Madras.

The Home Minister, Government of Madras.

The Finance Minister, Government of Madras.

The Minister for Industries, Government of Madras.

The Education Minister, Government of Andhra Pradesh.

The Chairman, University Grants Commission.

The Director-General, Council of Scientific and Industrial Research.

The Chairman, Board of Governors, Indian Institute of Technology, Bombay.

The Directors of Technical Education, Madras and Kerala.

The Secretary, Ministry of Scientific Research and Cultural Affairs.

The Directors of the Indian Institutes of Technology, Kharagpur, Bombay and Kanpur.

The Director of the Indian Institute of Science, Bangalore.

WELCOME ADDRESS BY DR. A. L. MUDALIAR

Your Excellencies, Hon'ble Ministers, Ladies and Gentlemen,

As Chairman of the Governing Council of the Indian Institute of Technology, I deem it an honour and a privilege to be given this opportunity to welcome His Excellency and the distinguished guests who have come here on a visit to our city and to this institution. We have been looking forward to this day—sometimes with anxiety—and we are glad indeed that it has been possible for us to welcome His Excellency to this institution. Events have occurred recently which have shocked the conscience of the world. The unprovoked and unexpected aggression of a neighbouring country on a peace-loving nation such as India, which had all the time been considering itself to be on terms of friendship and fellowship with the country concerned, has been a great shock to the people of this country. But the remarkable manner in which freedom loving countries have rallied to help India in its hour of trial and tribulation has strengthened our faith and made us feel that the eternal principles of justice and fair-play and the rule of law will ultimately triumph, whatever may be the initial reverses. May I, on behalf of the academic circles of this country, convey to Your Excellency our grateful thanks for the manner in which Your Excellency, your Government and your countrymen have so magnificently expressed their sympathy and support to this country in our hour of trial.

There are many links that bind India to your great country—links which have been forged by the great scholars who have studied our ancient classics and translated them into German and made them known to the world at large ; links through which our scholars have had unparalleled opportunities to study in your country ; and links by which your country has given us every possible help in our plans for the development of this country. I need hardly inform this audience that this Institute owes not a little of its progress to the generous assistance given by Your Excellency's Government, not only in the shape of equipment but what is far more important, by helping us with the personnel required for the several studies which are being conducted at this Institute.

Towards the close of the Second World War, a committee was constituted by the then Government of India to review the position with regard to facilities for technological training in the country and to suggest ways and means by which such training may be stepped up. This committee, which was under the chairmanship of the late Mr. N. R. Sarkar, suggested that apart from other measures, there should be four Institutes of Higher Technology opened in the country in the east, north, south and west. This recommendation was approved by the Government of India and the first of these institutes was started in Kharagpur and is now in full working condition, thanks to the co-operation of one of your distinguished Professors, Dr. Kraus, who helped not a little in achieving this object. This

Institute at Kharagpur started functioning in the year 1951. The next Institute was established in the west near Bombay and it began its work in 1958 while the Indian Institute of Technology, Madras, was formally inaugurated by Prof. Humayun Kabir in 1959. The fourth Institute began to function in July 1960 at Kanpur.

We deem it a matter of considerable gratification that this Institute is deriving much of its inspiration from such a highly developed country as West Germany. The Government of the Federal Republic of Germany offered to our Prime Minister, during his visit to that country in 1956, technical assistance in the establishment and development of a Higher Technological Institute in India. The assistance offered by Your Excellency's Government consisted of:

(1) scientific and technical equipment from Germany of the value of Rs. 1.8 crores;

(2) the supply of 20 German Professors and 5 Foremen for teaching and training;

(3) facilities for the training of 20 Indian personnel selected, in German Technical Universities.

The question of the location of this Institute was for some time under consideration and I am glad to say that through the helpful co-operation of the Chief Ministers of the Southern States in India, it was possible finally to come to an agreed conclusion that the Institute may be located at Madras. The generous offer of the Government of Madras of an area of over 600 acres of land adjacent to Raj Bhavan made it possible for us to secure, as Your Excellency will doubtless have seen, a most valuable site in the best surroundings possible. I should like to express my grateful appreciation to the Government of Madras and particularly to the Chief Minister and the then Finance Minister, whom I am happy to see here, as well as to His Excellency the Governor of Madras for the manner in which, at all times, they have helped to achieve our ambition of founding this Institute. In fact, the continued close co-operation that has been extended to us by the Government of Madras has been a source of inspiration and has enabled us, within a short period of time, to provide many of the buildings and other amenities required.

This Institute, which was originally registered as a Society, has since been given the status of an 'Institution of National Importance' under an Act of Parliament passed in 1961. The Institute offers facilities for under-graduate training and for advanced post-graduate studies and research in a wide range of subjects of special importance for the development of the industrial potential of this country. We have at the present moment full-fledged Departments of Physics, Chemistry, Mathematics, Humanities, Civil, Mechanical, Electrical and

Chemical Engineering and Metallurgy. Thus, with the simultaneous development of the training in essential basic sciences, we feel sure that the progress of technological training in this Institute will be of a high order and that, with the close co-operation of the different Departments, research will progress on sound lines. The Institute has at present 600 students on its rolls and the whole of the campus is developing into a sort of satellite city with amenities of a post-office, a branch of the State Bank of India and internal transport system. All the Professors, German and Indian, are housed in the buildings constructed in the premises so that there can be close liaison at all times between the students, particularly the post-graduate students, and the Professors concerned. When completed, the Institute campus will be a self-sufficient township with 10 hostels, 5 workshop buildings, 4 instructional buildings and an administrative block of 5 storeys, a primary and a higher school, a hospital, guest house, staff and ladies club, a bazaar, swimming pool and boating club. It will thus be seen that every effort is being made to give all the necessary facilities and amenities to the residents of this township so that they may not be inconvenienced in any manner in their day to day work.

The rapid development of this Institute would not have been possible without the excellent co-operation of the Federal Republic of Germany, the Government of India and the Government of Madras. The presence of distinguished members of the professorial staff from your country has been a source of stimulus and we are deeply grateful to them for their superb services in the cause of higher technological education.

We deem this institution as one of the most important and fruitful of the Indo-German Projects in this country. And the fact that the former President, Dr. Theodor Heuss paid a visit to this Institute late in 1960 and that the present President, His Excellency, Dr. Luebke, has honoured us with his presence on this occasion to lay the foundation stone of this Institute, gives us genuine pleasure and encourages us in the task which we have taken on hand.

We are very much indebted to Dr. Kraus, a distinguished mechanical engineer and one-time Director of the Indian Institute of Technology, Kharagpur, who has joined us as Adviser to the Government of India for the development of this Institute. To Dr. Gerhard Fischer as well as other members of the German Consulate, we wish to express our thanks for the interest they have taken and for keeping in close touch with the progress of this Institute. May I say a word about the Hon'ble Minister, Mr. Humayun Kabir, who is in charge of Scientific Research and Cultural Affairs. He has evinced a personal interest in the development of this Institute and has at all times helped us with his wise guidance.

As Chairman of the Governing Council, it is my duty and privilege to express to the Director of this Institute, Mr. Sengupto, to the Registrar, Mr.

Natarajan, and to all the members of the staff my sincere thanks and appreciation for their very devoted services in the development of this Institute. The building programme would not have been possible of execution but for the indefatigable labours of the Superintending Engineer, Mr. Ramaswamy, and his colleagues. I am happy to bear testimony to the fact that a sincere spirit of co-operation and a keen desire to make this Institute one of the best of its kind is the key-note of everyone attached to this Institute. I hope and trust that this Institute will prove to be a model of its kind which will bring credit not only to this country but to the sponsoring country, the Federal Republic of Germany, which has the reputation of being among the foremost countries in technical education.

Once more, may I convey to Your Excellencies and your colleagues a hearty welcome and our sincere gratitude for the trouble you have taken in going over to this country and inspiring us with your presence.

ADDRESS BY PROFESSOR HUMAYUN KABIR

Your Excellency, Members of the Indian Institute of Technology, Ladies and Gentlemen,

I consider it a great privilege to be present here this afternoon when the foundation stone of the Indian Institute of Technology, Madras, will be laid by His Excellency, the President of the Federal Republic of Germany. This is in many ways a memorable day not only for Madras but for the whole country. Dr. Mudaliar gave you a brief account of the way in which these Institutes have developed. The late Nalini Ranjan Sarkar had suggested the establishment of four Higher Institutes of Technology in order to provide in India the highest type of education in science and technology. The first of these Institutes was established in 1951 at Kharagpur. And thereafter we were considering how to proceed with the programme, when in 1956, our Prime Minister visited Germany. As a symbol of friendship and co-operation, the Government of the Federal Republic of Germany offered to build in India an Institute of higher science and technology. We gratefully accepted that offer and an agreement was signed in 1958. That very year, as Dr. Mudaliar told you, a second Institute came into existence at Bombay with the assistance of UNESCO and the co-operation of the Soviet Union. And in 1959, the Institute in Madras commenced operations.

From 1959 to 1962 means hardly three years and yet those who have visited this campus before know what a transformation has taken place. Within this short period of less than three years, a new city has grown up, a city dedicated to the pursuit of knowledge, dedicated to the development of science and technology, built in India with the co-operation of the great people of Germany.

We, in India, owe a great deal to Germany in many fields. For centuries, certainly over a century, German scholars have been among the greatest interpreters of Indian culture in the Western World. Some of them have helped us to rediscover our own heritage. The contributions they have made in the fields of Indology, in the field of Sanskrit studies, in the field of Indian philosophy can never be forgotten. We know that Germany has a glorious tradition in many respects. It has a brilliant political and military history, but whenever we in India think of Germany, we think of Germany as the land of Kant and Hegel, as the land of Bach and Beethoven, as the land of Euler, Kepler and Einstein. We think of Germany as a land great for its contributions in the fields of humanity, in the fields of art, in the fields of sciences and mathematics.

We, in India, also know how the German people after the devastation of the Second World War have rebuilt their country in the course of the last 10 or 12 years. Indians who visited Berlin in the year 1948 or 1949 saw nothing but ruins and

huge heaps of destroyed mansions and buildings. And yet within a few years German genius, German industry and German ingenuity have built out of that destruction new edifices of beauty, service and utility. When I visited Germany in 1955, I was struck by the way in which the debris had been transformed to build up new hillocks and beautiful parks and to give Berlin a new look. With the new physical look has come a new outlook and the life of Germany has been rebuilt so that today she is among the leading nations of the world in science and technology, in industry, in development and in every field of peaceful human activity.

We, in India, also recognise that the co-operation, the assistance, and the help we have received from German scholars and German scientists in the past have come with added premium after India became free. Germany had helped us in building up great industrial concerns in this country. Your Excellency, you have recently visited Rourkela where you have seen how a great steel town is coming into existence in a place which was a wilderness before. Rourkela is one of the shining examples of Indo-German co-operation, but there are many other projects scattered throughout the length and breadth of India built up by Indo-German collaboration.

We acknowledge gratefully the help and assistance we have received in many programmes built with the contributions of the German people, but I hope, Your Excellency, you will forgive me if I say that in some respects I consider this Institute in Madras to be the most important of all. In the other cases of Indo-German co-operative endeavour, they are building factories, they are turning out goods, they are providing services, but in this Institute, we are hoping to build up generations of scholars, scientists and technologists through Indo-German co-operation. This Institute is pledged to develop the man-power of this country, and as, Your Excellency, you know, as, ladies and gentlemen, you know, the greatest wealth of any country is educated, developed, dedicated man-power. We have therefore great hopes from this Institute where we are having co-operation at every level from German teachers, scientists and technologists.

I could give you details of the great assistance which the Federal Republic of Germany has offered for developing this Institute. Germany is giving equipment worth 15 million Deutsche Marks—or about a crore and 80 lakhs of rupees. Twenty German Professors will be serving here ; there will be in addition instructors who will help us to develop the workshops. Germany has also offered facilities for higher studies to some of our own teachers and they have gone to Germany for receiving the necessary training. When they come back, they will take the place of the German Professors who are helping us to build this Institute. I must, in this connection, mention my old friend Prof. Kraus who has been here for a long time, who has served India first at the Indian Institute of Technology, Kharagpur. Now he has become the Adviser, the German Adviser, to the Government of India for the Indian Institute of Technology, Madras.

Your Excellency, we have here an example of the way in which Indo-German co-operation has worked. This Institute will turn out generations of students who will be helping to develop the industrial and economic potential of our country. Simultaneously, they will help to build a visible symbol of the co-operation and friendship between the German people and the Indian people in the pursuits of peace, in the tasks of developing civilisation and culture, in a programme of expanding knowledge in science and technology. German scholarship is famous for its high standards and German thoroughness and attention to details have become proverbial. Indians are known for their imaginative and speculative achievements. We hope we will find in the Institute a marriage between these qualities, not for destructive purposes, but for the service of man in the cause of peace.

We also greatly appreciate the generous help which the German people have offered to us at this moment of crisis in our history. Dr. Mudaliar referred briefly to the shadow of danger under which we are living today. The Chinese attack has been a shock but it has united the nation in a firm resolve to throw out the aggressor. The Indian people have united and when a united people are on the march, they will reach the goal, however long the journey, however arduous the path, and however great the difficulties on the way.

In this march forward to victory and peace, we have received generous assistance from many great countries of the world and among them we remember the great help and co-operation offered by the people of Germany. Your Excellency, you have yourself graciously expressed again and again during your visit to India the sense of solidarity of the German people with the people of India in this hour of India's crisis. We are grateful to you for the words which you have used through which we have heard the voice of the German people. I am sure, Your Excellency, you will convey to the German people the deep sense of gratitude of the Indian people for the help and co-operation which we have received.

I consider it a privilege that I can welcome you today to this Institute of Technology built up with Indo-German co-operation. It is, as I said, a visible symbol of co-operation for purposes of peace, co-operation for purposes of enlightenment, co-operation for purposes of education, co-operation for purposes of developing science and technology.

We have received help from many quarters in developing this Institute. I have already spoken of the great contribution of Germany, but I would also like to express my thanks and the thanks of the Government of India to the Government of Madras and its Chief Minister. Its former Education and Finance Minister and its present Education and Finance Minister and the Industries Minister have taken a keen interest in its growth. Without their help, without their initiative, without their imaginative vision, this great campus of about 650

acres would not have been given free to the Institute, nor could it have developed so rapidly.

Nor must I forget my esteemed friend Dr. Mudaliar who has been a guiding spirit in Indian education for decades and has presided over this Institute with great distinction and grace. I am also grateful to the Director of the Institute and his colleagues and the officers of my Ministry who have all worked extremely hard. As a result of their devoted labour we see rising before us an institution which embodies the vision of Indo-German co-operation.

I have now great pleasure in inviting His Excellency, the President of the Federal Republic of Germany, to lay the corner-stone of the Indian Institute of Technology, Madras.

ADDRESS BY THE PRESIDENT OF THE FEDERAL REPUBLIC OF GERMANY ON THE OCCASION OF THE LAYING OF THE FOUNDATION STONE OF THE INDIAN INSTITUTE OF TECHNOLOGY, MADRAS

Excellencies, Ladies and Gentlemen,

Today is an important date in the long history of Indo-German co-operation. We have gathered here to lay the foundation stone of the Institute which shall commemorate for all time the joint achievement of Indians and Germans in establishing this Institute of Technology in Madras.

In past years Indians and Germans have co-operated to perform great achievements in very many different fields, and have carried out many projects jointly.

For a long time past scholars from both our countries have worked in close collaboration in the field of arts and literary studies. The economic development of India, which finds visible expression in the aims of the Five-Year Plans, presents your country with the tasks of training above all a large number of engineers, technicians and skilled workers. It has for long past been the wish of the Federal Government to help you in this, and to put the experience of an older industrial nation at your disposal. This has had the gratifying result of close co-operation between Germany and India in the field of training for technical professions. Representative of this is the prototype training centre at Okhla near New Delhi, where skilled workers and master-craftsmen are trained.

The Institute of Technology here in Madras is a practical addition. It will train the engineers who are so urgently needed for the economic development of India, and will contribute through research to the expansion of science and engineering.

The idea of establishing this Institute of Technology in Madras dates back to the visit of His Excellency, the Indian Prime Minister Nehru to the Federal Republic of Germany in 1956. The difficulties which arose in the execution of this scheme were manifold and could not at first be foreseen. They ranged from a shortage of construction steel and cement to concern regarding a sufficient supply of teachers. The decision to expand the project considerably, contrary to the original plans, confronted all those concerned with new problems. Thanks are due to the trustful co-operation between the two Governments, and between Indian and German professors and lecturers, that in spite of all this the project has almost reached completion within four years.

The division of labour agreed on, by which the Federal Government was for the greater part to undertake the equipment of the laboratories and workshops with machines, apparatus and material for theoretical and practical teaching, as well as send a number of professors and instructors, has proved successful. A form of co-operation has been carried out here which may serve as an example of good partnership on a basis of equality. In addition to training in their special subjects, the students have before them daily an object lesson on how two nations, which in their history, traditions and habits of life have developed very differently, can collaborate well and successfully to achieve a high aim.

The aim to be served by the Institute of Technology in Madras can be described most succinctly in the words of the great lodestar of Indian youth, Mahatma Gandhi:

'Knowledge will be the common property of the people.'

The stone which I now have the honour to lay should be a constant reminder of this task to us and to all who teach and study in this Institute.

I wish from my heart that the Institute of Technology in Madras may be successful in its further development. May it work for the welfare of the Indian nation and contribute to a flourishing friendship between Germany and India.

VOTE OF THANKS

by

PROF. B. SENGUPTO

Your Excellencies, Ladies and Gentlemen,

The foundation-stone of this Institute has been laid by no less a person than our distinguished Chief Guest, Dr. Heinrich Luebke, the President of the Federal Republic of Germany. Our Union Minister for Scientific Research and Cultural Affairs, the Chief Minister of Madras and Dr. Mudaliar—to mention only a few of the distinguished gathering today—are with us in person to wish us godspeed, thousands of you have assembled in this open-air theatre this evening to encourage us on to the completion of our immense project. Under these auspicious circumstances, who will not deem it a pleasant privilege to express his warm thankfulness on an historic occasion like this ?

Your Excellency has indeed placed us, forever, under a deep debt of gratitude, by traversing thousands of miles to lay the foundation-stone of this Institute and cheer us to the mighty task ahead. Your warm solicitude for the advancement of developing countries is a byword the world over. Your dictum that the Federal Republic of Germany should, to the best of her ability and from a sense of 'human and Christian obligation', 'try to remedy the enormous distress beyond her frontiers', especially in the developing countries, has been a deep source of inspiration to us and a model to other advanced countries. Your guiding principle that aid to developing countries should not merely be financial, but should also be one for education, with stress on self-help, has been warmly applauded everywhere. Kindly permit me, Your Excellency, to reiterate our gratitude to you.

May I take this occasion to express our deep thankfulness to Prof. Humayun Kabir, our Union Minister for Scientific Research and Cultural Affairs ? He has been intimately associated with our Institute from its very inception and but for his abiding interest, the progress of the Institute would not have been what it is today.

To Shri Subramaniam, our Union Minister for Steel and Heavy Industries, I cannot express our gratefulness adequately, for we know only too well the monumental effort that he made, as the then Education Minister of the Government of Madras, to get this Institute opened in Madras, so that it could best subserve the technological interests of the country in general and the southern region in particular.

We are deeply beholden to our Chief Minister, Shri Kamaraj, for graciously associating himself with the pleasant function this evening. He has a deep solicitude for our Institute. We have not forgotten, Sir, that you were present with us on the first anniversary of the Institute, to comfort us in the inevitable teething troubles of ours then and egg us on to further endeavour.

To Shri Venkataraman, the Technical Education Minister of Madras State, we owe much. His affection for our Institute has been a matter of grateful satisfaction to us. If we have been able to solve our water supply problem in the campus to any appreciable extent, it has not been a little due to the immense interest taken by him in the matter.

Dr. Mudaliar, the Chairman of our Board of Governors, has been a friend, philosopher and guide to us. What progress has been achieved at this Institute is wholly due to his inspiring stewardship. We will continue to look to him for captaining us to our destination.

I deem it an honour to express my gratitude to Her Excellency Wilhelmine Luebke and Frau Schroeder for having graciously consented to be with us on this memorable occasion. We are also deeply indebted to Mr. H. H. von Herwarth for gracing the occasion with his presence. I should also thank Their Excellencies Duckwitz and P. A. Menon for their fostering care of this Institute.

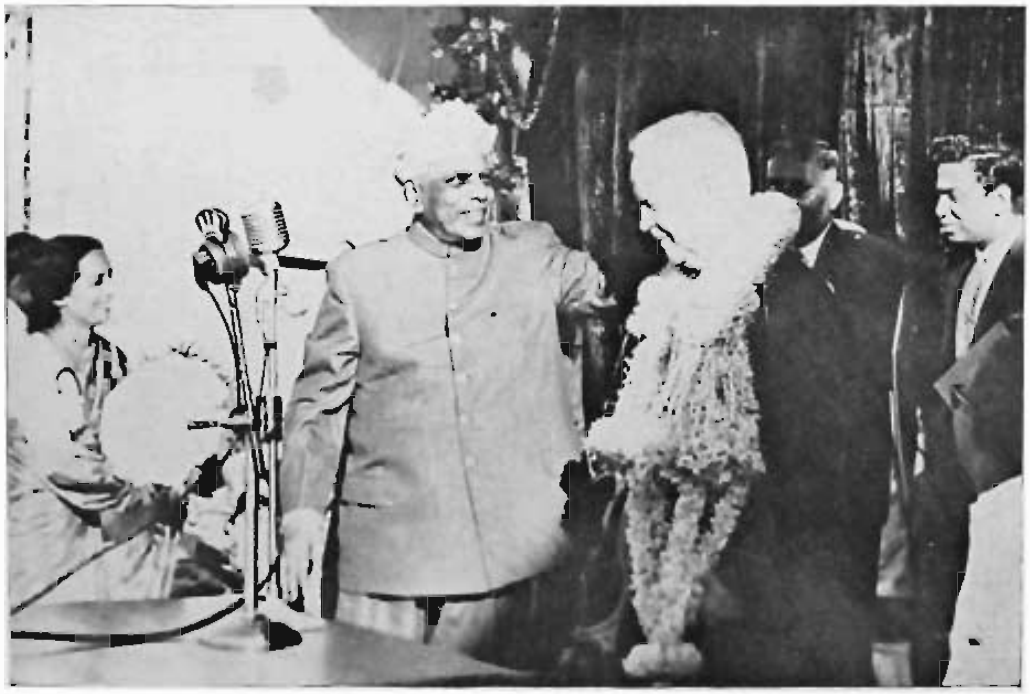
I shall be failing in my duty, if I do not express our thankfulness to Mr. Gerhard Fischer, the Consul of the Federal Republic of Germany at Madras, for the great interest that he has, forever, been evincing in our Institute.

I am happy to note that Mr. Chandiramani, Joint Secretary of the Union Ministry of Scientific Research and Cultural Affairs and until recently Member of our Board of Governors, is with us on this happy occasion. In both these capacities, he has been a tower of strength to us.

We have, indeed, been phenomenally fortunate to have received unstinted co-operation and assistance from the Government of Madras, the Madras University, the School of Town Planning and Architecture, New Delhi, the Madras and Central Public Works Departments, the Madras Police, the Director of Technical Education, Madras, the Director and Staff of the Central Leather Research Institute, the Director and Staff of the A.C. College of Technology, the Principal and Staff of the Guindy Engineering College, the Director of the Highways Research Laboratory, the Director and Staff of the Madras Institute of Technology, and the members of numerous selection and other committees, who have helped us in every possible way.

