



BHARATIYA VIDYA BHAVAN

Sardar Patel College Of Engineering

SUKARMA



VOL. 1



MARCH 1965

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THE IRON MAN OF INDIA



[1875—1950]

Hon'ble Defence Minister, Sri Y. B. CHAVAN



[The then Chief Minister of Maharashtra who laid the Foundation Stone of our College on 17-9-1961.]

OUR BELOVED LATE PRIME MINISTER



Pandit Jawahar Lal Nehru. (1889—1964)

Messages



Bharatiya Vidya Bhavan,
Chauhatty Road,
Bombay 7.
January 18, 1965.

I am glad that the Bhavan's College of Engineering is bringing out a College Magazine by the name "Sukarma". You have properly named it "Sukarma"; translated literally, it means "good work" or "excellent work".

I hope the staff and the students of the College will work hard to make the College a success, so that it can help the Bhavan to re-integrate Indian Culture.

(K. M. Munshi)

OUR KULAPATI



Dr. K. M. Munshi



Raj Bhavan, Bombay.
20th December, 1964.

I send my best wishes to the Sardar Patel College of Engineering through its College Annual Magazine, "Sukarma".

Rooted in our ancient culture and trained in up-to-date methods of technology, the alumni of this institution are sure to serve India with credit in the years to come. They all have my blessings.

(P. V. Cherian).
Governor of Maharashtra



Hyderabad House, Nagpur
24th December 1964.



I am happy to know that the Bharatiya Vidya Bhavan's Sardar Patel College of Engineering is bringing out its first College annual magazine "Sukarma". This is indeed a laudable venture and provides opportunities to students to develop their faculties. The college has to play a very important role in producing engineers for the development of the Country. I have no doubt that the college magazine "Sukarma" will provide the students with opportunities to show their initiative and creative genius. There is indeed a great need of able technicians dedicated to the service of India.

I send my good wishes for the success of "Sukarma".

V. P. Naik

(V. P. Naik)
Chief Minister of Maharashtra



OUR VICE-PRESIDENT



Smt. Leelavati Munshi

OUR EX-PRINCIPAL



S. B. Jumarkar
[From 20th June 1962 to 30-4-1964]



OUR PRINCIPAL



R. H. Chokhavatia
[From 1-5-1964]