Standing before you on the dais of this open-air theatre, completed only yesterday, I cannot but recall how this campus has, in the course of the last three

THE PRESIDENT ARRIVING AT THE OPEN-AIR THEATRE



THE PRESIDENT BEING GARLANDED BY DR. A. L. MUDALIAR

ON THE DAIS

From left to right: Mr. H. H v. Herwarth, Mrs. Wilhelmine Luebke, Dr. A. L. Mudaliar, The President, Prof. Humayun Kabir Shri K. Kamaraj, Prof. B. Sengupta, Mrs. Brigitte Schroeder.

years, been transformed from a forbidding forest to a homely haven, without pulling down the cool cathedral of greenery all round. The credit for this must surely go to our architects and our Engineering Unit. They have truly imbibed the spirit of our Prime Minister's dictum that ' cutting down a tree is murder '. The Engineering Unit have worked night and day to construct and complete this pretty open-air theatre in an incredibly small span of two months. To them, my thanks are specially due.

I must also thank Dr. Kraus, my staff colleagues, both German and Indian, as also my students for all their co-operation in ensuring so successful an evening.

To one and all of you, distinguished ladies and gentlemen, I offer my grateful thanks for coming over and making this a function to remember.

THE INDIAN INSTITUTE OF TECHNOLOGY

by

PROFESSOR B. SENGUPTO
Director

It was towards the end of the Second World War that it became apparent that the Indian sub-continent could not be ever dependent on foreign manufacturers for a supply of even essential commodities. India, if it had to survive, had to be industrialised and that, too, at as fast a rate as possible. The aftermath of the war also made it palpably clear that the work of reconstruction of Germany, Britain, France, Japan and other parts of the war affected world would demand priority of attention in those countries making it extremely difficult, if not impossible, for India to obtain the services of foreign scientists, technologists and engineers. There was, obviously, a crying need for training technical personnel, especially at the higher technical level training, with utmost speed.

2. The Hon'ble Sir Joginder Singh, the then member of the Viceroy's Executive Council, Department of Education, Health and Agriculture, appointed a high power Committee under the chairmanship of Shri Nalini Ranjan Sarkar to go into the question. The Committee consisted of twenty members drawn from among eminent scientists, technologists, industrialists, representatives of a number of various Government departments and the Armed Forces. The Committee was asked to consider and report on the necessity of establishing, with a view to ensuring an adequate and speedy supply of technical personnel, a central institution, possibly on the model of the Massachusetts Institute of Technology of the U.S.A. with a number of subordinate institutions affiliated to it, or a net-work of institutions on a regional basis, as also various other matters relating to their scope and size, location, control and management, staff, buildings, equipment, cost involved, etc.

3. Early in 1946, the Committee submitted its interim report. The main recommendations of the Committee were :

(i) Not less than 4 higher technical institutions, one each in the east, west, south and north would be necessary for the post-war requirements of India and should be established as quickly as possible ;

(ii) The eastern institution should be set up at or near Calcutta at an early date ;

(iii) The western institution should be established at or near Bombay ;

(iv) The northern institution should also be set up without delay with specialised training in hydraulics in particular ;

(v) To ensure proper planning of buildings, equipment, courses of study, the Principals and the Heads of the main departments of these institutions should be appointed and the services of an architect with experience in planning of technical institutions secured at a sufficiently early stage ;

(vi) The management of each institution should be entrusted to a small but representative governing body, composed of persons with the requisite background, qualifications and experience. The governing body was to be appointed by the Government in consultation with the All-India Council for Technical Education.

4. The Committee could not come to a conclusion about the location of the northern or the southern institution although, on several occasions, mention was made of Kanpur as a possible place for the northern institution. The Committee also submitted a detailed estimate of the physical needs of such an institution with regard to staff, buildings, equipment, cost involved, etc.

5. In pursuance of these recommendations of the Sarkar Committee, the Government of India established the first and eastern Indian Institute of Technology at Kharagpur, a railway colony seventy miles from Calcutta. The Government of West Bengal placed at the disposal of the Central Government an extensive area covering over 1300 acres of land and a large building which, at one time, had housed the detention camp and jail at Hijli. Dr. J. C. Ghosh was appointed the first Director of the Institute. The Institute took its first batch of undergraduate students in the year 1951 and has since then started post-graduate courses leading to M. Tech. with organised facilities for doctorate work and post-doctoral research. While attempting to organise the Indian Institute of Technology at Kharagpur, a number of difficulties and bottlenecks were brought to light. There was an acute dearth of staff with research and design experience who could be entrusted with the work of organising research departments in engineering and technology. The research equipment and instruments were not readily available in India nor could they be made here without adequate experience in design and fabrication. Instrumentation posed serious problems as we had neither instruments nor the requisite trained personnel to handle these. The necessity of obtaining assistance from technologically advanced countries in the matter of equipment and instruments was, therefore, felt very keenly. The Kharagpur Institute was fortunate in obtaining the assistance of the U.S.A. and the U.K. The services of a number of foreign experts were obtained for purposes of organising the research departments of the Institute. A considerable quantity

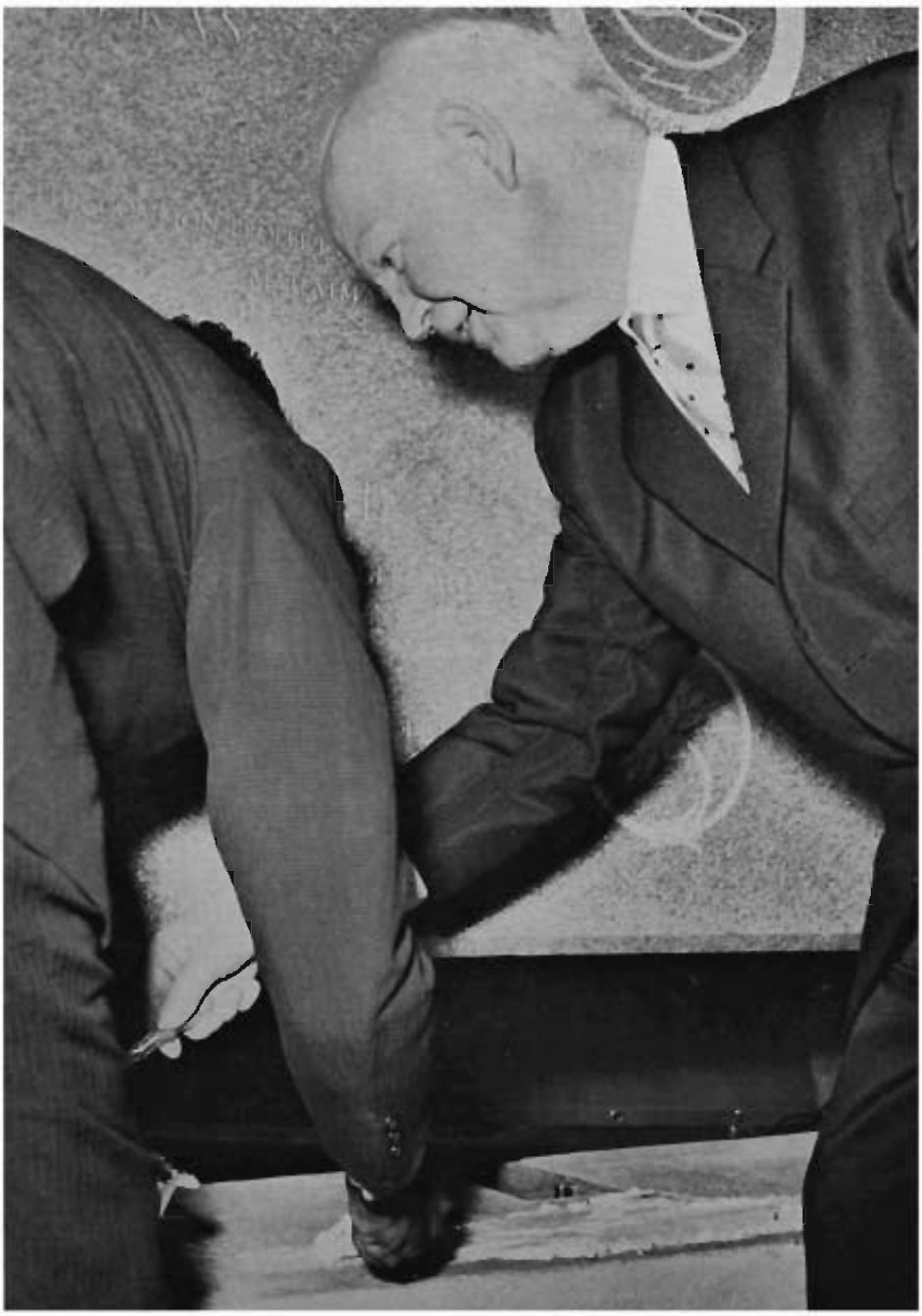
of equipment was made available by different participating countries for post-graduate training and research, and it must be said, in all fairness, that the assistance has, to a considerable extent, been responsible for the establishment of post-graduate departments at the Indian Institute of Technology, Kharagpur.

6. It was in this context that the Government of India thought it proper to seek for and accept any proposal of collaboration from the technologically advanced countries in the matter of setting up these institutions. The offer of such an assistance was not also lacking and it was, therefore, possible in the case of institutes started subsequently to try an experiment to eliminate difficulties experienced by the Kharagpur Institute. Furthermore, with such assistance forthcoming, it was hoped, that it would be possible to try out different systems of technological education prevalent in different technologically advanced countries with a view to evolving, ultimately, a system of education which would suit our needs.

7. During the visit of our Prime Minister to West Germany in June 1956, the Government of the Federal Republic of Germany offered technical assistance in the form of a technological institute in India. The Prime Minister readily accepted this gracious offer and suggested that a German Technical Mission should visit India and see different engineering colleges, research institutions, factories, etc., in order to get a clear view of the needs of our country, to discuss details of the scheme with experts, educationists and Government officials in India and to formulate final proposals for the establishment of the Institute.

8. Accordingly, a German Technical Mission under the leadership of the Minister of State Professor Dr. August Ruker visited India on 24th October, 1956. The Government of India also set up a Sponsoring Committee under the Chairmanship of the then Cabinet Secretary Mr. Y. N. Sukthankar for detailed discussion with the German Technical Mission. The members of the Sponsoring Committee were :

1.	Mr. Y. N. Sukthankar	..	*Chairman*
2.	Dr. D. S. Kothari	..	*Members*
3.	Dr. V. K. R. V. Rao	..	,,
4.	Prof. M. S. Thacker	..	,,
5.	Dr. A. Nagaraja Rao	..	,,
6.	Mr. Sudhir Ghosh	..	,,
7.	Mr. M. R. Kothandaraman	..	,,
8.	Prof. B. Sengupto	..	,,
9.	Mr. G. L. Mehtra	..	,,
10.	Mr. L. P. Singh	..	,,
11.	Mr. P. A. Gopala Krishnan	..	,,
12.	Mr. G. K. Chandiramani	..	,,
13.	Mr. L. S. Chandrakant	..	*Member-Secretary*



THE PRESIDENT LAYING THE FOUNDATION STONE

THE PRESIDENT WITH THE REGISTRAR, SUPERINTENDING ENGINEER AND DIRECTOR OF I.I.T., MADRAS, IN FRONT OF THE FOUNDATION STONE

The German Technical Mission visited the National Laboratories, important technical institutions, engineering colleges and industrial establishments in order to gain a first-hand knowledge of the conditions prevalent in India and the problems of higher technological training in this country. The Mission also held discussions with the Sponsoring Committee regarding various aspects of technical education, training, requirement of various types of technically trained personnel and about the proposal for establishment of a higher technological institute in India with German assistance and collaboration. The Mission was satisfied that the German offer of assistance could be utilised for the establishment of one of the three higher technological institutes in India, provided for in the second Five-Year Plan. Since, however, assistance for establishment of the western Institute had already been secured from the U.S.S.R. under the UNESCO's expanded programme for technical assistance, the German assistance should best be utilised for either the northern or the southern institute.

9. On the basis of the discussions of the Sponsoring Committee, the German Technical Mission submitted a report to the West German Government on the 23rd November 1956 setting out the details and the scope of assistance in the establishment of a higher technological institute. The salient features of the report were:

(*a*) One of the higher technological institutes provided for in the Second Five-Year Plan should be set up with West German assistance and collaboration. The organisational plan of this Institute should follow the example of the Indian Institute of Technology, Kharagpur. The location of the Institute would be either in the north or in the south and should be finalised, within the next three months, in consultation with the German Government.

(*b*) Since a broad introduction to practical work in India was of great importance in a country yet to get industrialised, the Institute should provide compulsory workshop training to the students in special workshops to be set up for the purpose. The period of training and workshop was to vary from 6 to 12 months in the pre-professional year, i.e. the first year of the five-year integrated course.

(*c*) There should be five engineering departments, viz. Civil, Mechanical, Electrical including Communications, Chemical and Metallurgical Engineering and Mining. In addition there should be a department of Science and Humanities.

(*d*) For the first three years the course should be common and specialisation should be confined to the last two years of the course and the electives, where introduced, should not exceed 30% of the curriculum of the last two years. Further specialisation should be concentrated in post-graduate courses.

(*e*) Co-operative research and design should be given the same importance as in German technical universities.

(*f*) The objective of the Institute will be to impart basic education in engineering, and provide instruction and specialised courses to develop research.

(*g*) The Institute should establish the closest possible relationship with industry and other research establishments.

10. The report of the German Technical Mission was considered by the Sponsoring Committee on the 12th March, 1957. A Sub-Committee under the chairmanship of the Cabinet Secretary was set up for discussing every detail of the Institute project, and for setting up various administrative organisations with corresponding authority on the German side and to advise the Government on the form and content of the Agreement to be entered into between the Government of India and the Government of the Federal Republic of Germany for the establishment of this Institute.

11. In the meanwhile, the question of location of the Institute was engaging the attention of the experts, both Indian and German. The claims of various places, both of the north and the south, were examined and ultimately it was decided that the Institute should go to the south. Probably, the bracing climate all the year round and the old tradition and culture of the South were the deciding factors in favour of the south.

12. Once it was decided that the Institute sponsored in collaboration with the West German Government should be established in the southern region, the different State Governments put forward their claims for the location of this Institute in their respective States. In view of the conflicting claims from different States, the All-India Council for Technical Education, however, decided to find out from the various State Governments in the region the facilities in the matter of suitable sites, temporary buildings, water supply, power, etc., which they would be prepared to offer. The Council also appointed a Committee consisting of Dr. A. L. Mudaliar, Dr. J. C. Ghosh and Prof. D. L. Deshpande, to report to the Co-ordinating Committee of the A.I.C.T.E., after ascertaining the final views of the various State Governments. The requirements originally laid down for this Institute were as follows :—

> Land : 1000 acres free of cost ; filtered water : 400,000 gallons per day ; electric suppy : AC, 3 Phase 400 V 50 cycles ; single phase 230 V 50 cycles ; D.C. 220 V 110 V.

13. It may be of interest to note that before the decision to locate the Institute at Madras was finally taken, the claims of a number of places such as Kuppam and Arkonam in Madras State, Lagir and Kudikodi in Mysore State, Sethuparvathipuram in the then Travancore-Cochin State, Anantapur and Hyderabad in Andhra State were put forward by the State Governments. Further, the alternatives of starting the Indian Institute of Technology in Madras in the

College of Engineering or the M.I.T. as nucleus, or at Anantapur at the Engineering College there, or at Hyderabad under the aegis of the Osmania University or at the Indian Institute of Science, Bangalore, were also put forward for consideration by the concerned Governments.

14. The matter was finally discussed at a meeting of the Southern Regional Committee of the All-India Council for Technical Education on the 4th of May, 1956, which was attended by representatives of the State Governments concerned. The Committee, after considering the various claims and the urgency of the situation, came to the unanimous decision that the Institute should be located at Madras. This decision was accepted by the A.I.C.T.E. and by the Government of India. It was also decided that the Institute should not be attached to any of the existing institutions but should be a separate entity.

15. The final decision having been taken in favour of Madras, the Madras Government graciously offered the Government of India a site within the Raj Bhavan, known as the Deer Park, for the location of the Institute. The site measuring about 633 acres of land, consisted of lovely wooded land of about 300 acres, irrigation tanks of about 100 acres and for the rest, a village named Taramani, just outside the Raj Bhavan estate. The site, although secluded, was in close proximity to the Guindy Engineering College, the Highways Researeh Station, the A.C. College of Technology, the Central Leather Research Institute and offered an ideal location for a technical institution, not too far from the city to be cut off, not too near to the centre of the city to be cramped, all in all an ideal setting for an educational campus, 'far from the madding crowd' and in surroundings calm and serene.

16. When the Government of Madras made the offer of this site, it cannot be said that there was no opposition to this gift. An influential Committee consisting of very prominent citizens of Madras voiced a very strong protest against the action of the Government which was sure to deprive the city of the Deer Park which was an open lung-space. The protest was so strong that it was thought at one time, that the Institute might have to move out of the city. However, the Government of Madras and the then Minister in charge of Education, Shri C. Subramaniam, stuck to the original decision and made it possible for the third Institute to get started at Madras.

17. Some of the citizens of Madras also felt that the Deer Sanctuary would be lost forever. It is true the deer have donated a part of their homeland for a better use. Although the land has been built up, the lung-space has been kept intact with all its beautiful trees, avenues and lakes. The one-time jungle has given way gracefully to an academic settlement in a wooded campus. The irrigation tanks are being converted into lakes, suitable for boating. The low-lying rice fields have been transformed into sports-fields and sewage farms.

18. The Indo-German Agreement for the establishment of the Indian Institute of Technology at Madras was signed on the 7th August 1958 at Bonn with the provision for :

(1) Twenty German Professors/Specialists and five German Foremen for teaching/training ;

(2) Supply of scientific and technical equipment costing about Rs. 180 lakhs ;

(3) Facilities for training of twenty Indian teachers in German Technical Universities in specialised subjects.

The Government of India also set up a planning committee for the Institute under the chairmanship of Dr. A. L. Mudaliar, to prepare detailed plans and estimates, courses of study, etc. The Committee consisted of the following members :

1. Dr. A. L. Mudaliar, *Chairman*
   Vice-Chancellor, University of Madras.
2. Director,
   National Chemical Laboratory,
   Poona.
3. Prof. B. Sengupto,
   Principal,
   Victoria Jubilee Technical Institute, Matunga, Bombay.
4. Shri S. Anantaramakrishnan,
   Managing Director,
   M/s. Simpson & Co., Madras.
5. The Managing Director,
   M/s. Binny & Co., Madras.
6. The Chief Engineer,
   Public Works Department,
   Government of Madras.
7. Shri N. Srinivasan,
   Director, Madras Institute of Technology, Madras.
8. Shri Qumar Tyabji,
   Managing Director,
   Osman Shahi Mills, Hyderabad.
9. Dr. S. Bhagavantam,
   Director, Indian Institute of Science, Bangalore.
10. Dr. V. M. Ghatage,
    Chief Designer,
    Hindustan Aircraft Ltd.,
    Bangalore.
11. Shri Shridharan Nair,
    Chief Electrical Engineer, Kerala.
12. Secretary, Department of Scientific Research and Technical Education,
    New Delhi, or his nominee.

The Committee, at its first meeting, formulated the courses of studies to be started at the Indian Institute of Technology, Madras. The work of preparation of detailed plans was, however, left over to the Director to join.

19. In pursuance of the resolution of the Government of India to start the Institute from the academic year 1959, Shri L. S. Chandrakant, Deputy Educational Adviser (Technical), was appointed as the planning officer for the

Institute. In the meanwhile, the Institute was registered as a Society under the Societies Registration Act XXI of 1860. The members of the Society and the Board of Governors of the Institute were :

Society :

(1) Dr. A. L. Mudaliar. .. *Chairman.*

(2) Shri Qumar Tyabji. .. *Member.*

(3) Shri P. M. Reddy, .. *Member.*
Deputy General Manager,
Hindustan Aircraft Ltd.,
Bangalore.

(4) Shri C. D. Deshmukh, .. *Member.*
Chairman, University Grants Commission,
New Delhi.

(5) Prof. M. S. Thacker, .. *Member.*
Director-General, C.S.I.R.,
New Delhi.

(6) Shri A. V. Venkateswaran, .. *Member.*
Financial Adviser,
Ministry of Scientific Research & Cultural Affairs,
New Delhi.

(7) Dr. A. Nagaraja Rao, .. *Member.*
Joint Secretary, Ministry of Commerce & Industry,
New Delhi.

(8) Shri K. Srinivasan, .. *Member.*
Legal Adviser, Ministry of Law,
New Delhi.

(9) Shri G. K. Chandiramani, .. *Member.*
Joint Educational Adviser,
Ministry of Scientific Research & Cultural Affairs,
New Delhi.

(10) Shri L. S. Chandrakant, .. *Member.*
Deputy Educational Adviser,
Ministry of Scientific Research & Cultural Affairs,
New Delhi.

Board of Governors :

(1) Dr. A. L. Mudaliar .. *Chairman.*

(2) Shri Qumar Tyabji .. *Member.*

(3) Shri P. M. Reddy .. ,,

(4) Shri C. D. Deshmukh .. ,,

(5) Prof. M. S. Thacker .. ,,

(6) Shri A. V. Venkateswaran	..	*Member.*
(7) Dr. A. Nagaraja Rao	..	,,
(8) Shri G. K. Chandiramani	..	,,
(9) Shri L. S. Chandrakant	..	,,
(10) Prof. B. Sengupto (Director)	..	,,
(11) Shri R. Natarajan (Registrar)	..	*Secretary.*

20. The 30th of July, 1959, was a red-letter day in the history of the Institute, for it was on this day, the Institute was inaugurated in the open field between the A.C. College and the C.L.R.I., by Prof. Humayun Kabir, the Union Minister for Scientific Research and Cultural Affairs, before a large and distinguished gathering. Addressing the gathering on this memorable occasion, the Minister said that the inauguration of the Institute marked the beginning of the fulfilment of a dream. He said they should be grateful to West Germany for their generous assistance. He was sure the German Professors and experts would lay down the traditions of the institution on sound and progressive lines and give it the thoroughness and efficiency, which characterised scientific and technical education in Germany. He was also certain the German experts giving practical training to students would help in raising the standard of the cultivation of manual skill of the students, which was almost neglected in their education.

Pointing out how foreign countries had been helping India in establishing the institutes, Prof. Kabir said such co-operation and collaboration had in it an element of competition in excellence.

The Union Minister said though the Madras Institute was third to be started, it had the advantage of starting straightaway the five-year integrated course, which the other institutions could not think of at the time of starting. He said this integrated scheme would soon become the pattern of engineering education in the country. In the Madras Institute students would alternately attend theoretical and workshop lessons. The 'sandwich system' would help to give the students that re-orientation, which sometimes had to be secured after they took their degrees, by actually working in Industries.

The minister felt that they had not yet paid adequate attention to education at the post-graduate and research level. Of course, the industries in India offered co-operation in this respect but not adequately. Greater collaboration between industries and research at all levels would be advantageous to the industry and the country as a whole.

In the 'age of the engineer' today, the role played by the engineer was of far-reaching consequence, because the introduction of a new technological programme very often changed the economy of the country. He also referred

to Germany's contribution to the development of philosophy, music and literature along with her achievements in the field of science and said the eternal verities of life should become part of the student's mental make-up.

21. From the very beginning the infant Institute was assured of all help from everyone. The Government of Madras offered every assistance. The Vice-Chancellor of the Madras University placed at the disposal of the Institute, 8 rooms in the A.C. College, to house the classrooms, drawing classes, teachers' room, library, etc. The Director of the A.C. College assured the Institute of all help. The Director of the C.L.R.I. made available two very large rooms to the Institute to house its offices. The Government of Madras made available the old Women's Hostel, attached to the Teachers' Training College, Saidapet, to house the first batch of trainees at this residential institution. The first batch of 120 students were admitted in July 1959. The Institute started functioning with its offices at the C.L.R.I. classes in the A.C. College, with the students residing in the old Women's Hostel at Saidapet and another hired hostel in Guindy with 633 acres of forest land where the Institute was to be located.

22. By this time, four German Professors and one German foreman had arrived in India. The Institute had also recruited the required Indian staff necessary to conduct the first year of the five-year integrated course in engineering.

23. The Government of Madras were kind enough to place at the disposal of the Institute, the services of Sri R. Natarajan, one of their senior I.A.S. officers, who joined as the Registrar of the Institute.

24. Prof. B. Sengupto, the first Director of the Institute, took over from the Special Officer on the 17th of August, 1959. The immediate task of the Director was to prepare a layout plan of the campus and report on the project as a whole, outlining the details of the scheme with an estimate of expenditure for submission to the Government of India for sanction. An engineering cell had also to be set up at the Institute for the construction of the instructional buildings, hostels, residential accommodation for the staff with all amenities and services, such as water, electricity, drainage, conservancies, school, market place, social services and community centres.

25. Since the first batch of students were admitted in 1959, it was imperative that immediate steps should be taken to have by July 1950, hostel accommodation to house at least two batches of students, classrooms and drawing office, workshop and stores accommodation for the two batches. As a preliminary step, the plans prepared by the Central Public Works Department at the instance of the Ministry of S.R. & C.A., were accepted and the first phase of construction, consisting of three buildings, viz., the Building Sciences Block,

the Workshops Block and the two hostel blocks to house 400 students was taken on hand. It was in October 1959 that the first sod was turned and the excavation of the foundation for the first building, viz., the Building Sciences Block was made.

26. It may be of interest to know that at its very first meeting, the Board of Governors took some important decisions regarding the Institute. One of the decisions was that the Institute should have the following departments :

(*a*) Civil Engineering,
(*b*) Chemical Engineering,
(*c*) Electrical Engineering (HC & LC),
(*d*) Mechanical Engineering,
(*e*) Metallurgical Engineering.

Besides these technical departments, there should be five other supporting departments, viz., Humanities, Mathematics, Physics, Chemistry and Applied Mechanics. The Institute was to admit about 300 students per year to the undergraduate classes for the five-year integrated course. This would account for 1500 students over five years. Besides, there was to be provision for post-graduate classes for a total number of 500 students for M.Sc., Ph.D., post-doctoral and research work.

27. The Board of Governors also decided that the work of construction of the Institute should be carried out by the Institute through its own Engineering Unit with the help of architects. M/s. Prynne, Abbott & Davis and Shri R. R. Sarma were appointed as architects of the Institute.

28. The services of Shri M. S. Srouty, a Superintending Engineer of the Mysore Government, were obtained on loan to start the Engineering Unit.

29. A plan of the campus was got prepared by the School of Town Planning and Architecture, New Delhi, through the good offices of Shri Manickam, its Principal. A Project Report, based on this plan was prepared and submitted late in 1960 and was accepted by the Government of India.

30. According to this plan, the Institute, when fully developed, will have a student population of 1500 undergraduates and 500 post-graduate and research workers. It will be a fully residential institution, as far as the students and academic staff are concerned. The Institute will have about 8 lakhs sq. ft. area for instructional buildings, ten hostel blocks to accommodate 2000 students, one hostel for staff and about 1100 staff quarters. This township with an estimated ultimate population of about 10,000 will be complete in all respects with its own schools, post-office, bank, marketing centre, hospital and health centre,

THE PRESIDENT DELIVERING HIS ADDRESS

THE AUDIENCE

services such as water, electricity, drainage and sanitation, roads and pathways, internal transport, internal communication and community centre. The estimated cost of the project is Rs. 9,37.69 lakhs. The project as estimated has made due allowance for expansion and an increased intake of students. In line with the recommendations of the Working Group on Technical Education, the Institute campus will, when completed, be a self-sufficient township of students and staff, with facility for education, recreation and amenities for modern living.

31. The First phase of construction activity at the Institute was a bit slow for various reasons. The Engineering Unit took some time to build up. Essential building materials, specially steel, were in short supply. Further, the plans of the individual buildings and the laboratories could not be taken up till the detailed planning of the laboratories was obtained from the German experts. It was not until the end of the year 1960, exactly one year after the construction work was started, that the Institute could get an adequate and steady supply of essential building materials and the construction work could be pressed home with vigour.

32. One wing of the Building Sciences Block, yet incomplete, was commissioned in October 1960 for housing the classrooms and the Physics and Chemistry Laboratories. The Building Sciences Block and the Central Workshop block were completed in July 1961 and the Institute moved into the campus with the starting of the session for 1961-'62.

33. When construction work was gradually picking up momentum, the organisation of the Engineering Unit had yet another set-back due to the resignation of the Institute Engineer in 1960. However, things began to settle down towards the beginning of 1961, when, through the good offices of the Honourable Minister for Works, Housing and Supply, the Institute got the services of Shri Y. S. Ramaswamy, Superintending Engineer, Central Public Works Department, for appointment as Institute Engineer. The designing work of the different institutional buildings, laboratories and staff quarters, procurement of essential building materials and appointment of suitable contractors took some more time before the extensive construction programme, which constituted the second phase, could actually be started in October 1961. Since then, the Institute has become a scene of hectic constructional activity.

In the year 1961, the Indian Institute of Technology, Madras, was declared 'an institution of national importance' by an Act of Parliament. Under this Act, a Council was set up to manage the Indian Institutes of Technology, Kharagpur, Bombay, Madras, Kanpur and Delhi under the Chairmanship of the Union Minister for Scientific Research and Cultural Affairs. The Board

of Governors of the I.I.T., Madras, has also been reconstituted with the following members :—

(1)	Dr. A. L. Mudaliar	.. *Chairman.*
(2)	Prof. B. Sengupto (Director)	.. *Member.*
(3)	Shri A. Abdul Rahim	.. *Member.*
(4)	Shri K. Srinivasan, Director, South India Textile Association, Coimbatore.	.. *Member.*
(5)	Shri I. M. Magdum, Director of Technical Edueation, Trivandrum.	.. *Member.*
(6)	Shri S. Rajaraman, Director of Technical Education, Trivandrum.	.. *Member.*
(7)	Shri P. M. Reddy, General Manager, Hindustan Aircraft Limited, Bangalore.	.. *Member.*
(8)	Dr. Y. Nayudamma, Director, Central Leather Research Institute, Adyar, Madras.	.. *Member.*
(9)	Shri Akbar Ali Khan, M.P.	.. *Member.*
(10)	Dr. Rajah Muthiah Chettiar	.. *Member.*
(11)	Prof. R. G. Narayanamurthi, Head of the Dept. of Mech. Engg., I.I.T., Madras.	.. *Member.*
(12)	Dr. P. Venkata Rao, Head of the Dept. of Electrical Engg., I.I.T., Madras.	.. *Member.*
(13)	Shri R. Natarajan, I.A.S. (Registrar)	.. *Secretary.*

34. Even though construction of the institutional building was in progress, the programme of training undergraduate students was going on as per schedule, though the number of students admitted had to be restricted to 121 in 1959-60, 138 in 1960-61, 180 in 1961-62 and 210 in 1962-63. Every square foot of space which the contractors could make available was occupied. Lectures and laboratory classes were conducted on the ground floor while the work was still going on in the first and second floors. The endurance and patience of the staff and the students were tried to the limit. Makeshift laboratories were rigged up for the most essential undergraduate work. It has been a trying experience, but everyone concerned has faced it with fortitude and forbearance.

35. There was, however, one obligation, which the Institute could not fulfil, at the beginning. The Institute, which was meant principally to be a post-graduate and research institution, could not enter this phase of activity.

The various buildings of the Institute including laboratory buildings were not complete and though some of the research equipment and instruments had already arrived from Germany, these could not be unpacked and installed, lest they should become unserviceable due to exposure to dust and moisture. Service connections could not be taken up as the incomplete buildings did not permit the installation of electrical and other channels. The short supply of cement since April 1962 had once again made the situation very difficult. It is gratifying to note that in spite of difficulties, the Institute was able to complete by the end of 1962, the construction of 9 workshop type laboratories, about 60% of the Electrical Sciences Block, 40% of the Mechanical Sciences Block, 40% of the Science and Humanities Block, 200 residential quarters, 4 students' hostels, one officers' hostel, a market place, a guest house, about 8 miles of roadway, a substantial part of the water supply and underground sewage system, electricity, etc.

36. One of the notable structures in the Institute and a landmark in the campus is the open-air theatre, which was designed and constructed by our Engineering Unit in record time. Designed after the Greek stadium and Roman amphitheatre, this open-air theatre has a seating capacity of about 5,500. It has a stage measuring 100′ × 50′, an underground dressing room and a central arena measuring 120′ × 80′ for group acting, folk dances, acrobatics, games like basketball, volleyball, badminton and tennis. It has been provided with illumination for conducting these games at night and for projection of films. The construction of this theatre was completed on the 1st December 1962 and the theatre was used for the first time for a very imposing function when Dr. Heinrich Luebke, President of the Federal Republic of Germany, laid the foundation-stone of the Institute on the 3rd December, 1962.

37. With the completion of the staff quarters undertaken under the second phase construction programme, the staff began to move into the Campus and by January 1963, practically all the staff quarters were occupied. The paucity of adequate number of staff quarters made it necessary to restrict the availability of residential accommodation to married staff-members. The bachelor members of the staff had to make their own arrangements outside the campus or take up chummery accommodation in the bachelor quarters inside the campus. Thus, community campus life, which is one of the objectives of the Institute, was started in the year 1963 with a population of about 2000 students and staff with their families.

38. This concentration of the students and staff in this residential campus brought in its wake urgent problems of water, electricity, sanitation including waste disposal, transport facilities, school for children, marketing centre etc. Thanks to the assistance received from the Government of Madras, the Madras P.W.D. and the State Electricity Board, it has been possible for the Institute to have its own water supply which assures adequate supply of water, electricity through its own supply mains, sanitary arrangements including underground lines, sewage

purification plants, conservancy service, a post-office, a branch of the State Bank of India, a marketing centre, own transport service and a primary school and a Montessori school to be started from July 1963. The Institute has already a Medical Officer and a Medical Consultant. A small dispensary has been started. This will, shortly, be expanded into a small hospital. The development of land has already been undertaken, which, when completed, will convert a large low-lying land into recreation ground with sports fields, a large lake for aquatic sports and lovely woodland with pathways. The work of laying playgrounds, sports tracks, construction of a stadium has also been taken up and it is hoped that the Inter-I.I.T. Meet scheduled to be held in December 1964 will be at the new sports stadium.

It was in the fitness of things that Herr Luebke, the President of the Federal Republic of Germany, paid a visit to the Institute on 3-12-62, to bless our activities. He was impressed with the progress of the project and gave public expression to his satisfaction over the speedy, successful implementation of this historic Indo-German project. He came, he saw and was conquered.

39. According to the schedule laid down, the entire instructional building with the exception of the administrative block and the library will be completed by the beginning of 1964. By the middle of 1964, 15 more staff-quarters are also expected to be ready. At the turn of 1964, the Institute Campus had about a 1000 students, and 220 staff members with their families, with an overall population of 3000. A sizeable part of the equipment received from Germany has been installed and it will be only a matter of months before the staff are able to engage themselves fully in study, teaching, learning and researching, the destination so longed for so long.

M.Sc. courses were started in Physics and Mathematics in 1962 with a student strength of 14. 11 were admitted to the M.Sc. Physics and Chemistry in 1963. M.Tech. courses were started with a strength of 10 students in Civil Engineering, 4 in Mechanical Engineering, 12 in Electrical Engineering and 7 in Chemical Engineering. 8 students have registered themselves for the doctorate in Physics, Mathematics, Chemistry and Civil Engineering.

40. This cherished hope of ours, has, to an extent, been coloured by the sudden Chinese onslaught on our country. The Institute has risen gamely to meet the challenge, in its own humble way. Accelerated courses were introduced from the academic year 1963-64, to turn out engineers sooner. An additional three year course for B.Sc. students was started alongside with 93 students. There have been certain inevitable cuts on our expenditure. Certain parts of our programme may have to be postponed or, perhaps, curtailed. With courage, fortified by our successful surmounter of our teething troubles, we hope that the national emergency is only a passing phase and will vanish quickly enough, leaving us to complete our task of setting up a model higher technological institute, of which our country can be proud. A dear dream would, then, have come true.

DIRECTOR'S QUARTERS

PROFESSORS' QUARTERS

GERMANY AND INDIA

Cultural and Economic Relations between the two Countries

by

GERHARD FISCHER

Consul for Germany in South India

This title would be more appropriate for a book—in fact a rather thick book. In this article I shall merely sketch in outline the numerous contributions of the German and Indian people to one another.

Cultural Relations

Cultural ties have existed between Germany and India for three or four centuries. The historical background can be traced from the time of the compilation of a Sanskrit grammar by scholarly German missionaries who visited India. The names of Goethe, the brothers Schlegel, Schopenhauer, Max Müller, Deussen, Geldner and many others are indissolubly linked up with Indian classical literature and philosophy. These scholars developed a deep interest in India which stemmed from the scholars before their times who had been making a continuous search for the country of the origin of the human language and culture—a country believed to be the 'Orient' by which they meant INDIA. Wilhelm von Humboldt, the philologist, poet and diplomat, was enchanted by the Bhagavad Gita which he studied after learning Sanskrit from Franz Bopp. Humboldt's abiding interest in Indian philosophy, his studies and preferences had many practical consequences —the most important one was the reforming of the German Universities which was mainly his work, the work of a man so deeply influenced by Indian philosophy.

Among these German indologists Max Müller holds a unique position. Having grown up in the romantic tradition of his period he became one of the greatest interpreters of Indian thought. His treatise on the Rig-Veda is considered invaluable by scholars both in India and abroad.

The regional languages of the Indian sub-continent also received the attention of German scholastic missionaries. The dictionaries in the Kannada and Malayalam languages compiled and brought out by Kittel and Gundert need special mention.

The foundations for Indo-German cultural relations can be said to have been firmly and truly laid by a vast number of German indologists and scholars. And it is upon this foundation that the present policies for the development of culture and economic relations between the two countries are based.

When a suitable name was sought for the cultural institutes opened by the Goethe Institute in India, the name of Max Müller, therefore, was the unanimous choice. The Max Müller Bhavans are dedicated to the aim of establishing a better understanding and friendship between the two countries, and promoting cultural relationships. The Max Müller Bhavan in Madras was formally opened on August 20th, 1960, by the Honourable Shri C. Subramaniam, the then Minister for Education and Finance, Government of Madras.

Another field of cultural relations in which there has been intense activity is the award of fellowships by the Alexander von Humboldt Foundation. The Foundation is a tribute to the memory of a great German who, in the words of Professor Theodor Heuss, ' was the recognised, though not officially invested, ambassador of the supernatural spirit of science, research and learning'. The Foundation now awards 185 fellowships each year and at the moment, these are held by over 40 countries including India, enabling students to carry on post-graduate studies in Germany. Then there is the scholarship programme of the German Academic Exchange Service (DAAD) and the Federal Government has a special and separate ' Exchange of Persons ' programme. Under this programme, prominent Indians and Germans from all fields of activity are enabled to visit the other country for specified periods to gain first-hand impressions of the development of their particular fields of work. Further, German Universities also have a programme of their own under which Indian scholars are invited to lecture in the universities in Germany for short periods.

A word about the establishment of friendship societies and cultural organisations in Germany. As in India, there exist in Germany many such organisations and institutes doing work of lasting value. Cultural weeks are organised at regular intervals by these societies all over Germany. In Berlin an Indian Cultural Week has been a regular feature since 1958 and in December 1962 the veteran Indian Dancer, Uday Shankar, celebrated his 62nd birthday in Berlin and presented a programme of Indian dances.

Economic Relations

India has dedicated itself to deriving the most out of her human and material resources and to establishing basic industries vital to the growth of its

ASSISTANT PROFESSORS' QUARTERS

LECTURERS' QUARTERS

ASSOCIATE LECTURERS' QUARTERS

economy. She naturally looks toward those industrial partners who are giving her assistance. The Federal Republic of Germany recognises and appreciates the ambitious principles underlying this policy and is eager to help.

The growing economic strength of Germany and an inherent desire to assist developing countries has created in Germany a strong feeling of responsibility for the economic events in the free world. A clear policy for extending aid has been formulated under which Germany has been taking part in multilateral and bi-lateral aid programmes—in the implementation of which an amount equivalent to 1% of the gross national income is involved. This figure, which is based on material recently published in Germany, compares favourably with that of the UK or USA.

The policy of extending assistance to developing countries stems also from a deep awareness of aid received from the USA—without whose massive assistance in the form of the Marshall Plan the rise of the German economy like the ' phoenix from the ashes ' would probably not have been possible. The President, Dr. Heinrich Lübke, has made repeated references to this obligation. He has said—and I quote : ' A nation, which has itself risen again out of deep distress, and received its daily bread from helpers in other lands, owes a special debt of gratitude beyond the common call of charity. More than other nations, it must feel itself obligated to satisfy the countless hungry people in all parts of the world.' He further affirms that ' our nation is ready to play its part in building a just and peaceful world.' More recently he declared that ' our people agree that economically progressive nations have an obligation to the developing countries in their expansion. The Federal Republic will, in its contribution to this great work, act conscientiously and with a sense of duty.' He views Development Aid as basically a humanitarian problem, one of moral obligation.

I would like to stress the ethical basis and the importance of Development Aid. There exists a widespread opinion that Development Aid is only a reaction of the free world against the threat of communism. This is not the core of the matter. Even without communism, a world-wide organisation of Development Aid would be essential for the provision of a dignified basis of existence for mankind. In view of the communist expansion, it has turned out to be also a political task. The fight against hunger, want and distress in the world and the obligations to see that in the developing countries, there should be an economic and social order worthy of the dignity of mankind—is a problem which should concern all of us and one which cannot be disregarded.

It is therefore the aim and task of Germany to assist the developing countries, thereby contributing to the preservation of peace and ensuring a dignified existence.

The pivotal position of India and the great role she can play in world affairs,

are recognised by the Federal Republic which is anxious to assist India and welcome her as an economic partner in the free world.

The German Government has three main types of projects for developing countries and in India there are important examples of all three.

They are :

1. The establishment of training centres, that is various types of institutions providing instruction in technical subjects and of model training centres, such as proto-type workshops and model farms;
2. Provision of experts for preliminary planning arrangements, such as the laying out of harbour installations, recovery of mineral wealth, public health projects;
3. Scholarships for trainees and students.

Keenly alive to the fact that a sound technological and engineering education conforming to standards obtaining in progressive countries is the first and foremost requisite to the growth of Indian economy, the Federal Republic made a 'gift' of a higher Institute of Technology to Prime Minister Nehru, in 1956. The tangible expression of this is the I.I.T. The German Government have allocated DM 15 Million (Rs. 1.7 crores) for installations and equipment besides undertaking to provide a teaching staff of twenty professors and five skilled foremen for a period of 3-5 years as well as training facilities for Indian professors at German Universities. It can be taken for granted that in future this German assistance will be enlarged by additional allocations for equipment and materials as well as for the dispatch of further teaching staff.

A proto-type workshop and training centre at Okhla, south of New Delhi in the vicinity of the Delhi Industrial Estate was set up jointly by the Government of India and Germany. The German Government's share of expenditure on this amounts to Rs. 50 lakhs. This is to be followed by gifts of Machinery etc. valued at Rs. 8 lakhs. The Okhla project is intended to be a model example for similar production and training centres in as much as the centre will manufacture proto-types of complete machines and machine parts and develop special-purpose machinery to improve existing plants such as could be built by small-scale industrialists. The centre was officially opened by Prime Minister Nehru on March 3rd, 1961.

Pursuant to the signing of a technical assistance agreement in the field of agriculture with the Government of India, an agricultural project was launched in the Mandi District of Himachal Pradesh by the German Government. The Project which will cost Rs. 1.2 crores, envisages rationalisation of farm management, technical assistance for intensive mixed farming, i.e. simultaneous develop-

ment of agriculture, horticulture, animal husbandry and dairying. This is a significant contribution of German experience and equipment planned to cater to the needs of the agricultural economy of India. The German Ambassador in India made a formal birthday gift of this project to Prime Minister Nehru recently. The project was inaugurated on November 14th, 1962.

I would also cite the presentation of a fully-equipped mobile workshop by my Government to the Government of Madras through the German Ambassador in India last February. It has enabled the Agricultural Department of the Government of Madras to arrange for the maintenance of agricultural machinery in use in the districts.

The Government of India is setting up a modern printing press in South India for the purpose of printing inexpensive text-books for primary schools, and teachers' manuals. This Press will be set up on a 100-acre site with the assistance of the Federal Republic of Germany which has offered machinery worth Rs. 30 lakhs as a gift. The whole project is expected to cost over Rs. 1 crore. This contribution will assist the Government of India considerably in the implementation of the programme of compulsory primary education in the country.

The industrialisation of South India is seriously handicapped by the shortage of fuel. The mining of large deposits of lignite near Neyveli, South Arcot, will usher in a new phase in the industrial development of the South. Germany which has considerable experience in the mining and processing of lignite has extended assistance. Deputations of experts from Germany to advise upon and guide the project administrators on techniques together with invitations extended to Indian executives and technicians to visit and study lignite mining projects in Germany are two projects which have already been initiated. Also numerous German firms have supplied giant excavators, pumps, conveyors and other machinery for this work.

The contribution of technical assistance to developing countries requires a proper assessment of the needs and the re-evaluation of the assistance in various fields at regular intervals. The work of the Foundation for Developing Countries in Berlin meets such a need. India has been a regular participant in the numerous seminars and conferences convened by the Foundation.

Trade Relations

Trade and commercial relations between India and Germany date back several centuries. In 1505 some merchants from Augsburg set out in three ships for Malabar to trade with kingdoms in South India. The exchange has continued ever since. During the last fifty years the tempo has quickened with India changing from being a trading partner to being an economic partner.

Germany's participation in and contributions to the economic development of India have been extensive.

The three Five-Year Plans have been big steps in the industrial history of India since her independence. It has been natural for Germany to come to the aid of this country in her efforts to attain self-sufficiency through industrialisation. Entrepreneur activity, industrial skills, managerial talents and a rich background of efficient industrial production combined with a knowledge of machine and men are significant German contributions.

A detailed enumeration of instances where German industry has associated itself with the public and private sectors of Indian economy is not attempted here, but some joint ventures characterised by excellent team-work between the partners and giving evidence of their beneficial influence on the economy are cited.

The Rourkela steel plant is the biggest public undertaking that the Federal Republic of Germany accepted to erect and finance. Thirty-six major German firms and about three thousand sub-contractors featured as the builders of this modern steel plant. A vast number of Indian personnel—both executives and technicians—have visited Germany to confer with the supplier firms and receive training.

The team-work of Daimler-Benz, Stuttgart, and Tata Engineering and Locomotive Co., Jamshedpur, has contributed to the enormous popularity of and demand for the Mercedes-Benz Trucks powered by Diesel engines. Tata has also started the manufacture of locomotives with technical assistance from Krauss-Maffei and Henschel of Germany.

Bangalore has a prominent position on the industrial map of India and German participation in industrialisation is reflected in the following ventures :

1. Motor Industries Co. commonly known as MICO—with Robert Bosch—produces fuel injection equipment and spark plugs—items which are in great demand for the country's rapidly expanding motor transport.

2. Hindustan Machine Tools—with Fritz Werner—is engaged in the production of machine tools.

3. Hindustan Aircraft Ltd.—has a team of German experts assisting in the design of an All-India aircraft. At the same factory M.A.N. (Maschinenfabrik Augsburg-Nürnberg A.G.) is contributing assistance in the production of modern coaches.

Apart from steel production, there are the Indo-German Projects for fertiliser factories, in the electro-technical industry, chemical and pharmaceutical industries

ELECTRICAL SCIENCES BUILDING

MECHANICAL SCIENCES BUILDING

and the machine construction industry in addition to a large number of smaller projects each in their own sphere important. Up to the end of 1962, there were as many as 300 instances of capital and technical assistance projects between Germany and India.

Among the many construction projects involving German technical assistance and supply of equipment, I should mention the double tube design of the Banihal tunnel linking Jammu with Kashmir completed in 1956.

In a country where benefits of artificial irrigation are realised, 700 tube wells drilled by the German Water Development Corporation in Uttar Pradesh were a major contribution towards better cultivation and higher crop yields.

The sugar and cement factories supplied by German industries and erected by German engineers, German machine tools operating in Indian factories and workshops, German-built vessels flying the Indian flag, German-made power station equipment, German cranes for shipyards, dams and railways, German transformers for Indian industry—these and many other instances speak eloquently for Indo-German co-operation.

Participation in industrialisation naturally involves the responsibility for training personnel. The Federal Government and private industry both play their role in sponsoring traineeships in Germany. Indian trainees have been regularly receiving training in engineering and technology.

The contribution of the Federal Republic of Germany to the development of India can be broadly divided into three groups : participation involving technical assistance, financial participation which may involve capital or the supply of capital goods on deferred payment terms or a combination of both.

The credits provided by Germany in the last few years to assist India's economic development have been substantial. In contrast to direct investments by German business in India which is much lower than that invested by British or American business, the supplies of goods on credit within the scope of technical assistance have reached a handsome level. If we take into consideration the prolongation and long-term consolidation of India's liabilities, we arrive at Rs. 600 crores.

Before concluding, a reference should be made to the trade between the two countries. Reviewing the trend of the last few years, it is difficult to foresee any spectacular rise in India's export to Germany which would reduce the adverse trade gap. But the encouraging figures for 1961 indicate that something more could be done in the field of export promotion, the responsibility for which is to be borne by both the trading partners. Market research, standardisation, quality

control and last but not least repeated personal contacts which are the basis of lasting business relationship, have to receive serious attention.

Some time ago the Federal Republic of Germany made available to India, the services of three experts to advise India on general export promotion. Several recommendations were made. Following the suggestion of experts, a Trade Centre was set up in Frankfurt to promote export to Germany by direct contacts between Indian and German businessmen and by providing regular information to Indian industry about the German market, bringing to its notice any items important for India's exports.

The work of the Indo-German Chamber of Commerce over the past six years both in India and Germany deserves special mention. It is a new type of Chamber of Commerce for India where 'bipartite' organisations are not known. The Chamber took up practical work in March 1956 and has prepared the ground for effective Indo-German partnership dispensing advice on and promoting trade and co-operation schemes. The Chamber is in close touch with all levels of the central Administration in matters affecting Indo-German trade and industrial relations.

In conclusion may I remark that, whatever be the sphere of activity which brings Germans and Indians together, their joint contributions are based on respect for each other, friendship and generous goodwill.

In the years to come, there is little doubt that this peaceful team-work will grow at an increased tempo—cementing old friendships and contributing to the evolution by peaceful means of a democratic nation, a staunch friend in the free world.

THE VANISHING FRONTIER

by

R. NATARAJAN, I.A.S.
Registrar

The attempted substitution of God by Science and the hero-worship of the Machine are, unfortunately, the cruel characteristics of our modern age. However sagely Bertrand Russell might caution that 'the Machine as an object of adoration is the modern form of Satan, and its worship is the modern diabolism' and 'it is only when the Machine takes the place of God that I object to it; whatever else may be mechanical, values are not', it is an indubitable, though tragic, fact that standards, aims and institutions which were generally accepted even a generation ago are now challenged and changing. Old motives are weakening and new forces are springing up. Sociology and Psychology, Biology and Anthropology have undermined the traditions of orthodox theology. As Dr. Radhakrishnan has said, 'there is, everywhere, a quickened consciousness, a sense of something inadequate and unsatisfactory in the ideas and concepts we have held and a groping after new values.' Bertrand Russell was poignantly right when he said, 'we were told that faith could move mountains, but none believed it; we are now told that the atomic bomb can remove mountains, and everyone believes it.' Dissolution is, undoubtedly, in the air. An arrogant aggressive materialism, nurtured under the umbrage of the almighty State and mocking at the Individual, is sweeping a helpless world off its hobbling feet. Religion has gone to the wall.

Of course, the Communists have denounced Religion as the 'opium of the masses' but, sadly enough, they are not the only ones who deride it. There are the 'fashionable' who say that God is but a shadow of the human mind, a dream of the human heart. The skeptics, who dub Religion as a pursuit of infantile minds which the bold thinkers have nothing to do with, assert that there is no God and we are the instruments of a cold, passionless Fate, to whom neither virtue nor vice is of any account and from whose grasp we escape only to utter and total darkness. To them, Religion and its restraints are antiquated shibboleths. Many feel that Religion is the twilight moon, fading inevitably before the morning Sun of Science. They never tire of contrasting the prescientific world where all the

power was supposed to be derived from God through the open sesame of humble prayer, with the scientific, where, they say, 'it is not by prayer and humility that you cause things to go as you wish, but by acquiring a knowledge of natural laws' and draw up the balance sheet in such a way as to show that the power acquired in the latter fashion is much more reliable, as prayer had recognised limits—it would have been too impious to ask too much—while Science knows no limits and just waited for Man to unlock all its treasures.

It is true Science and its technique—technology—have given Man sweeping sway and sceptre over Matter—why, over Nature herself. As Bertrand Russell has pointed out, 'Man has existed for about a million years. He has possessed writing for about 6,000 years, agriculture somewhat longer, but perhaps not much longer. Science, as a dominant factor in determining the beliefs of educated man, has existed for about 300 years; as a source of economic technique, for about 150 years. In this brief period, it has proved itself an incredibly powerful revolutionary force.' Verily, the advance of Science has become latterly too spectacular and its range too wide for a quiet adaptation or quick assimilation. Nuclear energy has become a plaything in the hands of modern man, almost like a toy in the mischievous hands of a spoilt child. It is a potent instrument for good or for bad and as Sir Henry Dale, Nobel Prize winner, has cautioned, 'can either destroy civilisation or immensely enrich its possibilities.' But with all its efflorescence, is Science incompatible with true Religion? Is it true to say that Science has made Man arrogant and atheistic by giving him freedom from want and leisure, thereby fostering a 'work less but get more' philosophy? Has Science made an ethical existence impossible or difficult, to say the least? Should Science alone take the blame for all the ills of the day? These are the vital questions which assail the mind of every thinking man of today.

Obviously, the scientist is not the only one to blame. One is surely tempted to agree with Dr. C. P. Ramaswamy Aiyar's diagnosis that 'one of the main reasons for the catastrophic developments that we are now witnessing in the world is, perhaps, the exclusive and aggressive devotion of the scientist to his forte and the preoccupation of the teachers of the world with the non-moral aspects of education. Not less baneful has been the narrowly commercial and economic outlook that has produced the universal and illogical craze of self-sufficiency whereby a small group of a nation endeavours to produce everything for itself and to sell as much as possible to its neighbours and at the same time to keep out everything from outside. Specialisation, narrowness, exploitation, the deliberate ignoring of the neighbour's point of view are all exemplified in the conflicts of the present day, which are the result of wrong national education.' If the diagnosis is correct—I feel it is—it is clearly the absence of a vital education which provides the taught with a vivid awareness of the meaning of life, a conspectus of the world's problems in the proper order and the deliberate choice of the things that are really worthwhile, that is the basis for all this chaos.

WORKSHOPS

WORKSHOP-TYPE LABORATORY

A scientist is as much a good and peaceable being as any other. He gives us atomic energy. It is for the world to apply or misapply it. It would clearly appear to be wrong to blame the scientist for the ' Dr. Jekyll and Mr. Hyde ' personality of Man. No doubt, it is the scientist who places the temptation but he is no great saint who cannot resist it but will prefer Oscar Wilde's precept—The best way to resist temptation is to succumb to it.

Of course, there is always the danger of too exclusive an addiction to Science. 'The biologist intent upon the study of micro-organisms, the Chemist in his laboratory and even the astronomer gazing at his stars' tend to lose a sense of perspective and proportion. It is here that the scientist is apt to slide into a fanciful feeling that his work is the fulcral point of all existence: It is here that a corrective has to be applied and nothing can do this better than true Religion as distinguished from mere dogma or specific creed, posturing or fanaticism. Science and Religion have the same quest before them—the pursuit of Truth. They also adopt the same means to get at it—ceaseless enquiry and self-searching. There is, therefore, nothing incompatible between Science and Religion and, as such, there has to be beneficient interplay between them, if we are to survive the gloomy prediction of Bertrand Russell that ' we are, perhaps, living in the last age of man and, if so, it is to Science that he will owe his extinction.' Even as it is, Rajaji already feels that ' Science has outgrown her original, materialistic arrogance. Higher Science has now all the stuff of spiritual thought and is as mystic as the Upanishads themselves.' The late Albert Einstein was only very right when he said, 'I assert that the cosmic religious experience is the strongest and noblest driving force behind scientific research. The most beautiful and profound emotion we can experience is the mystical. It is the source of all true Art and Science. This insight into the mystery of life has given rise to Religion. To know that what is impenetrable to us, really exists, manifesting itself as the highest wisdom and the most radiating beauty—this knowledge, this feeling is at the centre of true religion. In this sense and in this sense only, I belong to the ranks of religious men.'

Bertrand Russell, who is as much a hard boiled scientist as he is a philosopher, has come out with the statement that ' modern science is tending to prove that there are no such things as things.' In other words, men and matter are merely apparent semblances, produced by ever active and perpetually moving protons, electrons and neutrons, whose vibrations just give the appearance. This is western science, physical science at that, but as Dr. C. P. Ramaswamy Aiyar has pointed out even the wildest skeptic will not deny that it was precisely what our Vedanta proclaimed millennia ago.

Or, for that matter, the philosophy of the unconsciousness or subconsciousness perfected by Freud, Adler and Jung—a philosophy which lays down that the human personality is seen only superficially, imperfectly when you look at the

apparent doings of a person. This theory of ' Submerged Personality ', which is now taken for granted, is what was exactly postulated under the Sushupti and Turiya states of Yoga philosophy.

Religion has clearly proved that what has been sought to be discovered or demonstrated by experimentation was in a mysterious but, nevertheless, vivid manner, perceived by intuition. It will, thus, be clear that Religion and Science are not only not incompatible, but also have to act together for the fulfilment of man's true destiny. Ex-President Eisenhower, himself a soldier-statesman, said once, ' Peace cannot be left to the diplomat and the soldier. It desperately needs the transforming power that comes from men and women the world over, responding to their highest allegiances and to their best motives. The cause of peace needs God.' Science, no less than Peace, needs God.

In fact, it is the vanishing frontier between Science and Religion, which Rajaji and Einstein have already perceived that is going to be our best bet against what Mahatma Gandhi once called ' the Godless fury of dehumanised Man '.

Technical Education in Germany

by

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Technology and Science are so much interwoven that a separation of the two is not possible. If we think of Mechanics, Thermodynamics or any other part of Physics, they are as much technical as physical sciences, and thus Technical Education is as much an education in science as one in what we may call technical matters, if we consider as technical matters, the development of everything that contributes to the welfare or destruction of the human race be it motor-cars or guns. Technical vocations range from the mechanics up to the research and development engineers. Accordingly the training and education will vary. In the lower ranges a larger part of training consists of acquiring skill and know-how, but science even centres there and it is unthinkable that an apprentice to become a mechanic does not acquire at least so much of science that he understands what he is doing and even is capable to think about improvements of tools and processes much to the benefit of the factories.

Elementary and Secondary schools

Realising the importance of science not only for technical but for any education, our schools lay much emphasis on sciences and start these subjects early enough so that a pupil leaving school at the age of 14 years has at least a fundamental knowledge of science. Moreover all the schools possess the necessary equipment to demonstrate in Physics and Chemistry abundant experiments to make the laws clear and unforgettable. Needless to say the classrooms are fitted with all installations necessary for demonstrating and that the demonstrations are prepared by the teacher before a class starts so that no time is squandered.

The education in school is essentially the same as in all schools the world over. A marked difference is the number of years spent in school. Everybody has at least to visit the elementary school, which he enters at the age of 6 years

and which, if he does not go for higher learning, he will leave at the age of 14 years. A pupil with the capacity for higher learning may at the age of 10 years switch over to a secondary school, which he leaves at the age of 16 years. The final examination of the secondary school does not entitle him to visit a university. After passing through the secondary school a pupil might stay on for another 3 years and thus leave the school at the age of 19 years. The examination he passes entitles him to enrolment at any one of the technical or non-technical universities.

Considering technical education only pupils leaving school at 14 years of age or after 8 years of school attendance are the ones going for a vocation as skilled mechanics. Those leaving school at the age of 16 years or after 10 years of school attendance go for a vocation as what may be called applied enigneers, while the ones who continue in school up to the age of 19 years will become academic engineers.

Mechanics and Foremen

To become a mechanic one has to go through an apprenticeship of 3 years. Apprentices are trained in factories which usually have a special department for apprentices under the guidance of one or more well-trained and experienced foremen-instructors. The training follows a well worked-out plan approved by the Chamber of Industry and Commerce. Besides the training in the factory the apprentice has to attend an apprentice school of the respective state government for one or two days per week. After finishing the apprenticeship the apprentice has to pass an examination before the Chamber of Industry and Commerce and only after having passed the examination successfully he is entitled to call himself a skilled mechanic.

After several years of experience as a mechanic and only after he finds himself superior to average mechanics, a mechanic may strive to become a foreman. When he passes an admission examination he visits a course of one year duration at one of our technical schools and concludes his studies with an examination, which brings him the title of foreman. With this course the training of a foreman, who rose in any case from the state of a highly skilled mechanic, does not come to an end. He will attend from time to time to special courses of shorter duration on subjects like time and motion studies, workshop organisation, workshop management etc. The German foreman being familier not only with the work of mechanics but also with the requirements needed for running a workshop, is put in charge of one or the other workshop and is responsible for it. The works management prepares everything what is needed for the work in shops, issues its orders to the foreman-in-charge and after that the foreman is left to himself and bears the responsibility for his shop and its products. Nobody has to interfere with his work, which anyway he knows best.

UNDERGRADUATES' HOSTEL (OPEN TYPE)

UNDERGRADUATES' HOSTEL (QUADRANGLE TYPE)

Applied Engineers

Omitting schools for training of draftsmen and schools for training of what are called technicians, which are meant for drawing and design of simple equipment, we may consider what we call schools for engineers. Admission requires attendance of secondary school up to the age of 16 years or 10 years of schooling and as a minimum 2 years of practical training. The subsequent education in the engineering school takes 2½ or 3 years. Only in such schools the education is based on text-books and consequently the students are learning in distinction from the universities, where they are studying. Accordingly the aim of such engineering schools is to produce engineers who are particularly fit to apply technical sciences, be it as designing or as production engineers. The extensive practical training keeps the student's mind on production and while working in drawing classes, he will do his drawings with the view on easy, accurate and economical production. About 90% of the engineers in German industry are such, so to say, applied engineers. They may be civil, electrical, mechanical, chemical, metallurgical or mining engineers.

The engineering schools are equipped with the necessary laboratories, which, since no research work is done except by interested teachers, are only of such extension as needed for routine testing of machinery and measurements. Such schools are well equipped with all facilities for demonstration of physical and chemical experiments in the respective classrooms, with models and charts and films and slides of technical objects and as a matter of course also with projectors and blackout curtains in the various classrooms.

Since a student in any school is not only supposed to learn, but should also feel that he is cared for and moreover should develop a sense of orderliness, the classrooms and the entire school are spotlessly clean, walls are properly painted, seats are comfortable and blackboards are large and really black. Students are invited to ask questions during lectures, and engineering societies of the students are welcome to forward proposals or complaints to make education as successful as possible and to quench dissatisfaction.

Technical Universities

Since 13 years of education in school are required for admission to a university, a student is not less than 19 years old, when he applies for enrolment. In case of mechanical, chemical and some other branches of engineering practical training is required to make the student familiar with the ways and difficulties of production. Half of the training has to be absolved before the start of studies, while the rest of the training can be done during vacations. The training officer provides the student with a curriculum for his training and places him in a suitable factory. The student is obliged to keep a record of his training and submit it to the training officer.

The 13 years at school give ample time to study Mathematics, Physics, Chemistry and to do many problems. The first year at the university therefore starts at quite a high level in these sciences and also commences with engineering sciences like Mechanics, Strength of Materials and others. Humanities have already been studied in school, and practical training is excluded from the study courses. Thus devoting the whole time to studies, it was originally thought that 4 years of studies would suffice for the technical education at a university. Practically it takes at present at least 5½ years to graduate and to get the degree of a Diplom-Ingenieur. Counting from entering school a boy has to put in 19 years of learning and studying or in other words he is 25 years old when leaving the university. In comparison a B.Tech. has put in 15 or 16 years all together and an M.Tech. 2 years more, which comes to 17 or 18 years of learning and leaving the university at the age of 24 years. This may explain why German universities do not consider a B.Tech. degree quite equal to the degree of a Diplom-Ingenieur. The curricula are in both cases about the same. The reasons for the longer time needed at German universities are various. The academic engineer is from the beginning trained for independent work, because later on in industry he is expected to play a leading and progressive part in design, production or research. There are no text-books, which will be followed by the professor and on which the student can rely. The professor teaches what he thinks best, and the student takes down notes and completes them by studying literature, which the professor will recommend to him. To make it easier for the student, most professors issue imprints containing important data, diagrams, formulæ etc. For this purpose the I.I.T. Madras has 3 years ago been provided with a Rotaprint machine. The lectures are accompanied by seminars, where one of the students is asked to refer about a given topic and to stand the questions and discussions coming from the attending students and professors. Further on there are design and drawing classes, where the students beginning with elements of machines proceed to the designing of complete machinery. Each student gets a separate problem to ensure as far as possible independent work. The drawing classes are only meant as an occasion for the student to come and to get advice from the instructors or professors. The hours set apart in the time-table for drawing classes would by far be insufficient to accomplish the drawings. This is next to the studies one main reason, why so many years are needed till one is admitted to the final examination. Another reason is the extensive work in laboratories, which is essential for creation of research-mindedness and ability. The Physics laboratory is the first laboratory in which the students work. Since during lectures the professor demonstrates all fundamental experiments, the students know, how it is done, and therefore in the laboratory can be put to special problems, for which they will find the equipment prepared by the laboratory attendants. They work in small groups or single as the case may require. In the Physics laboratory the student becomes prepared for the work in the engineering laboratories. This is why extensive and independent work in Physics and richly

available equipment are an absolute necessity. The work in the engineering laboratories is of two kinds. There are laboratory classes, where groups of students work under the guidance of the professor and his staff. Besides that students get individual assignments of problems, which they have to work on independently and which in fact are research problems. To make all this laboratory work possible, each laboratory has a sufficient staff of mechanics and its own workshop to help a student to rig up a test stand and to provide him with the needed materials. After submitting the required drawings and reports about his research work in the laboratories and after having passed the final examination, the student is obliged to work on a thesis for 3 months in case of design work and 4 months in case of laboratory work to get his certificates as Diplom-Ingenieur.

To get the degree of Doktor-Ingenieur (Dr.-Ing.), which requires in the average 3 years of research, a candidate has to submit a thesis, which must show progress in science and which has to be done independent of any help. The thesis is examined by two or three professors of the same or other universities. The oral examination is public and conducted by a committee of 3 to 4 professors.

After some years and after publishing research papers and completing a more comprehensive paper, a Doktor-Ingenieur may apply for the degree of a Doktor-Ingenieur habilitatus (Dr.-Ing. habil.), which degree entitles him to lecture at the respective university. After his thesis work has been accepted by the department, as an examination he has to deliver a lecture before the entire staff of the department and has to stand an exhaustive discussion afterwards.

Academic Freedom

We may distinguish between the academic freedom of the students and of the professors.

Regarding the students, they are free to choose among a considerable number of elective subjects supplementary to the compulsory subjects and they are also free to attend the lectures or acquire their knowledge in other ways. It is left to their own conscience and responsibility how they carry on with their studies. They are not pupils but grown-up students, and for failures they have nobody to blame but themselves.

The professors are appointed for a certain limited field of engineering. It is left to them what they teach within this field and how they do it. They have a certain administrative and research staff, in certain cases also assistant professors to whom the professor may assign certain lectures. The professor assigns the work to the staff. There is no question of interfering of a Head of Department or of a Director. The budget for the professor, his staff and laboratories

is granted by the Ministry of Culture of the respective state, and the professor spends his means within the budget according to his own judgment.

Organisation of a Technical University

Every full professor is in charge of a so-called chair, for instance chair of Combustion Engines or chair of Turbomachinery etc. A chair comprises the pertaining laboratories, the administrative staff, research staff, instructors, chief engineer and workshop staff, Assistant Professors and so-called Scientific Advisers, which do lecturing and research work as may be assigned to them by the professor.

The chairs of a branch of engineering, for instance Mechanical Engineering, are combined into a department. The Head of the Department is one of the professors elected by them for two years, after which another professor takes over. The Head of Department calls for departmental meetings, where problems of general interest are discussed and directives to the Heads of Departments are given. He has an office with an administrative staff to carry out the detail work.

Two or more departments with common interests like Mechanical and Electrical Engineering form a faculty. The Head of the Faculty is again one of the professors elected by them for two years.

The Heads of Faculties and Departments form a Senate which is presided over by the Rector. Also the Rector is one of the professors and after two years is succeeded by another professor. The Rector represents the University in public and also before the Minister of Culture. He co-ordinates the interests of the faculties and, in consultation with the Senate, takes decisions for the whole University. He has however just as the Heads of Faculties and Departments not to interfere with the work of the professors.

To become a professor requires a minimum of 10 years experience in industry and research, a reputation for this work and on invitation a number of successful lectures before the staff of the respective department. Hereafter a candidate on recommendation from the department in the first instance is appointed by the Minister for lifetime. The staff of chair is selected and appointed by the professor himself.

The administration is placed under the Rector of the University but otherwise entirely separated from the academic staff. Since every professor has his budget and also the freedom to spend his grants as he thinks fit and to purchase equipment directly from the supplier, the administration does only the bookkeeping for him. Otherwise the administration has the same tasks as anywhere else.

THE CAMPUS

By Y. S. RAMASWAMY
Superintending Engineer

The Indian Institute of Technology, Madras is the third in the chain of the four Higher Technological Institutes set up by the Government of India. This Institute has been set up with the aid of the Government of the Federal Republic of Germany in the matter of equipment to the extent of 16 million Deutschmarks (approximately Rs. 1.80 crores) and 20 Professors and 5 Workshop Foremen for a period of five years. Of the three other Institutes, Kharagpur and Bombay were set up earlier to the one at Madras and the Institute at Kanpur has also since started functioning. The Institute at Madras has been set up with the generous assistance of the Government of Madras with respect to land, water supply, electricity etc. The Institute is situated adjacent to the Raj Bhavan Estate and a total area of nearly 630 acres of land has been made available for the construction of the Institute campus, major portion of the area being carved out from the Raj Bhavan Estate and some portions in the neighbouring areas of Taramani, Pallipattu and Kanagam villages being acquired for the specific purpose of the Institute.

As a major portion of the Institute campus has been carved out of the Raj Bhavan Estate it is a fairly wooded area and has a good drainage. In the lay-out of the campus efforts have been made not to disturb the existing drainage and also to retain as many of the trees as possible to provide a natural surrounding for the entire campus.

The lay-out of the campus has been prepared by the then School of Town and Country Planning, New Delhi, now called the School of Town Planning and Architecture and can broadly be divided into four distinct sectors (see plan attached), namely, the Residential Sector, the Instructional Sector, the Hostel Sector and the Recreational Seetor.

1. *The Residential Sector :* When the Institute is fully developed it is expected that the total number of residential units that will be required to accom-

modate all the staff will be over 1,100 quarters. The residential quarters are being located as near to the main Guindy-Adyar Road as possible in order to give easy access to the occupants of the quarters to the main-road, the State Transport etc. In the lay-out of the quarters efforts have been made to have a mixed colony, the houses for the Professors, Assistant Professors and Lecturers being intermingled with each other. Further, in the lay-out of each of the buildings, the natural ventilation aspect has been fully taken care of and most of the buildings are facing either the south or the east direction so that the natural ventilation is not obstructed. Another important aspect that has been considered in the lay-out of the quarters is the retention of as many of the trees as possible around each of the quarters. In fact the location of the quarters has been done in as much of the open space as is available after retaining most if not all good-sized trees—the only exceptions being perhaps the palm trees which are not of much significance. The residential quarters are being built in various stages depending upon the recruitment of staff and the progressive development of the Institute. In the first phase of the construction of the residential quarters, the following constructions have been undertaken and completed.

Director's quarters ..	1	No.
Professors' quarters ..	20	Nos.
Assistant Professors' quarters ..	10	,,
Lecturers' quarters ..	24	,,
Associated Lecturers and Senior Technical Assistants' quarters ..	42	,,
Junior Technical Assistants, Mechanics, Foremen's quarters ..	66	,,
Class IV staff quarters ..	60	,,

In the second phase of the construction of the quarters, the following units are proposed to be constructed:

(1) Assistant Professors' quarters

(2) Lecturers' quarters

(3) Associate Lecturers' and Senior Technical Assistants' quarters.

(4) Office Assistants' and U.D.Cs' quarters

(5) Class IV staff quarters.

The total provision for residential quarters in the Project Report is Rs. 176.62 lakhs and the first phase of construction has cost the Institute approximately Rs. 27.63 lakhs and the second phase of construction which is being undertaken will cost about Rs. 27.42 lakhs for which necessary funds are available. The entire programme of construction of quarters is expected to be completed by 1966.

2. *The Instructional Sector :* In this sector, the buildings to be constructed are for (i) the administration, (ii) the various departments of the Institute, (iii) laboratories for the various departments, and (iv) one general workshop. In according priorities for the various buildings in the Instructional Sector, the highest priority has been given to departmental buildings and the laboratories, and the administrative building will perhaps be the last one to be constructed in this sector. For the various departments, the buildings are either separate or two or more departments are included in one building.

(*a*) *Building Sciences Block :* This building has a plinth area of 85,415 sq.ft. and provides for drawing halls, lecture halls,staff rooms and laboratories. The building has generally two floors excepting the front block

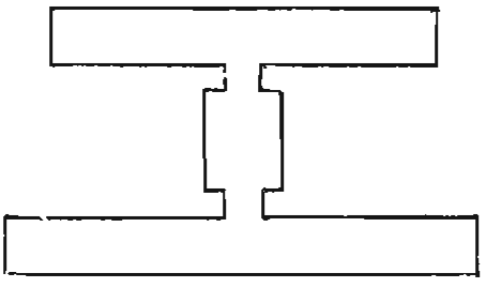


Fig. 1

which has ground, first and second floors. For the present, the Library is located in the top-floor of this building. The total cost of the construction of this building is Rs. 10,69,310 working out at a plinth area cost of Rs. 16.04 per sq.ft. The design of the building is entirely functional, and the specifications adopted are the minimum. This building was completed in August, 1961.

(*b*) *Electrical Sciences Block :* This building has a total plinth area of 1,29,090 sq.ft. and a carpet area of 89,685 sq.ft. The entire building has three floors, ground, first and second floors. The lay-out of the various labo-

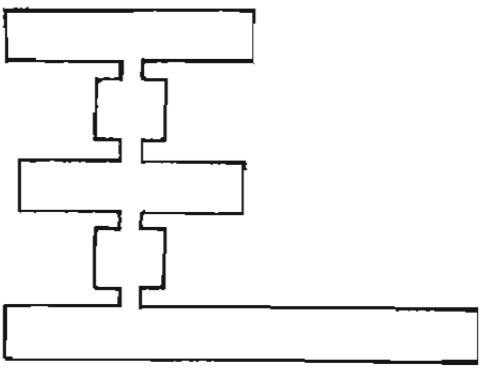


Fig. 2

ratories, classrooms, workshops have been finalised in consultation with the German Planners and is in accordance with their requirements. The building work was started on 27-2-61. A part of the ground floor of the building was however occupied for conducting classes from July, 1962. The cost of completion of this building is Rs. 21,00,000 working out at a plinth area rate of Rs. 16.27 per sq.ft. The entire building was completed in December, 1963.

(*c*) *Mechanical Sciences Block :* This building houses the departments of Mechanical Engineering, Chemical Engineering, Applied Mechanics, and Metallurgy. The respective areas allocated for each of the departments is 26,701 sq.ft. for Mechanical Engineering, 21,250 sq.ft. for Chemical Engineering, 17,050 sq.ft. for Metallurgy and 8,330 sq.ft. for Applied Mechanics (walls, lavatories and verandah etc. 46,728 sq.ft.). For each department necessary laboratories, staff rooms and lecture halls have been provided. The

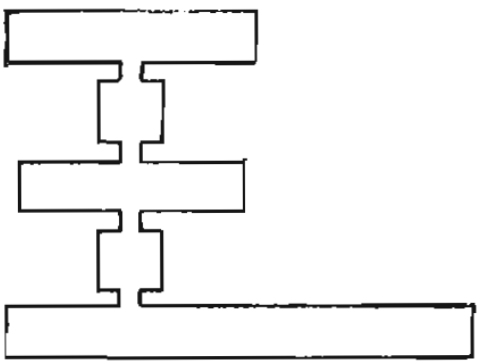


Fig. 3

total cost of the building is Rs. 21,20,000. The work of this building was started on 11-9-61 and is expected to be completed by March, 1964. It is however expected that the building will be occupied in portions as and when they are completed.

(*d*) *Science and Humanities Block :* This building houses the departments of Chemistry, Physics and Humanities. The total plinth area of the building is 1,84,820 sq.ft. and the respective areas allocated for the various departments are Physics 49,351 sq.ft., Chemistry 24,022 sq.ft., Humanities 1,102 sq.ft., Mathematics 10,203 sq.ft., and General including drawing halls etc. 34,257 sq.ft. (walls, lavatories and verandahs etc., 65,885 sq.ft.) The Science and Humanities building is also a three-floor construction and in addition it has three lecture halls, two small lecture halls to accommodate 200 students at a time and one big lecture hall to accommodate 400 students at a time. The lecture halls have provisions for a preparation room and a demonstration area with facilities as required by the German Planners. The total cost of this building is estimated to be Rs. 34.8 lakhs. The work of this

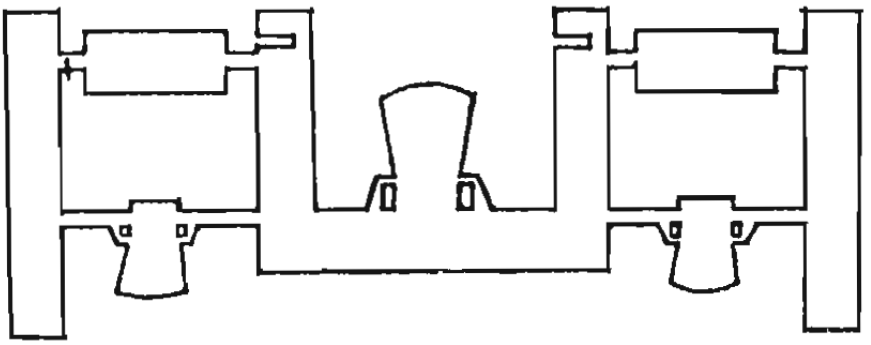


Fig. 4

building was started on 13-9-1961 and is expected to be completed in all respects by the end of 1964.

From the lay-out plan it will be observed that the various departmental buildings are located quite close to each other. The allied and associated departments are contiguous so as to promote co-operative research and facilitate inter-departmental consultation. Separated by a few hundred yards from these departmental buildings are located the various departmental laboratories which are noisy and dirty, and the workshops.

(*e*) *Workshops :* This was one of the first constructions taken up when the Institute was started in the campus and the work on this workshop building was completed in June, 1961 and is in occupation since then. The work-

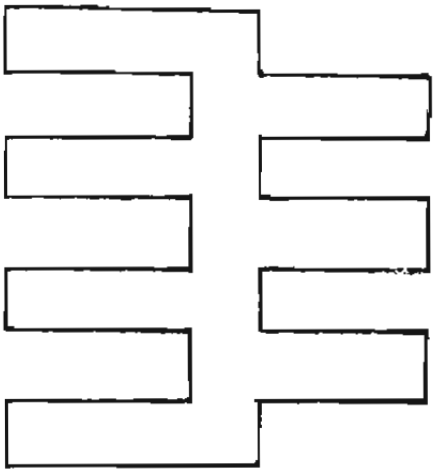


Fig. 5

shop provides for 7 distinct halls for each of the various sections, namely, carpentry, foundry and smithy, fitting shop, machine shop, electrical shop, welding shop and production engineering. Each of the halls is 150′ × 50′ and

has a R.C.C. shell roof construction. The workshop halls are located on either side of a common corridor and are provided with auxiliary facilities like store-rooms, staff rooms etc. The total plinth area of the workshop building is 68,891 sq.ft., the carpet area being 58,241 sq.ft. The cost of the building is Rs. 12.46,107 worked out at a plinth area rate of Rs. 23.60 per sq. ft. The Workshop is fitted with the most modern equipment.

(*f*) *Laboratories :* As an aid to the practical aspect of teaching and research, various departments have been provided with special laboratory facilities to enable them to conduct experiments and research. The laboratories which are however likely to be noisy and dirty and would require large supplies of water and power and have waste disposal problems have been separated from the main Departmental Buildings and have been housed in Individual Unit laboratories. At the present moment Individual Unit laboratories are under construction for Steam Engines and Thermodynamics, I.C. Engines, Metallurgy, Chemical Engineering, Fluid Mechanics, Turbo

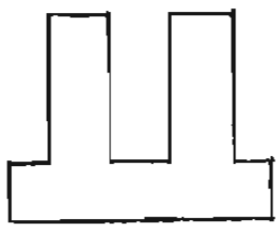


Fig. 6

Machines, Hydraulic Machines and Hydraulic Structures. Further, laboratories for hot and cold working of metal, a special shed for Chemical Engineering and a structures' laboratory are under contemplation. The design of the laboratories includes rooms in the front of the laboratory hall to provide space for a small workshop, instrument room, store, seminar room, research rooms etc. and at the back is a laboratory shed 120′ × 50′ for installing the machines and conducting experiments and research. Special facilities of power, water supply, steam, compressed air, vacuum, etc. are being provided in the laboratories, in accordance with their special requirements. The laboratories under construction are in various stages of completion and are expected to be ready for use from the next academic year.

3. *Hostel Sector :* The Institute in its ultimate set-up will have for the Five Year Courses 1,600 under-graduates plus another 400 students in Post-Graduate courses leading to Master's Degree, Doctorate and other research schemes. Hostel accommodation will therefore be required ultimately for 2,000 boys. A unit of the hostel has been fixed at approximately 200 boys and therefore 10 hostels will be required to accommodate the 2,000 boys. In the first phase of construction two hostels were built to accommodate 424 boys.

In the second phase of construction one more hostel was completed to accommodate 192 boys. Three more hostels are under construction each to accom-

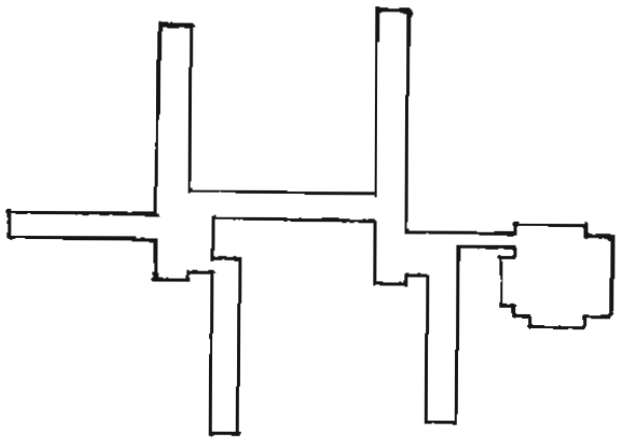


Fig. 7

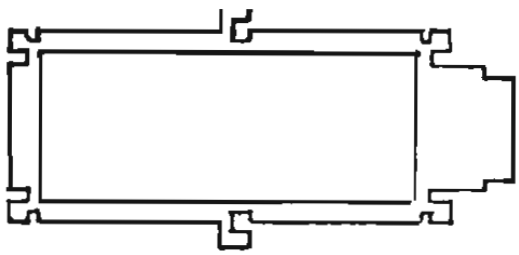


Fig. 8

modate 192 boys. Four more hostels are still to be constructed to complete the full complement of the hostels for the ultimate requirements of the Institute.

The hostels are all single-seated. The first two hostels that were constructed were of the open type (Fig. 7) which had its own advantages and disadvantages. The area provided in the first two hostels is 118 sq.ft. carpet area per boy (including balcony) and an overall area of 283 sq.ft. per boy including dining hall, kitchen, common-room etc. The cost per student in hostels No. 1 and 2 worked out to Rs. 5,450 exclusive of furniture.

As this cost and design was found to be costly the design of the present hostels has been amended to provide accommodation in a single-seat room for each boy of 82.5 sq.ft. in the room and in the overall 216 sq.ft. This has reduced the overall cost per boy in the hostels to Rs. 4,160. The design of the new hostels is of the quadrangle type (Fig. 8) with the kitchen on one end and the common-room at the other end of the quadrangle. The rooms are all facing south so that full and free ventilation is assured for each of the rooms.

In addition to the 10 hostels for the students an Officers' Hostel to accommodate 42 Officers has also been completed (Fig. 9). The accommodation

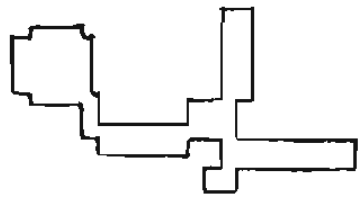


Fig. 9

provided in the Officers' Hostel is a single room 12′ × 10′ for each Officer with an attached bathroom and a balcony. There is a common-room, a kitchen and a dining hall for all the 42 officers that are likely to stay in the hostel. This accommodation is meant especially for the Bachelor Members of the staff of the Institute and the staff and senior members who are likely to come from other Institutes for a short period either for seminars or refresher courses or for any other special meetings or discussions.

In addition to this it is also proposed to have a Girls' Hostel to accommodate the girl students who are likely to join the Institute.

4. *Recreational Sector :* In this sector it is proposed to provide necessary playgrounds, swimming-pool and gymnasium and a lake for students where rowing facilities are expected to be provided. The playgrounds are located in between the residential quarters and hostels and nearer to the hostels for the benefit of the students staying within the campus.

5. *Other amenities :* In a campus of this nature special facilities for recreation, children's education, marketing etc. become a fundamental necessity. For recreational purposes, an open-air stadium to accommodate about 5000 persons has been constructed at a cost of about Rs. 2½ lakhs and is available for special occasions.

A marketing centre for meeting the daily necessities of both the students and staff members staying in the campus has been constructed. It is proposed to construct necessary schools for both the primary and secondary stage students. A small hospital with 15 beds is also proposed to be constructed for the benefit of the occupants of the campus. A branch of the State Bank of India is already functioning in the campus from 19-11-62 and a post-office has been functioning from 2-7-62. The Institute has its own transport services for the facility of the staff and students who have to go out of the campus to catch the normal State Transport buses etc. There are two buses of the Institute running at frequent intervals.

A small Guest House with 4 beds has been constructed for the benefit of any important guests likely to visit the Institute.

6. *Services :* Necessary services like roads, parks, water supply, electricity, drainage have all been provided to reasonable standards.

(*a*) *Roads :* A total length of 16.4 miles are proposed to be provided when the campus is ultimately developed. For the present 7.5 miles of roads have been completed. There are three main important roads in the campus and they have been named Delhi Avenue, Bonn Avenue and Madras Avenue, to symbolise the common efforts being put by the West German Government, the Government of India and the Government of Madras in the setting up of this Institute.

(*b*) *Water Supply :* The water supply to the campus will ultimately be from two main sources namely the Urur Water Supply Scheme sponsored by the Institute at Urur about 3 miles from the Institute and an assured supply of 4 lakh gallons per day from the Municipal Corporation of Madras. The water that is pumped from the Urur Scheme and the supply from the Corporation is expected to be collected in a sump near the entrance gate and pumped to two overhead reservoirs of the capacity of 1,50,000 gallons and 50,000 gallons suitably located to serve the entire campus. Necessary main and branch lines have been laid to serve the entire area. The total length of pipe-line that will ultimately be laid is 10.7 miles of which 9.4 miles of pipe-line work has already been completed.

(*c*) *Sewerage :* The campus is served by underground sewers. The sewage is ultimately treated in an oxidation pond. The treated sewage is being used to develop a sewage farm at the periphery of the campus. The total length of sewage lines to be laid in the campus is 13.00 miles of which 7.5 miles of sewage line work has already been completed.

(*d*) *Electricity :* The ultimate requirement of electricity in the campus is about 2,000 Kw of which the Government of Madras have for the present assured a supply of 1,000 Kw and a further request for additional supply of another 1,000 Kw is being made. The distribution within the campus has been the responsibility of the Institute authorities and necessary transformers and sub-stations have been provided for this purpose.

The total cost of the entire Civil Works in the setting up of the campus is expected to be Rs. 4.65 crores out of which Rs. 1.7 crores have already been spent and the balance is expected to be spent in the years to come. The budget allotment for the year 1962-63 is Rs. 120 lakhs and for 1963-64 Rs. 80 lakhs.

When the entire compus is completed it will be a small self-contained township of 10,000 persons with all up-to-date facilities provided within the campus.

RANDOM REFLECTIONS ON THE HUMANITIES COURSE IN I.I.T., MADRAS

by

PROF. R. KRISHNAMURTI, M.A.
Head of the Department of Humanities

The need for teaching some Humanities subjects in Professional Colleges and Technological Institutes has been urged by almost every person who has bestowed any thought on the subject. In the Indian Institute of Technology, Madras, every undergraduate student has to study some languages and some social science subjects. The study of the Humanities extends over all the five years of the course.

The Indian Institute of Technology, Madras, started functioning in July 1959 : and a Courses Committee set about preparing the scheme of studies for the undergraduates. A special Committee called the Humanities Advisory Committee was constituted with the Director of the Institute as the Chairman, and a number of experts as its members. The following were the members of the Committee :

Professor B. Sengupto.
Professor R. Balakrishna.
Professor C. V. Krishna Rao.
Professor A. L. Krishnan.

The Committee went into the whole question in great detail at more than one sitting, and arrived at certain conclusions. They had with them for their guidance the course of studies in Humanities in the Massachusetts Institute of Technology, the University of Michigan, the University of Madras, and the Indian Institute of Technology, Kharagpur.

The following was the scheme recommended for the I.I.T., Madras, by the Humanities Advisory Committee :

I Year —English—3 hours a week.

II Year { English—2 hours a week.
German—2 hours a week.

III Year —History and Culture—2 hours a week.

IV Year —Principles of Economics—2 hours a week.

V Year —(*a*) Industrial Economics including Cost Accounts and Labour Relations. } 2 hours a week.

—(b) Industrial Management, including Industrial Psychology and Human Relations. } 3 hours a week.

These are days of specialization : and a Higher Institute of Technology like ours at Madras has as its primary aim the giving of specialised training to its students to enable them to become good technologists and engineers. The need for first rate specialists in Technology, especially in an under-developed country like ours, is very great. Without them, there can be no scientific progress or technical or technological accomplishment. Vast scope for specialisation is available in the fields of Pure Science and/or Applied Science.

At the undergraduate level, the Indian Institute of Technology, Madras, is training its students (in addition to the Humanities) in Mathematics, Physics and Chemistry, and in one of the specialities—Civil, Mechanical, Electrical, Chemical Engineering and Metallurgy. Out of 39 hours a week, students devote about 36 hours for the study of Pure and Applied Sciences.

All over the world, and particularly in the developed countries of the West, people are recognising the need for some general education being imparted to students undergoing specialised courses in Science. In India also, great luminaries like the President of the Indian Union, the Prime Minister of India, Ministers of Education at the Centre and the States, University authorities, and distinguished educationists who can speak on the subject from their rich experience have all spoken with one voice on the need for teaching some Humanities subjects in Professional Colleges. To take only one example, some months back, the Minister in charge of Education with the Union Government, expressed himself on the subject in unequivocal terms. According to him, subjects like history, languages and Social Studies should be introduced in the curriculum of professional colleges, as the Humanities widen the outlook of men, and give a new meaning to their profession. Another great educational authority thinks on the same lines, and is of the opinion that as part of general education in a Professional Institute there should be provision in the syllabus for the study of foreign languages, the thought and culture of the ancients, the elements of Economics, the study of international relations, and some other kindred subjects.

The question has sometimes been asked why the Humanities should be taught at all to prospective engineers and technologists. It is said that when a student enters an Engineering College or a Higher Technological Institute, he has already

received the necessary general education, and that there is no further need for special provision being made for any more training in the languages and the Social Sciences. Some may even go to the extent of saying that the Humanities may be scrapped altogether from the curriculum. Happily, the men who think on these lines are very few in number.

The Massachusetts Institute of Technology, which is in many ways a model for Technological Institutes, expects every student to take some lectures on English Literature, and one or more foreign languages and some Fine Arts : and one distinguished President of the same Institute declared that the ' Institute trains for life and for citizenship, as well as for a career. Its teaching staff seeks to cultivate in each student a strong character, high ideals, as well as a keen intellect.' These words are significant.

Such a training given to the students of Technology will help in the creation of fully developed personalities, with all their faculties experiencing an all-round development. They will be benefited immensely by a working knowledge of various branches of study not coming under their field of specialisation. The professional man (it has to be remembered) is not merely a component of the machinery of a large workshop or factory. In the practice of his profession, he has to deal with quite a number of human beings. Human reactions, feelings and imagination are inevitably brought into play. It is clear that if the specialist in some branch of Science is to make himself socially useful, he should have a good understanding of the community which he is called upon to serve.

Already, society and employers have begun to realise that while specialization is necessary, it can never be an end in itself. Education does not aim at merely producing human robots. The specialist should have his vision widened, and his personality enriched. He will be distinctly the better for a cultured mind and a developed outlook. The study of psychology, sociology and other social sciences will be very useful to the engineers by equipping them with a good knowledge of human nature and human relations.

So far, an attempt has been made to show how the study of the Humanities will be *useful* to the Technologist, how it will increase his *usefulness* to the community. Let us remember at the same time that this is only one aspect of the problem. The study of the Humanities is an end in itself, and will open out vistas before the specialist, which he would not have dreamt of. The Delectable Land is always there for him to enter and enjoy. That is why the study of the Humanities is considered to be one of the intellectual disciplines. No student's education will be complete, even in a technological institution, unless he has learnt to experience at least some of the thrills and joys which Humanities alone can give.

The reading of history, sociology and literature, the capacity for a right appreciation of the Fine Arts like Poetry, Drama, Music, Sculpture, Painting and Architecture, and the study of International Relations are rewarding experiences. What pleasure there is in reading some of the great classics of the world—the plays of Shakespeare, the poems of Milton and others, and the masterpieces of Kalidasa! They plumb the innermost recesses of the human heart. What thrill is experienced when one listens to the inspired compositions of some great musician (Beethoven, Wagner, Theagaraja) or stands before the Taj Mahal at Agra or St. Peter's Church at Rome! How entrancingly beautiful are some of the great masterpieces in painting or sculpture! How the student of history stands dazzled when he studies the progress achieved by mankind through the centuries, in spite of all the wars and battles, intrigues and failures, and the various acts of human folly and human crimes! How much the study of Economics means to the individual and to the community in this complex modern world! And how fascinating it becomes when expounded by an inspired teacher! How we experience a widening of our mental horizon when we read the great books written in other languages by some of their accredited leaders of thought—whether in the field of Arts or in the field of Science!

GERMAN MEMORIES

by

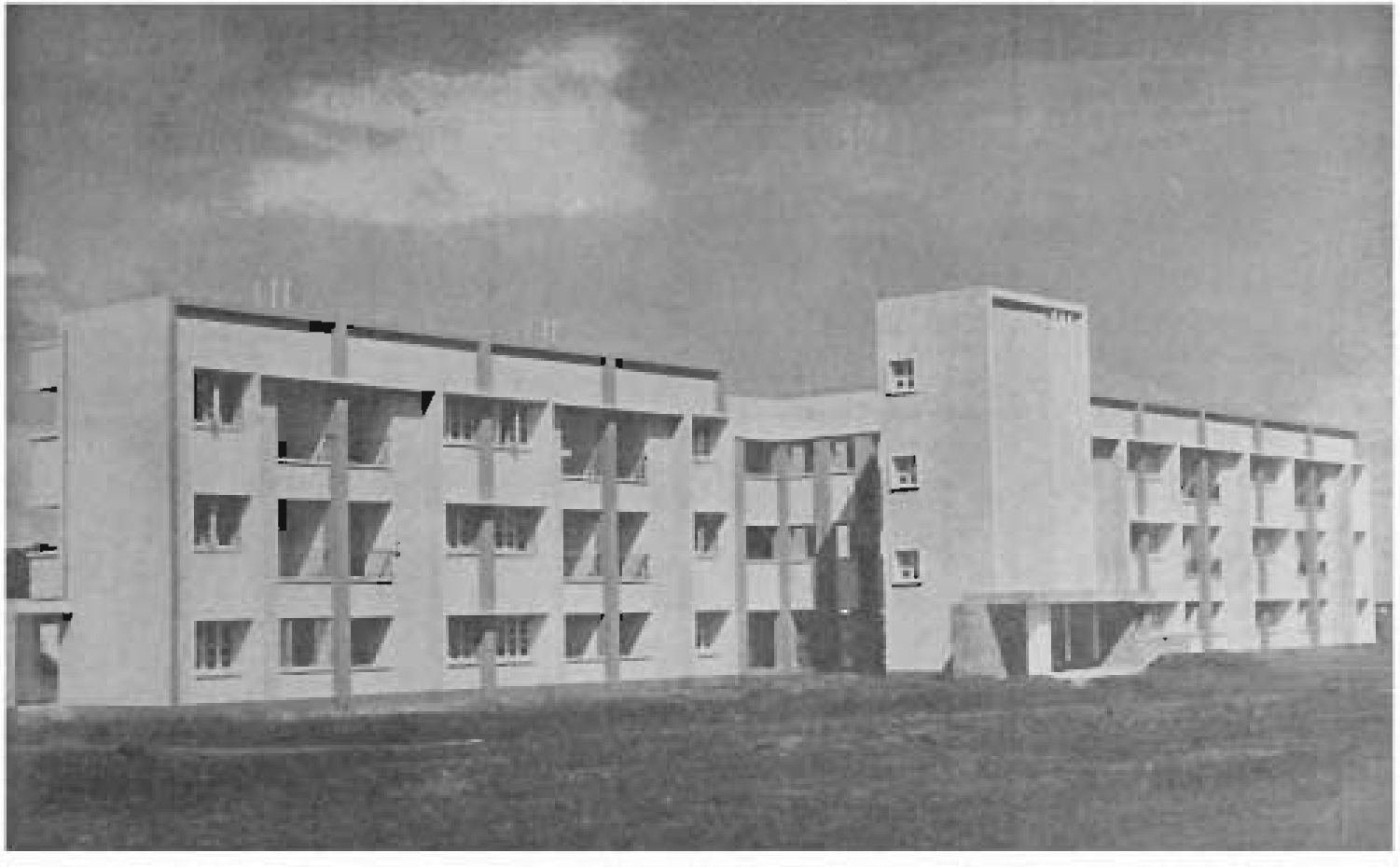
DR. T. RAMACHANDRAN
Assistant Professor, Department of Metallurgy

Although owing to historical reasons the United Kingdom has been the Mecca of Indian students and trainees for a long time, there has been, especially since the last war, a growing tendency on their part to seek knowledge in the other advanced countries as well. For reasons of language and similarity in the educational system the majority of Indians wishing to attend a University or a Technical College abroad still prefer the U.K. or the U.S.A. to other countries. Where specialised practical training is the goal, W. Germany seems to offer special attractions to the aspiring engineer and has become an important centre for the training of Indian engineers and technologists. It is no exaggeration to say that most Indians, who have had the opportunity to work in the U.K. or elsewhere in Europe, consider their preparation for a professional career incomplete, unless they put in a spell of work in German Industry.

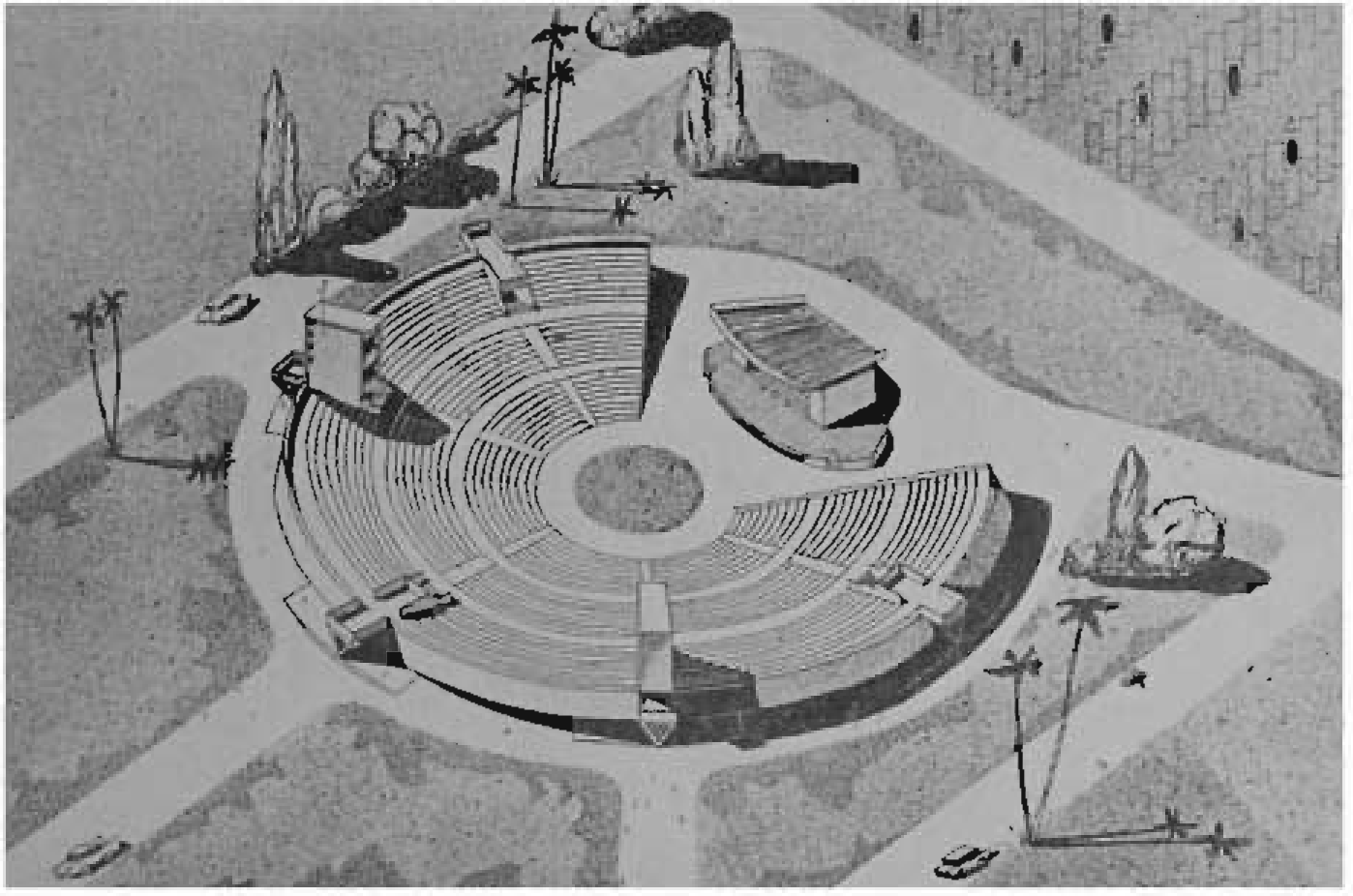
The reasons for this are not far to seek : even before the war the words ' Made in Germany ' meant much to the Indians. The tremendous creative activity of the Germans after the most complete destruction imaginable, however, fired the imagination of the new generation of Indians, whom Destiny marked out to be the torchbearers of a resurgent India, determined not to remain the despicable dot that they are on the industrial map of the world. Was not the example of the Germans, who rose like the Phoenix from the ashes, worthy of emulation ?

I do not suggest for a moment that only such ideals motivated my own trip to Germany. The desire to improve on my training as a foundryman—started in India, matured in the U.K.—in one of the renowned foundries in W. Germany was certainly the main aim ; not insignificant, however, was the role played by a spirit of adventure, or desire to experience for oneself something of the mood of a great nation at work in a gigantic way !

The process of getting fixed up in Germany was not without a trace of drama, only one firm out of twenty to which I wrote responding even partially positively.



OFFICERS' HOSTEL



OPEN-AIR THEATRE

Even that one did not go beyond offering to consider my application at a later date, when the Indians already with them were expected to depart. All this I learnt, of course, with the help of a teacher of German at the local school in the small town in Scotland, where I was working at the time. Soon I learnt to my discomfiture to look for the three damning words, incidentally also the first three words of German I picked up, which were the common theme of all the other nineteen replies, viz.: leider . . . . . nicht . . . . . moeglich (unfortunately . . . . . not . . . . . possible) ! Most of them had several Indians working with them already and were committed to train people for the Rourkela plant.

That one-in-twenty chance did finally work out in my favour, the Bergische Stahl-Industrie in Remscheid taking me on for an initial period of six months. I would have been in hot waters if they had not done so, for I had no money to pay for my passage back to India. An interview with an Indian Firm in London, coincidentally fixed up at the proper time, helped pay my fare from Scotland to Utrecht in Holland (the firm paid return-fare with no questions asked !) where, meanwhile, I had secured an International Student Exchange Scholarship for two months. This fellowship suited me fine as I had exactly two months to go before starting work in Remscheid, which was only three hours' journey by rail from Utrecht.

Thus it was purely a combination of circumstances, Fate as one may call it, that determined the course of my life for several years to come. (Like the man who came to dinner and stayed on for six months, I lived in W. Germany for nearly six years though I had planned for only six months !)

In the railway bookshop at Duesseldorf, I armed myself with a copy of *German Without Toil*, which has been my constant companion ever since. I started my serious study of the German language in the overheated, rather stuffy, compartment of a fairly antiquated-looking train, the like of which is found in Germany only rarely. I had not proceeded far, certainly not beyond the first lesson, when I heard someone shouting something of which I clearly heard the word Remscheid. Believing that I had arrived at my destination, I asked, with appropriate gestures, one of my co-passengers, with an economy of words rendered necessary by linguistic ignorance, ' Remscheid ? ', to which he replied ' Ja. . . . . Remscheid. . . . . ' This was confirmation enough for me, though the gentleman gesticulated to me still and tried to tell me something more. I was now on the platform and the train began pulling out of the station which was rather badly lit and looked very deserted. I looked frantically for my luggage from the brake-van, flaunting my baggage ticket but nothing was to be seen. Finally I did manage to convey my problem to the Station Master with the help of gestures and the baggage ticket. He immediately took up the telephone and conversed with someone somewhere, and then proceeded with success to make me understand that I had alighted at an unimportant station at the end of Remscheid,

and that another train in an hour's time would take me to the main station. My luggage would be perfectly safe and would be awaiting me there !

As accommodation had been arranged by my employers I had absolutely no difficulty in that score. Conversing with the landlady, however, was a major problem as her knowledge of English was considerably less than mine of German, and my acquaintance with the Teutonic tongue consisted largely of half a lesson in *German Without Toil* ! You can then imagine my relief when it turned out that the other occupant of the two-room flat and employee of the local Post Office knew some English as a result of association with the occupation forces after the war ! After a month or so he was posted elsewhere and in his place came a veritable master of the English language. Both this gentleman and his fiancée, now his wife, had worked for the British after the war and had a rare command of English. There soon developed a conflict of interests as he would come to my room in the evenings to practise his English with me, while I was busy learning German from my book. I must say I greatly resented his intrusion at the time, and more than that, his well-meant insistence on the use of English. I told him then of my desperate need to learn German, and we soon became good friends and learnt to live together in harmony and to our mutual benefit. We left the flat, for different reasons, after about six months, but kept in touch with each other.

It took me only a few days in Germany to learn an important difference between the British and the Germans, namely, the much more ' open ' nature of the latter. In Britain I had the advantage of the common bond of language and felt perfectly at home, in a way. I got on very well with my co-students and later with my colleagues of all ranks, but the relationship was mostly confined to the college or the hostel or the factory. I was very rarely invited by my friends to their homes, and there was always some sort of a barrier. Within a week or two of my stay in Remscheid, however, I had been invited to more homes than in my three years in Britain ! And this was not some make-believe invitation to assess the strangeness of a foreigner. After more than five years in Germany, I was still very much at home in all these places. The contrast was very real and, coming immediately after my experience of Britain, was particularly striking.

In the factory too I was looked after well right from the first day. A young German engineer who knew excellent English was entrusted with the task of helping me find my feet and he it was, who guided me through all the routine procedure of the first day of work. Permission had to be taken from the Trade Union representative before any new appointment (yes, in ' capitalist ' W. Germany !), other formalities like informing the administration about my joining duty, registration with the police, application for a working permit and so on had to be gone through. Without this help all this would have been very difficult for me. (He and his wife were a great help to me throughout my stay in Germany, and I learnt to appreciate their constant friendship and hospitality). What I

still vividly remember of that day is the look of utter disbelief on the face of the office-girl at the police office when she took down my father's name and found that our names had nothing in common !

My first assignment was to assist two students doing thesis work for their first degree. In return they were to teach me German and generally help me get settled down. Some sort of a friction developed between me and one of them, particularly when he repeatedly requested me to carry empty milk bottles (after we had all consumed huge quantities of milk) upstairs from the laboratory, which had been rigged up in a cellar in the foundry. In the beginning I thought every one would take his turn, but this failed to materialise. As a graduate of some years' standing (!) I was a little offended, so I refused to do it any longer, except strictly on a duty-sharing basis. He saw the point, and we got on fairly well thereafter. We soon made up a foursome for Bridge and had quite a few jolly evenings, even though I left them after a couple of months and started moving about the foundry to learn the art and technique of steel melting and casting.

One incident that stands out in my mind is my learning, by experience, how to get on well with German workmen. (Of course, I do not mean that it does not work with others !) The first melts of metal for my work had been got ready and instructions had already been given to the Workshop attached to the Laboratory to machine the test-pieces required. But even after two months no test piece came, and my repeated visits to the small workshop revealed no attempt to start work on my material. The workshop foreman (Meister) would explain to me how much work he had, which was all connected with production control and so took precedence over other types of work. But I noticed that as soon as I entered there would proceed from all the machinists some sort of a choking sound and the word Durst (thirst). I had not been long enough in Germany to understand the significance of this general manifestation of extreme thirst. Soon, however, someone in the Laboratory put me wise on this, and all I had to do was to press a five-mark note into a collection box kept for the purpose in the Workshop. Towards closing time that day I was summoned to the presence of the foreman and, with Schnaps-glass in hand, he wished me all success in my work ! This was important, for, from then on I never had any difficulty with test-pieces and other materials. I had only to indicate what I wanted and when I would like to have it. I started to enjoy the joke, and we used to have occasional thirst-quenching sessions in the small workshop !

Being rather familiar with the British foundry industry, I was struck by the large number of highly qualified engineers employed by the Bergische Stahl-Industrie. Later I discovered that this was the case with all industries in Germany. Whereas, at that time at any rate, the majority of management posts in England in the Iron and Steel and kindred industries were held by persons without any formal academic training, but who had reached the top by dint of

hard work, most of the persons in such posts in Germany had either been to a Technical University or to a College imparting a more practical type of education. It is difficult to say categorically which system works better, as both England and Germany seem to he doing quite well though I feel that the German industry has produced more new ideas in the form of new materials and processes. One result of the presence of a large number of academically trained people in the German industry is that a lot of experimentation goes on, even, so to say, on the shop-floor. They seem to have realised in England too that a University man is more likely to bring in new ideas and try out innovations, and serious attempts are being made to attract such men to take up posts in the practical field, as distinguished from the purely design and research positions.

Research and development play a very important role in German industry and most of the medium-sized and all the large units have their own research laboratories, often combined with their control units. A large amount of original work is done, often of a fundamental nature, and quite often the results are then tried out for validity in large-scale operations. There is complete interchangeability of research personnel in industrial laboratories and academic institutions, and often there is active co-operation between them. Most of the professors in the technical field do consultation work (I understand that the Universities or the concerned ministries never interfere in this ; nor do they demand a portion of the consultation fees !) for the industry and are thus in active contact with industrial problems. Many of the heads of industrial research laboratories are invited to lecture at Universities on topics not always covered by formal lectures, and those among them who satisfy certain University requirements are appointed honorary professors. The firms, no less than the recipients themselves, consider this a great honour and offer every encouragement to such people.

The possibility of earning a Doctorate degree for research carried out in a Works laboratory is a great spur for such activity in these places. Generally speaking, a laboratory having a Professor or a University lecturer as its head always goes in for Doctorate work. In special though rare cases, other persons of outstanding ability may also be allowed to guide such work. In any case close co-operation with the Professor at the University where the thesis has ultimately to be submitted is essential. A peculiarity of much of this type of work is that laboratory-scale experiments of a fundamental nature are correlated to results obtained in actual practice. Where some special equipment required for a particular investigation is not available in a Works laboratory, the candidate may be deputed to one of the Max-Planck-Institutes or a University institute. Thus I spent nearly a year at the Max-Planck-Institute for Research in Ferrous Metallurgy in Duesseldorf on deputation, and there was never any hesitation on the part of the firm to pay all the connected expenses. Often, as in my case, the work is treated as part of the normal programme of the Institute and is not charged, but in such cases the results are published as a joint communication

from the firm concerned and the co-operating Institute. This arrangement works out wonderfully as it leads to full utilisation of the facilities available at both places and helps in avoiding all unnecessary duplication of costly and specialised apparatus. The example of the Bergische Stahl-Industrie, employing about 3000 people, is an indication of the extent of work done in industrial laboratories ; during the years 1950-1960 some six persons completed the work towards their Doctorates ; a dozen or more substantial pieces of research work, each consisting of full-time work for 6-9 months, were completed in part fulfilment of the requirements for the Diplom-Ingenieur examination (the equivalent of a M.Tech. degree) ; several other investigations of practical importance were carried out by students as part of their curricular assignments ; all this, of course, in addition to the various studies conducted as part of the quality control programme or to investigate particular failures.

As regards the actual working of the factories or in the working conditions there is not much to choose between the best of Germany and the best in Britain. Workers' participation in management is particularly well-developed in Germany and there is a union representative (or more than one, as the case may be) permanently assisting and sometimes advising the Management on all matters of policy and control that affect workers in any way. Of course the Trade Union representatives often complain that the figure of production and profits revealed to them are not often the actual ones, but this suspicion may be a hang-over from the days of antagonism between Labour and Management. On the whole the relations between the employers and employees seem to be very good, and one doesn't find in Germany the obvious clash of interests and the almost open hostility between the two groups that one senses in Britain.

One aspect of industrial management in Germany worth mentioning is perhaps the composition of the Boards of Directors. Generally speaking, there is equal representation for technical and non-technical people, the latter usually lawyers or economists. This well-balanced set-up ensures on the one hand, as one Technical Director of a firm (himself a professor) put it, that economically non-feasible flights of his fancy are checked in time by the hard-headed economists, but that on the other hand, technical improvements are not completely hamstrung by the lack of engineering vision on the part of the non-technical Directors, who, as a rule, seem to have the final say anyway. I must also point out that even the non-technical members of the Board acquire an amazing knowledge of the Industry they manage, mostly owing to long apprenticeship and association, as they generally ' grow up ' in the firm.

I have only tried to touch upon a few random points that struck me particularly during the time I spent in the German Industry. I have no claim to any specialised knowledge on all aspects of German Industry and many of my

statements and conclusions are perhaps strictly limited in validity, and strongly coloured by my personal experience. I have purposely not expatiated on the very hard and thorough work the Germans have been putting in all these years, mainly because it has been written about so much and can be considered well-known !

I wish to conclude this account of some of my experiences in W. Germany and of a few impressions gained there with my unqualified appreciation of the extremely friendly and helpful attitude of all the Germans—they included workers, students, engineers and professors—with whom I was associated during a period of nearly six years. I sometimes wonder whether we in India, on our part, are doing all we can to help and co-operate with the German advisers, engineers, technicians and teachers, who are trying to do a difficult job in very strange surroundings. I hope very much that as time goes on we will learn to appreciate each other's qualities better and that an even more fruitful co-operative effort will emerge than at present.

EARLY GERMAN CONTRIBUTIONS TO INDOLOGY

by

DR. N. KLEIN
Professor of German

Whenever a conversation turns to the subject of the history of German Indology, especially to that of its beginnings, it invariably is the name of one man that is mentioned first, that of Friedrich Max Mueller whom India has honoured by Sanskritizing his name into Moksha Mular. Often it is even claimed that he was the founder of, at least, German Indology.

Far from intending to belittle Friedrich Max Mueller's contributions to Indology which will be mentioned in due course, I am afraid this myth has to be destroyed if a true account of the beginnings of German Indology—even as a scientific discipline—is endeavoured, for the year Friedrich Max Mueller was born, the first German university chair for Sanskrit at Bonn was already five years old.

The question, however, is whether or not it is correct to date German Indology only from its becoming a scientific discipline, i.e., from the day the first regular chair for Sanskrit was established. According to a lexicographical definition, Indology is 'a branch of arts dealing with India, her archaeology, history, culture, art, literature, philosophy, religions, and languages.' If we stick to this definition—and there is no reason why we shouldn't—it seems only proper to consider any work on any of the subjects mentioned part of early Indology provided, of course, it has a scientific approach. This may even include books of travels. It may, but it mustn't, as publications especially of the last fifteen years have shown which not only lack a scientific approach but quite obviously any serious approach whatsoever. However, it is, for instance, surprising what German officers and soldiers in the service of the Dutch East India Company observed, noted down and brought back to Germany from their travels to India, in particular to the Malabar coast These reports written between 1602 and 1797, have, fortunately, been collected and published in thirteen volumes along with those on travels to other Eastern countries and to the West Indies ('*Reisebeschreibungen von deutschen Beamten und Kriegsleuten im Dienst der Niederlaendischen West-und Ostindischen Kompanien* 1602-1797', *Haag* 1930-32).

In 1651, a most remarkable book was published at Leyden (Holland), *De Open-Deure tot het verborgen Heydendom* (The Open Door to the Hidden Heathendom) by the Dutch missionary Abraham Roger who had been working at a mission north of Madras from about 1630 onwards. In its subtitle, this book promised to be a ' true account of the Life and Customs, in particular of the religion and the worship of the Brahmins at the Coast Chormandel and the countries thereabout '. It became, to use a modern term, a bestseller and was soon translated into several European languages. Its German translation appeared in 1663 at Nürnberg. What made this work so particularly valuable was the fact that it contained the first translation into a European language of Indian poetry, of two hundred verses from Bhartrihari's famous *Satakas*. Thus Bhartrihari was the first Indian poet to become known in Germany.

At about 1650, Father Heinrich Roth (1610-88) who worked for almost thirty years at Srinagar, Garhwal and Agra, wrote the first grammar of the Sanskrit language. This grammar, composed in Latin, was, however, never printed, but the manuscript is still extant. He also contributed script plates in Devanagari to Athanasius Kircher's *China Illustrata* published in 1667 at Amsterdam, a work which also contained a number of illustrations depicting Hindu deities and scenes from Hindu mythology such as the ' Churning of the Milk Ocean '. The title of this book which in English means ' Illustrated China ', must not be taken literally. At that time, ' China ' still stood for everything far to the east of Europe.

Another German missionary, the Jesuit padre Johannes Ernst Hanxleden who died in 1732, also wrote a Sanskrit grammar besides a ' *Dictionarium Malabaricum Samscrdamicum Lusitanum* ' (Malayalam-Sanskrit-Portuguese Dictionary). Both works remained unprinted, but their manuscripts preserved at Rome, formed the main source for two Sanskrit grammars and several indological treatises published by the Austrian J. Ph. Wesdin in 1790 and 1804, respectively.

Probably the best-known among those Germans who carried out valuable research work in the field of Indology long before this had become a subject taught at the university, was Bartholomaeus Ziegenbalg, missionary at the Danish Protestant Mission of Tranquebar about two hundred miles south of Madras where he died in 1719 at the age of only thirty-six. Although by no means talented for languages and despite his heavy duties so often seriously and maliciously hampered by the Danish Governor and the head of the Portuguese Catholic Mission—he was even imprisoned for some time in the dungeon of Fort Danskeborg—Ziegenbalg through sheer hard work learnt Tamil not only to be able to translate the New Testament. (The only copy of this translation I would know of as being extant in India is being preserved at Serampore near Calcutta). He rather wanted to gain first-hand knowledge of what people around

him thought and believed in, he wanted to be able to enter into earnest discussion with them, especially with the Brahmins, as to his mind missionary work did not simply mean preaching to the people, it rather meant convincing them, and this he knew he could achieve only, if he understood them properly. And thus we find Ziegenbalg travelling as far as Bangalore, mostly on foot, and stopping wherever he found an opportunity for discussion. If one of his biographers, Erich Beyreuther, claims that Ziegenbalg convinced and proselytized each and everyone he met and spoke to, I am afraid this has to be dismissed as a biased statement. But it is certain that he achieved a lot more than the majority of missionaries who come to India, or any other non-Christian country for that matter, blissfully ignorant of its religious and philosophical thinking.

The outcome of Ziegenbalg's intensive studies and discussions were two outstanding works, *Malabarisches Heidenthum* (Malabar Heathendom, 1711, published 1926) and *Genealogie der Malabarischen Goetter* (Genealogy of Malabar Gods, 1713, published at Madras in 1867), the first extensive and reliable descriptions of the religious life and thought of the Hindus to be written in German. Ziegenbalg may be forgiven for having called Cholamandala (Coromandel) 'Malabar', it is a minor shortcoming. Besides these two works, he was the author of a *Grammatica Damulica* (Tamil Grammar, 1716) and a *Bibliotheca Malabarica*, a collection of Tamil (not Malayalam !) texts (1708).

The first systematic book on the history and geography of India was published as early as 1785 by a priest from Southern Tyrol, Father Joseph Tieffenthaler. This work entitled *Historisch-geographische Beschreibung von Hindustan* (Historio-geographical Description of Hindustan) contains a list of names of Indian kings and of twenty-three different areas in India presenting for the first time a fairly detailed and, above all, authentic account of parts of that country which then lived in the imagination of many Europeans as something coming straight from a fairy-tale, an impression which still lingers with some people.

Apart from those mentioned above, there were many missionaries who lived in India before the 19th century and who published their experiences and observations, even busied themselves with the languages and religions of India. Unfortunately, most of their works have fallen to oblivion. I am certain, it would not only be an interesting, but a definitely valuable contribution to the study of the history of German Indology, if someone took the trouble to excavate, collect and publish these early works which cannot simply be dismissed as laymen's work. Sometimes, a layman's on-the-spot observation is more accurate and revealing than a professional's learned interpretations of thousands of miles away from the country concerned.

How deep the interest in Indian culture must have been already as early as the 17th century, may be taken from a few extracts of a letter by the German

poet Friedrich von Spee (1591-1635) who, in 1617, sent the following application to the General of the Jesuit Order begging to be sent to India :

> ' I have long been consumed by a secret fire, almost from my cradle. In spite of all attempts to suffocate the flame, it has always burst out anew, for India has seared my soul. I was never free from longing for India, even as a boy at play. My parents tried to divert my attention, but in time they had to give up. This alone and nothing else was why I desired to enter the Society of Jesus.
>
> ' For the moment I was silent, but I have never lost sight of my goal. Recently a letter from Your Reverence was read out and my heart was once more consumed with longing for India. Could I help opening my heart to Your Reverence ? . . . '

The second Sanskrit text to he translated into German was—one is tempted to add : of course—Kalidasa's *Sakuntala*. The German scientist and ethnologist Georg Forster (1754-94) rendered it in German prose in 1791. When Johann Wolfgang von Goethe (1749-1832) read this certainly most beautiful work of Indian literature in Forster's translation, he was stirred so deeply that he dedicated the following enthusiastic epigram to it :

> ' Will ich die Blumen des fruehen, die Fruechte des spaeteren Jahres,
> ' Will ich, was reizt und entzueckt, will ich, was saettigt und naehrt,
> ' Will ich den Himmel, die Erde in einem Namen begreifen,
> ' Nenn' ich, Sakontala, dich, und so ist alles gesagt.'
>
> ' Is it the blossoms of the early, the fruit of the later year,
> ' Is it what charms and delights, is it what satiates and nourishes,
> ' Is it heaven, is it the earth I want to comprehend with one name,
> ' I name, Sakontala, thee, and then all is said.'

In his *Anmerkungen und Essays fuer das bessere Verstaendnis des West-Oestlichen Diwan* (Notes and Essays for the better Understanding of the West-East Divan) Goethe writes :

> ' One may recall the most definite applause which we Germans bestowed upon such a translation (viz., Forster's prose translation) of *Sakontala* (sic !), and we may well attribute the happiness it has rendered to that general translation. But now it is time, a translation of the third kind (viz., a translation in verses) were given to us which would correspond to the various dialects, to the rhythmical, metrical and prosaic language of the original, and would anew make this poem in all its individuality delightful and vernacular. As there exists a manuscript of this immortal work in Paris, a German residing there could deserve well of us by such work.'

In the same essay, Goethe mentions the English translation of Kalidasa's *Meghaduta* (supposedly that of H. H. Wilson of 1813) which he thinks should also be rendered in German verses, a task apparently taken up by J. G. L. Kosegarten, orientalist at Jena University. I must, however, confess that I have never come across this translation which was perhaps left incomplete. In fact, the first German translation of *Meghaduta* to be published was that of Friedrich Max Mueller of 1847.

Other works of Indian literature became known in Germany at the beginning of the 19th century, among them those fifty *Upanishads* which the Moghul Prince Mohammed Dara Shikoh had translated into Persian with the help of Indian pandits, the so-called *Oupnekhat*, and which, in turn, the Frenchman Abraham Hyacinthe Anquetil-Duperron (1731-1805) had rendered in Latin in 1795 (published 1801-2). It was in this version that the German philosopher Arthur Schopenhauer (1788-1860) learnt of the Upanishadic wisdom of India which had considerable influence on his philosophical thinking.

Unlike Immanuel Kant (1724-1804) whose only source of knowledge of India were books of travels available at that time, and, in particular, unlike Georg Wilhelm Friedrich Hegel (1770-1831) who dismissed India as a country 'where there is no true religiosity, morality, right and justice', and in whose mythology and philosophy he found nothing but 'unrestrained madness', not to mention other *bon mots* quite obviously originating from the tales of horror spread by the East India Company, Arthur Schopenhauer was deeply interested in the religious and philosophical thinking of ancient India, adding to his library whatever publication on this subject he could find.

It must, however, be stated—and this is by no means meant as a depreciation—that Schopenhauer's knowledge of India, of her philosophy or, rather philosophies, and her religions was rather incomplete, had of necessity to be so, as only a fraction of what is known today about India was known to the Europe of Schopenhauer's age. In fact, indological research then stood only at the threshold of its discovery of India, a discovery which very much was a haul in a vast sea of manuscripts. It is, therefore, hardly surprising to find occasional mild absurdities in his interpretation of Indian thought which are, certainly, not the result of any incapability on his part to grasp the proper meaning of a particular subject or to understand its position within the development of Indian thinking, be it Hindu or Buddhist. It was rather the result of the absence of any systematic description of the evolution of Indian philosophical and religious thinking which, apart from certain earlier fragmentary treatises, was not available until 1894—thirty-four years after Schopenhauer's death—when Paul Deussen published the first volume of his *General History of Philosophy*.

Taking these facts into consideration, one no more wonders why Schopenhauer regarded the *Upanishads* as containing the primeval wisdom of man-

kind, at the same time dismissing the *Rigveda* and *Samaveda* as making 'absolutely insipid reading', 'for both consist of prayers and rituals which breathe a rather crude sabaism. There Indra is the chief god who is invoked, and with him the sun, moon, winds, and fire. Before these in all hymns the most servile base flatteries are recited besides requests for cows, food, drink and victory, and sacrifices are performed along with them. Sacrifice and giving away of presents to the priests are the only virtues praised.' So much of and about Schopenhauer.

At the beginning of the 19th century, the *Bhagavadgita*, too, became known in Germany, although there is no German translation prior to that of Paul Deussen of 1911. However, Ch. Wilkin's English translation had been published as early as 1785, and August Wilhelm von Schlegel brought out a Latin translation in 1823. The appearance of the *Gita* roused enthusiastic acclaim. After having read the Sanskrit original, Wilhelm von Humboldt (1767-1835), then Prussian Minister of State, is reported to have said: 'I thank God for having allowed me to live so long as to be able to read this poem'. And in 1826, he published an essay *Ueber die Episode aus dem Mahabharata bekannt unter dem Namen Bhagavadgita* (On the Episode from the Mahabharata known by the Name of Bhagavadgita).

Among those works translated into German during the first half of the 19th century, we find one of the most enchanting episodes of Indian literature, *Nala and Damayanti*', rendered in German verses by the poet Friedrich Rueckert (1788-1866). The Sanskrit text had also been published by a German, Franz Bopp (1791-1867), the eminent scholar who brought out the first European edition of the *Nalopakhyana* in 1819.

Friedrich Rueckert has somewhat fallen to oblivion as a poet. But German Indology not only remembers him, but regards him as one of the greatest orientalists. Still, we have to give an Indian, Dr. Mahadeo Karmarkar, the credit for having made an exhaustive study in Friedrich Rueckert's contribution to German Indology (*Friedrich Rueckert und die indische Dichtung, Goettingen* 1959).

Besides *Nala and Damayanti*, Friedrich Rueckert who is said to have picked up Sanskrit within a few weeks, translated into German verses two other episodes from the *Mahabharata, Savitri* and *Hidimba*, and prepared philological translations of *Amarusataka, Gitagovinda, Sakuntala* and the *Atharvaveda* as well as a number of fragmentary translations of several works of classical Sanskrit literature.

It must be admitted that what has been said so far on the beginnings of German Indology, looks like stray efforts, like the outcome of the personal in-

terest of only a few which, indeed, it was in the earliest stage, lacking the systematic approach which would make it an attempt to establish a new field of research. Justified as this impression may seem, it is wrong. The interest in the literature, philosophy and religions of India did not only exist with a few missionaries and poets but also with linguists who soon began to do systematic research in Sanskrit and to study the philosophy and the religions of India as they found them expounded in the texts known at that time. Naturally, an overall picture of Indian thought could not be gained overnight. It required decades to acquire at least a fair knowledge covering all aspects, and we should be honest enough to admit that we still don't know everything and quite probably never will.

It, certainly, was not merely by chance that the beginnings of German Indology as a scientific discipline coincided with the Romantic Period of the first half of the 19th century. The Romantic Movement was characterized by a hitherto unparalleled intuitive understanding for and insight in the spirit of other cultures. It was the time of the brothers Jakob Grimm (1785-1863) and Wilhelm Grimm (1786-1859), famous collectors of German fairy-tales, of Wilhelm von Humboldt (1767-1835) and Alexander von Humboldt (1769-1859), of Friedrich von Schlegel (1772-1829) and August Wilhelm von Schlegel (1767-1845). In 1802, Friedrich von Schlegel began to study Sanskrit under the only person on the European continent who, at that time, had a thorough knowledge of this language, Alexander Hamilton, a British Navy officer who was held prisoner-of-war at Paris. Six years after his sojourn at Paris, Friedrich von Schlegel published his important book *Ueber die Sprache und Weisheit der Indier* (On the Language and Wisdom of the Indians) which, giving a first outline of the study of Sanskrit, became a pioneer work of German Indology.

What is generally unknown is the fact that much of what Friedrich von Schlegel wrote about the ' wisdom of the Indians ', is based on studies made by the eldest of the Schlegel brothers, Karl August von Schlegel, Lieutenant of His Majesty's 14th Hanoverian Regiment who died at Madras in 1789 and lies buried in St. Mary's Cemetery.

Friedrich von Schlegel's example inspired his brother August Wilhelm to make a comprehensive study in Sanskrit. He became the first German Professor of Sanskrit when, in 1818, he was appointed to the first indological chair at Bonn University known since then by the nickname ' German Benares '.

In 1816, the linguist Franz Bopp published a book entitled *Ueber das Conjugations-System der Sanskrita-Sprache in Vergleichung mit jenem der griechischen, lateinischen, persischen und germanischen Sprache* (On the Conjugational System of the Sanskrit Language in Comparison with that of the Greek, Latin, Persian and Germanic Language) making Sanskrit the centre and

fundament of any comparative research in Indo-European languages. Franz Bopp had been studying Sanskrit manuscripts since 1812 in London as well as in Paris where he was guided by Alexander Hamilton, the learned P.O.W. In 1827, Bopp published his first critical grammar of the Sanskrit Language (*Ausfuehrliches Lehrgebaeude der Sanskrita-Sprache*) an abbreviated version of which appeared in 1834.

Between 1833 and 1852, Franz Bopp published his second important work, *Vergleichende Grammatik des Sanskrit, Zend, Griechischen, Lateinischen, Lithauischen, Gothischen und Deutschen* (Comparative Grammar of Sanskrit, Zend, Greek, Latin, Lithuanian, Gothic and German).

With these two works, Franz Bopp actually laid the foundation-stone of two scientific disciplines, of Comparative Linguistics and of the linguistic aspect of Indology without which a proper interpretation and critical edition of any text would have been and still is quite impossible.

Beginning with Friedrich von Schlegel's book *On the Language and Wisdom of the Indians*, a large number of works on the religions, the philosophy and poetry of India were published in Germany, many Sanskrit texts were critically edited and translated some of which have already been mentioned. It is difficult for us today to realize the sensation these publications created at that time. Till then the knowledge of the West about the Orient had been gained from the Bible and about India in particular from Greek and Roman sources, the famous but, nevertheless, half forgotten Classical Accounts of India now, at last, available again thanks to Dr. R. C. Majumdar. The author remembers that not too long ago the Indological Seminar of a German university was happy to have hunted out a fragmentary edition of Megasthenes' anyway fragmentary account.

With the publication of those indological works the horizon began to expand considerably revealing a highly developed, rich culture with its own literature and philosophy. India's *Hitopadesa* stood side by side with the Greek fables of Esop, Manu's *Laws* provided evidence of the elaborate legal system of the Hindus, and the religious-*cum*-philosophical poetry of the *Bhagavadgita* was a match to the epics of the classical ages of the West, not to mention the *Upanishads* and their philosophy presented in such simple yet powerful language.

We can very well understand the zeal and enthusiasm of those early indologists to whom a seemingly boundless field of research began to open. And we today even envy them, for the times of the great discoveries are over, Indology, like any other discipline has lost the drive of its early days, necessarily had to lose it, and has settled down to a meticulous study of details certainly equally important.

Though Bonn University had become the first seat of indological learning in Germany, it did not remain the only one for long. In quick succession, most of the other German universities opened a separate Department of Indology as, for instance, the University of Erlangen where the poet Friedrich Rueckert taught oriental languages, or that of Berlin whose Chair for Oriental Languages and General Linguistics was held by Franz Bopp. In fact, very soon a university without a chair for indology was looked upon as lacking an essential field of learning, a view which still lingers.

It will not be possible to give a complete list of all early German indologists and their works, not only because it would fill page after page, but also because conveying such encyclopaedic knowledge can hardly be the meaning of a brief account like this. A few names, however, should be mentioned in order to draw an admittedly rather sketchy outline of the further development of early German Indology.

Of course, the first name that springs to one's mind (after having been suppressed for so long) is that of Friedrich Max Mueller (1823-1900) who, though not the founder of German Indology, at least introduced German linguistics to England. Professor at Oxford University, he is famous all over the world for his critical edition of the *Rigveda* along with Sayana's commentary which was published in six volumes at the expense of the (ever controversial) East India Company. He is also known as the editor of the fifty volumes of the *Sacred Books of the East*, a most valuable collection of documents of the high religions of Asia in English translation. Out of print for decades, they are being reprinted now, a fact which not only specialists will welcome.

Even before Friedrich Max Mueller had completed the last volume of his edition, Theodor Aufrecht (1822-1907), the compilator of *Catalogus Catalogorum*, the master catalogue of Indian manuscripts, had edited the text of the *Rigveda* in Roman characters, and very soon the first complete German translation of the hymns appeared, that of Alfred Ludwig (1832-1912). The German employed in this translation, however, is so peculiar that this pioneer work can hardly be appreciated any more.

A task equal in importance to that of Friedrich Max Mueller's edition of the *Rigveda* was the compilation of the *St. Petersburg Dictionary* by Otto von Boehtlingk (1815-1904) and Rudolf von Roth (1821-95), later on supplemented by Richard Schmidt, a work just as important for the study of Sanskrit as the Webster or Oxford is for that of English. Boehtlingk also edited Panini's *Ashtadhyayi*, the famous 'Eight Chapters of Grammatical Rules', the grammatical codex, as it were, of classical Sanskrit.

A first extensive study in and description of the six classical systems of Indian philosophy as well as of the philosophy of the Buddhists and Jainas is

to be found in Paul Deussen's *Allgemeine Geschichte der Philosophie* (General History of Philosophy, 1894-1908) already mentioned above. Paul Deussen (1845-1919) who actually was not an indologist proper but Professor of Philosophy at Kiel University, accepted nevertheless, without any reserve by even the most inveterate indologists (which deserves special mention), also published a first complete German translation of Badarayana's *Brahmasutras* with Sankara's commentary, and of sixty *Upanishads* (*Sechzig Upanishad's des Veda*, 1897). His *System des Vedanta* (System of the Vedanta, 1883) based upon the *Brahmasutras*, is still most valuable to the German student of Advaita philosophy despite the fact that being a strict follower of Schopenhauer, Paul Deussen arrived at many an incorrect conclusion.

Based upon Boehtlingk's edition of Panini's *Asthadhyayi* are the Sanskrit primers by Wilhelm Geiger (1856-1943) and Adolf Stenzler, the latter's book still being the first a young German indologist has to plunge into, and, last but not least, the most extensive of all works on Indian grammar written in German, the *Altindische Grammatik* (Ancient Indian Grammar) by the two Swiss linguists Jakob Wackernagel (1853-1938) and Albert Debrunner.

Wilhelm Geiger was also the author of *Pali, Literatur und Sprache* (Pali, Literature and Language, 1916), while a grammar of the various Prakrits was published by Richard Pischel (1849-1908) (*Grammatik der Prakritsprachen*, 1900).

Some of the works mentioned above form part of the *Grundriss der indoarischen Philologie und Altertumskunde* (Compendium of Indo-Arian Philology and Archaeology', founded in 1896 by Georg Buehler (1837-98) who, incidentally, was for quite some time professor at Bombay University at the same time holding the post of Inspector of Schools for the Northern District of Bombay. This compendium, later on continued by the grammarian and epigraphist Franz Kielhorn, by Jakob Wackernagel and Heinrich Lueders (1869-1943), an encyclopaedic work of now twenty volumes, was meant to give a comprehensive introduction to the various fields of indological research including besides those in the languages of India, studies in ancient Indian medicine, mathematics and astronomy, lexicography and law, to name but a few.

The philosophy of the classical systems of the Samkhya and Yoga were the subject of the research of Richard Garbe (1857-1927), whereas Hermann Jacobi (1850-1937) worked on the literature of the Jainas. The religion of the Veda was extensively treated by Hermann Oldenberg (1854-1920) who also published *Die Lehre der Upanishaden und die Anfaenge des Buddhismus* (The Doctrine of the Upanishads and the Beginnings of Buddhism, 1915) and *Zur Geschichte der Altindischen Prosa* (On the History of Ancient Indian Prose).

Enough of names, of men and works. Those who are familiar with the history of German Indology, may regret that so many have been left out, those who are not, may feel that far too many have already been mentioned. Interesting though it may be to trace the further development and growth of German Indology, to show how the interest and work in a particular field of research was handed down from teacher to student and again to student, this is hardly the place for it. The intention behind the short list of indologists and their works given above was merely to illustrate how German Indology grew out of the stray efforts of its early days picking up a subject here and there, to the immense field of research and learning covered by the *Compendium* comprising practically every aspect of ancient India.

Indology, not only that of Germany but Indology in general has often been reproached with having lost interest in many a subject since the time of the *Compendium*. It is true that the average indologist, at least in Germany, has next to no knowledge of, for instance, ancient Indian mathematics or law. This, however, is not a case of interest lost. One must never forget that Indology started as and still is a branch of linguistics primarily concerned with the languages of India and their literature be it philosophical, religious, epic, dramatic or lyrical. Research in the field of ancient Indian law, however, requires a double talent : the zeal to study Sanskrit and the patience to worm one's way through legal matter. And the same is true of ancient Indian medicine, for what does the average linguist know of medicine ?

Such double talents, fortunately, exist, and we have every right to hope that they will continue research in those fields of Indology for which Georg Buehler's *Compendium of Indo-Arian Philology and Archaeology* laid the foundation but which, of necessity, had to be rather neglected ever since. In fact, the 'South-Asia Institute' of Heidelberg University was founded a few years back with the express intention of providing facilities for studying such indological subjects as the average indologist simply has to neglect.

The beginnings of German Indology may date back to as early as the 17th century, if not earlier, but the adventure of discovering India is not over. On the contrary, it seems there is a new beginning, and this may prove to be just as exciting and just as fruitful as the first.

MY IMPRESSIONS OF SOUTH INDIA

by

CHARLOTTE KOCH

To start with the main impression : life in India is more natural than that in Europe at present. The environments in daily life are not such artificial and mechanical ones. This relates not only to the daily life, but also to the spiritual life. In daily life, you will depend here more on human beings than on technical devices. That means, life is not so much company with things as with persons. Therefore, here, it is easier to remain feeling a human being. Also, your inner life is not so much influenced by the so-called achievements of modern life like the television and a perpetual flood of printed papers, filling up your brain with a lot of unnecessary impressions which prevent you from really observing and thinking. Your spiritual life is guided by the influences of a natural environment and by the exchange of ideas with interested human counterparts. To some extent, this type of life resembles the past patriarchal life in Germany before the First World War, mainly in rural areas and in small towns, as I could assimilate it as a child.

To give some of my impressions about the people of South India, I would like to state that most of these people are more satisfied and happier than their counterparts in Europe. They are living in a very simple way, and if somebody brings them some help they are always very thankful. During Christmas time I met at a function a lot of very poor children. They got a small gift, only a cup of tea, one bun, one orange or banana and a few sweets. How grateful were those children, how shining their eyes ! For me, it was a very happy event, and I will never forget it. For these and many other reasons, I like the quite unspoiled mind and character of the friendly South Indian people. (To prevent misunderstanding, those are the only ones I know). I have the impression that European people could learn the art of life and see for themselves the overestimated modern achievements in the right scale.

A very important thing in India to see the richness of its old culture is the dressing of women. My own impression is that the saree is the most womanly

dress in the world. However, only the Indian woman knows how to wear a saree and walk in it and with her wonderful black hair she looks beautiful by contrast to the shiny colours of the saree. It is very sad to say that most of the European women have spoiled their hair by a hairdresser. In India all the people use natural things to take care of their bodies. So, all women will use a natural oil for their hair and they all wash it by themselves. An Indian lady never goes to a hairdresser. In our country the fashion will change every three months and we have to spend a lot of money for all the fancy goods. When Indian women go to a festival their best decoration are the wonderful natural flowers in the hair. I like their smell and surpassing beauty on such festive occasions.

One of the most impressive opportunities to get some information about the essence of Indian life are the dance performances, especially of the South Indian Bharata Natyam and Kathakali dance. How colourful are these ! However, it is not merely their innate beauty, much more essential is the harmony of the co-working artistic, mythological, spiritual, intellectual and physical components of these dances, represented by the statics and dynamics of a well-trained body, resulting in a unique aesthetic enjoyment of the spectator. A comparison with the European dance is unfavourable for the latter because it is more restricted on the physical and formal artistical side and has not so much spiritual and intellectual background. Those dancers have to learn from very early childhood, about ten years and more to get full control of their body to realise the explained harmony of the several components of the dance.

Now I would like to say a few words about the South Indian landscape which is so characteristic in all its varieties.

In the plains about Madras, the palmyra palms dotted over the land and along the waterfront areas dominate the view in front of the background of the delicate silhouettes of some distant hills. I feel, they represent the will of Nature to produce life, even in a desert. Moreover, the shape of these trees makes me feel gay, contrary to the lonely oaks in meadows in Germany which make the landscape serious.

When you drive from Madras to Bangalore you can meet at many places, crude, monstrous blocks of granite rocks. It is nearly the stopped act of Creation, or perhaps, the playground of giants. It is a very original, brutal landscape giving us some idea of the elementary power of Creation.

In the hills about Kodaikanal and Ootacamund, you can enjoy the fulsome miracle of tropical vegetation at a height of two thousand meters whereas in Europe there is not even one tree or shrub. You have beautiful flowers of all kinds, Rhododendron trees in full blossom, dense jungles, nice lakes among the hills— and the beautiful views of the plains, giving us a lurid contrast between the poor vegetation there and the super-abundance at the heights.

When I remember the dreams of my childhood about paradise, I would like to localise it now, after having seen the landscape of Kerala in its intricate interplay of land and water, the backwaters, where all around the fertility of Nature is symbolised by the fruit-bearing coconut trees, though, I know too well that behind all this lovely scenery, the problems of overpopulation have already destroyed the paradisaic character.

At the end, I have no hesitation to confess I shall never miss my impressions in India which have enriched me so much.

THE GERMAN STAFF MEMBERS OF I.I.T., MADRAS

H. J. Ebert was born on November 26th, 1931 at Stuttgart. He completed his school education with an examination similar to Senior Cambridge in 1948, thereafter serving his apprenticeship as toolmaker in an instruments and controls factory for three and a half years passing the final examination conducted by the Chamber of Industry and Commerce, as a skilled toolmaker. He then worked for two and a half years as special mechanic for research work in control instruments, for another four and a quarter years as supervisor and 'Meister' (superintendent) of the apprentice workshop. From 1957 to 1958, he underwent a course for shopmasters and obtained the Chamber of Trade Certificate for Mechanical Shopmaster (examiner and superintendent of apprentices in mechanics, fine mechanics and toolmakers cadres). In 1959, he worked for three months as a planner for I.I.T. Madras on the staff of Prof. Dr. R. A. Kraus at Bonn.

Mr. Ebert, expert staff member, workshops, joined the Institute on April 14th, 1959.

Walter Goetz was born on March 4th, 1925 at Bochum. Hailing from a family who, for two generations, had been blast-furnace and foundrymen, it was but natural for him to take up the same profession. He received his apprenticeship in foundry and moulding practice between 1939 and 1941 in the factory Bochumer Verein of Germany's biggest Steel and Iron Foundry, Fried. Krupp A.G., Essen, completing his training with the Certificate as skilled worker. From 1942 to 1945, he served in the German Air Force as a parachuter. From 1948 to 1950, he received special training in the Meehanite Iron Foundry Eickhoff at Bochum and at Bochumer Verein, Fried. Krupp A.G. At the same time he underwent a course in iron and steel production at the State Government Engineering College, Duisburg passing the Final Examination under the auspices of the Association of German Foundrymen. He then joined the Time and Motion Academy, Comburg passing the examination in Time and Motion Study, Parts I and II, Foundry Technique.

From 1951 to 1953, he worked as an assistant at the Iron and Malleable White Iron Foundry at Minden. From 1954 to 1960, he was works engineer and chief of production planning with M/s. Hundt & Weber, Siegen, one of Germany's biggest non-ferrous foundries. From 1961 to 1962, he worked as works engineer and acting division manager at the famous Henschel-Werke A.G., Kassel.

Mr. Goetz joined I.I.T. Madras on April 4th, 1962 as an expert to set up and run the Institute Foundry and Pattern Shop.

Willi Hasenbein was born on January 25th, 1926 at Dortmund. After completing his school education he served his apprenticeship and, in 1943, was awarded the Government Trade Certificate as tool and die-maker. During his apprenticeship, he attended special classes in technical construction drawing and mathematics. From 1943 to 1947 he served in the German Army.

From 1948 to 1949 he was employed in a developing department of M/s. Concordia as a tool and die-maker. After having attended the technician's course at the Government Engineering School, Dortmund and having acquired the Government Technician Certificate in 1952, he was employed by M/s. Huettenunion, Dortmund as technician in charge of machine-tools and tool and die-making in their section Presswork.

From 1952 to 1954, he underwent special training in motion and time studies at Refa Association, and from 1957 to 1959 he was trained for pre-planning and time study at machine-tools.

Mr. Hasenbein who is a member of Refa Association and M/s. Huettenunion, Dortmund, joined I.I.T. Madras on October 4th 1961.

Dr.-Ing. Kurt Willi Haug was born on May 28th, 1909 at Lindau (Lake Constance). He worked for two years as a practical trainee and for another two-years as designer in the firm ' Maybach Motorenbau Friedrichshafen '. After passing his School Final Examination, he entered the Technical University, Munich to study machine construction. In 1935, he acquired the degree of Diplom-Ingenieur and took up the post of scientific assistant at the ' Lehrstuhl und Versuchsanstalt fuer Allgemeine Maschinengestaltung ', Technical University, Berlin. In 1940, the same University conferred on him the degree of Dr.-Ingenieur. From 1940 to 1945, he acted as Head of the above ' Lehrstuhl und Versuchsanstalt '. From 1946 to 1953, he was Ingenieur de Recherches de

l'Office National d'Etudes et de Recherches Aeronautiques (O.N.E.R.A.) at Paris. In 1952, he published his book ' Drehschwingungen in Kolbenmaschinen '. Between 1953 and 1961, he was Technical Director of the ' Factory for Testing Machines Alb von Tarnogrocki ', Essen, ' Oberingenieur ' at the ' Lehrstuhl fuer Mechanische Schwingungen und Maschinendynamik ', Technical University, Berlin ; Senior Research Officer of the ' National Mechanical Engineering Research Institute ' of the ' South African Council for Scientific and Industrial Research (C.S.I.R.), Pretoria ; ' Dozent ' of ' Technische Mechanik und Konstruktionslehre ' at ' Rheinische Ingenieurschule Bingen ' at Bingen-on-Rhine and at ' Staatliche Ingenieurschule Gauss ', Berlin. In 1959, he was designated ' Baurat ' by the ' Senator fuer Volksbildung ', Berlin.

Dr. Haug, Professor of Applied Mechanics, joined the I.I.T. Madras on October 1st, 1961 as an expert for Mechanical Vibrations and Dynamics of Machinery.

Dr.-Ing. Herbert H. Heitland who was born on July 2nd, 1924 at Ubbedissen, passed his School Final Examination at Bielefeld in March 1940. From 1940 to 1942, he underwent practical training in ' Duerkopp-Werke ', Bielefeld. In 1942, he was called up for military service to be discharged only in May 1945. In March 1948, he passed his Final Examination at the Engineering School Lage (Lippe). From 1948 to 1949, he worked as a constructor with M/s. ' Deutsche Tecalemit ', Bielefeld. In October 1952, he took his Diploma examination at the Technical University, Aachen and, subsequently joined the Institute of Thermodynamics and Combustion Engines, Technical University, Aachen, as scientific assistant (1952 to 1960). In July 1957, the same University conferred on him the degree of Dr.-Ingenieur. From January to August 1961, he was a Post-Doctoral Fellow at California Institute of Technology, Pasadena, U.S.A., and from September to December 1961 guest of the Faculty of Mechanical Engineering at Massachusetts Institute of Technology, Cambridge, U.S.A. In September 1963, he qualified for inauguration as academic lecturer (Dr.-Ing. habil.) at Technical University, Aachen.

On November 1st, 1963, Dr. Heitland joined I.I.T. Madras as Professor of Mechanical Engineering and Head of the Thermodynamics and Combustion Laboratory.

Dr. Nikolaus Klein was born on October 22nd, 1929, at Frankfurt-on-Main. After passing his School Final in spring 1951, he studied Greek, a subject not taught in school. In November 1951, he joined the University of Frankfurt-on-Main to study Comparative Linguistics, Philosophy and History of Fine Art. Very soon, however, he concentrated his studies on the field of Indology. In 1953, he joined the University of Munich, and in 1954, he went to Tuebingen to continue his studies in Indian Philosophy (Advaita) and Comparative Religions under the renowned Indologist H. v. Glasenapp. In November 1956, the degree of Dr. Phil. was conferred on him. The title of his thesis was ' The Advaita Doctrine of Redemption according to Vidyaranya's Panchadasi '. In July 1957, he left Germany on an India Government scholarship to further pursue his studies in Advaita Philosophy and the connection between the history of Sringeri Mutt and the foundation of Vijayanagara, at Visva-Bharati University, Santiniketan (till 1958) and at the Government Sanskrit College, Calcutta (till 1960). He went to Germany in May 1960 to return to Calcutta after only five weeks to take up his post as Lecturer of German at Calcutta University and Bengal Engineering College, Sibpur, which he held until he joined I.I.T. Madras on July 13th, 1961.

Dr. Werner Koch, born 1903 at Stralsund (now E. Germany), studied experimental and theoretical physics, mathematics and chemistry, especially physical chemistry from 1923 to 1929, i.e. 1923 at the University of Greifswald, from 1924 to 1925 at the University of Berlin under Max Planck, Max von Laue, Walther Hermann Nernst and others. In 1926 he undertook laboratory work in the Magnetic Departmet (O. von Auwers) of ' Siemens Forschungslaborantorium ', Berlin. From 1927 to 1929, he studied at the University of Goettingen, especially physics under James Frank and Robert Wichard Pohl, theoretical physics under Max Born, mathematics under R. Courant, and physical chemistry under Gustav Tammann. From 1928 to 1929 he prepared his thesis (under R. W. Pohl) about a comparative microchemical and optical determination of a number of disturbance centres in alkalihalide phosphors. In 1929, he received a research scholarship of the ' Notgemeinschaft der deutschen Wissenschaft '.

From 1930 to 1945, he was a member of the scientific staff of the 'AEG-Forschungsinstitut' (C. Ramsauer), Berlin, attached to the 'Roehren-Laboratorium' (A. Glaser) whose Deputy Head of Department he became in 1932. From 1930 to 1936, he did research on plasma and hot cathode emission and worked on thyratron development. From 1936 to 1945 his work covered semi-conductor research and development of selenium rectifiers and basic research in control of barrier layers. From 1942 onwards, he was Head of the above department. From 1946 to 1958, he was Head of semi-conductor research of AEG at Belecke (Moehne), as during this period the 'AEG-Forschungsinstitut', Berlin could not continue its work. Dr. Koch's work at Belecke comprised selenium, germanium, and silicon research and development.

Dr. Koch, Professor of Physics, visited Sweden (1948), England (1947 and 1950) and the USA (1952) on a study tour before joining I.I.T. Madras on July 3rd, 1959.

Dr.-Ing. Gerhard Rouvé was born on December 4th, 1927 at Kaiserslautern. Called up for military service in 1944 and returning from war service in 1946, he took his School Final Examination in 1947 at Kaiserslautern. He then worked for one year as a practical trainee in constructions passing the examination as a specialist for RC-constructions. From 1948 to 1952, he studied Civil and Mechanical Engineering at the Technical University, Karlsruhe and, in 1952, joined the world-famous 'Rehbock-Laboratory' (Hydraulics) under Prof Dr.-Ing. W. Wittmann. From 1955 to 1958, he held the post of chief engineer at this laboratory.

In 1958, Dr. Rouvé was called as a technical adviser in Hydraulic Structures to the Ministry of Public Works at Ankara (Turkey) where he was on project work such as dams, water power, irrigation, river improvement etc., as well as planning and establishment of the State Hydraulic Research Station. After four years in Turkey, Dr. Rouvé, Professor of Civil Engineering and expert for Hydraulics and Hydraulic Structures, joined I.I.T. Madras on June 1st, 1962.

Dr.-Ing. Wolfgang Scheer was born on March 15th, 1923 at Wartjenstedt in Lower Saxony. He attended High School till 1941 when he was called up for military service. Returning from war service in 1945, he underwent a reorientation course to take his School Final Examination in 1946. He then worked in different factories as a practical trainee till 1948 when he entered the Technical University, Braunschweig. From 1952 to 1959, he was a member of the academic staff of the 'Pfleiderer-Institut fuer Stroemungsmaschinen', Technical University, Braunschweig, obtained the degree of Diplom-Ingenieur in 1954, that of Dr.-Ingenieur in 1958. The examinations for both degrees as well as his research performed at the above Institute, were connected with investigations of axial-flow pumps. From 1959 onwards, he was member of the planning staff of I.I.T. Madras. Dr. Scheer, Head of the Laboratory for Turbo Machinery, joined the Institute on April 14th, 1959.

Kurt W. H. Schroeter, born on June 6th, 1914 at Berlin, received his entire education at various institutions till 1930 in which year the firm 'Berliner Physikalische Werkstaetten' offered him an apprenticeship of four years for practical training in Precision Mechanics. After having successfully completed his training and having passed his examination conducted by the Chamber of Trade, he continued to work with the same firm as a precision mechanic for a further year. In 1935, he joined the antiaircraft wing of the German Air Force and was given special training in the operation, maintenance and repairs of predictor-computers. From 1936 to 1946 he again worked with 'Berliner Physikalische Werkstaetten' in various supervisory positions.

After a short employment in a West-German firm manufacturing high-frequency diathermical apparatus, he went to Switzerland under instructions of the Government of Uttar Pradesh to work out Project plans and to study the working of Swiss watch manufacturers and allied industries. By the end of 1949, the Government of Uttar Pradesh called him to Lucknow to set up a

factory in the Public Sector for the manufacture of various types of water-meters, microscopes, pressure gauges and other precision instruments. This enterprise is considered a pioneer project in the manufacture of precision instruments in India and, apart from being a Foreign Exchange saver, its annual balance-sheets are showing considerable profits. By the end of the second Five-Year Plan, all skilled workmen, supervisory and engineering staff were sufficiently trained to run the establishment independently, and Mr. Schroeter joined I.I.T. Madras on November 1st, 1961.

Dr.-Ing. Siegfried Seinecke was born on July 1st, 1932 at Braunschweig. After passing his School Final Examination at the High School of the Volkswagen city of Wolfsburg, he, in 1951, entered to Technical University, Braunschweig to study Electrical Engineering. His practical training he received in various firms at Braunschweig and Hildesheim between 1951 and 1957. In 1957, he obtained the degree of Diplom-Ingenieur from the Technical University, Braunschweig. From 1957 to 1963, he worked as a scientific assistant to Prof. F. Kirschstein, Institute of Telecommunication and High-Frequency Technology, Technical University, Braunschweig. In 1962, the Faculty of Engineering of the same University conferred on him the degree of Dr.-Ingenieur.

Dr. Seinecke, Associate Professor of Electrical Engineering, joined I.I.T. Madras on July 11th, 1963 to set up the Laboratory for Telecommunication and High-Frequency Technology and to lecture on Telecommunication.

Heinz Sohre was born on July 27th, 1926 atBunzlau in the Eastern part of Germany, now under Polish administration. From 1934 onwards he lived in Riesa in Saxony (now E. Germany). After finishing High School in 1942, he entered an Institute for Electrical Engineering and received his practical training in the training centre of one of the biggest steelworks in Germany which employs about 10,000 people.

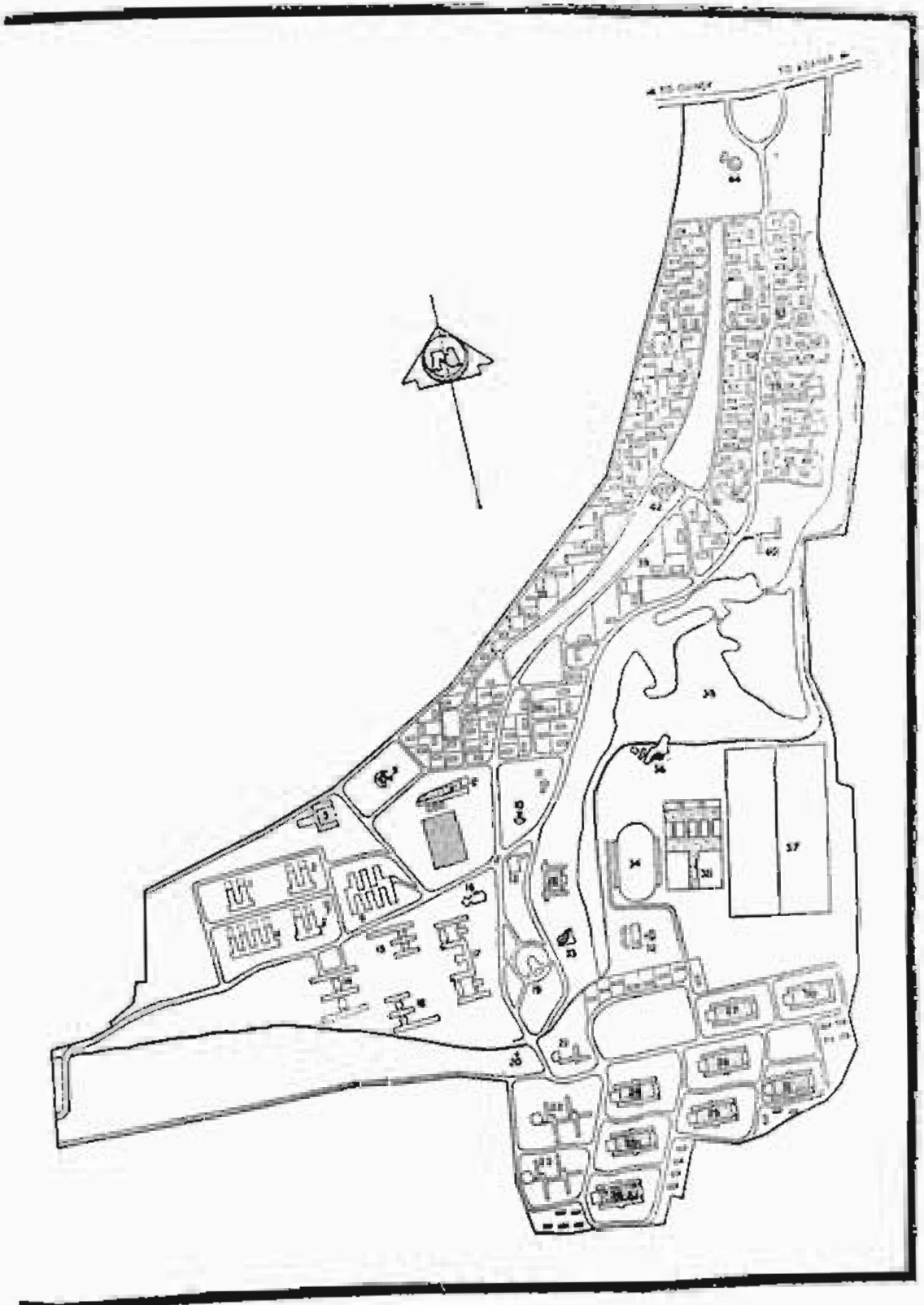
In 1944, he was called up for service in the German Army and saw action in Holland, Belgium and France. Having been taken prisoner by a British Army unit, he spent three and a half years in England as a POW returning to

Germany only in 1948 to do his share in rebuilding the country. In 1951, he attached himself as a civilian to a U.S. Army Engineers unit taking over the management of the electrical section with an operation area of about 180 sq.km. In 1960, he left this post and accepted the offer of an Arabian company at Bahrain in the Persian Gulf. He worked there as a technical adviser to the company which had production plants for oxygen, nitrogen and carbondioxide besides a workshop for air-conditioning systems.

Mr. Sohre joined I.I.T. Madras on April 4th, 1962 as an expert to set up and run the Electrical Workshop a job which he is sure, will enable him to gain experience in many ways.

Dr.-Ing. Guenter Stahl was born on October 24th, 1926 at Braunschweig where he also attended school till, in March 1944, he was called up for service in the German Air Force. Having returned from British imprisonment in Belgium in August 1945, he joined a course preparatory to his School Final Examination at Braunschweig. From September 1945 to May 1947, he worked in different machine factories at Braunschweig. Subsequently, he worked as draughtsman at the Technical University, Braunschweig until, in October 1947, he enrolled as a student of Mechanical Engineering at the same University. From August to October 1950, he joined ' Iberia Airlines ', Madrid (Spain) as a practical trainee. In October 1952, he obtained the degree of Diplom-Ingenieur from the Technical University, Braunschweig, in June 1957 the same University conferred on him the degree of Dr.-Ingenieur. From October 1952 to December 1957, he held the post of scientific assistant for Internal Combustion Engines, Technical University, Braunschweig, from January 1958 to March 1959 that of test engineer for turbo-engines at M.A.N., Augsburg. From April 1959 to February 1961, he was Head of the test department for combustion and combustion chambers of ' Metallbau Semler G.m.b.H.', Munich, and from March to October 1961, he worked as scientist at ' Deutsche Forschungsanstalt fuer Luft-und Raumfahrt ', Braunschweig, specializing in research in turbo-jet power-plants.

Dr. Stahl, Professor of Mechanical Engineering and Head of the Internal Combustion Engines Laboratory, joined I.I.T. Madras on September 29th, 1962.



INDIAN INSTITUTE OF TECHNOLOGY, MADRAS
CAMPUS LAY-OUT

REFERENCE

1. 2. 4. } Workshop Type Laboratories.
5. Central Stores.
6. Workshops.
7. Metrology Laboratories.
8. High School.
9. Hospital.
10. Guest House.
11. Director's Quarters.
12. Library.
13. Girls' Hostel.
14. Building Sciences Block.
15. Mechanical Sciences Block.
16. Administrative Block.
17. Science & Humanities Block.
18. Electrical Sciences Block.
19. Open-Air Theatre.
20. Service Reservoir for Hostels
21. Officers' Hostel.
22. 10 31. } Students' Hostel.
32. Swimming-Pool & Club.
33. Ladies' Club.
34. Stadium.
35. Playgrounds.
36. Swimming-Pool & Boat Club.
37. Sewage Disposal Works.
38. Lake.
39. Staff Quarters.
40. Shopping Centre.
41. Service Reservoir for Quarters
42. Primary School.
43. Temple.
44. Pump House.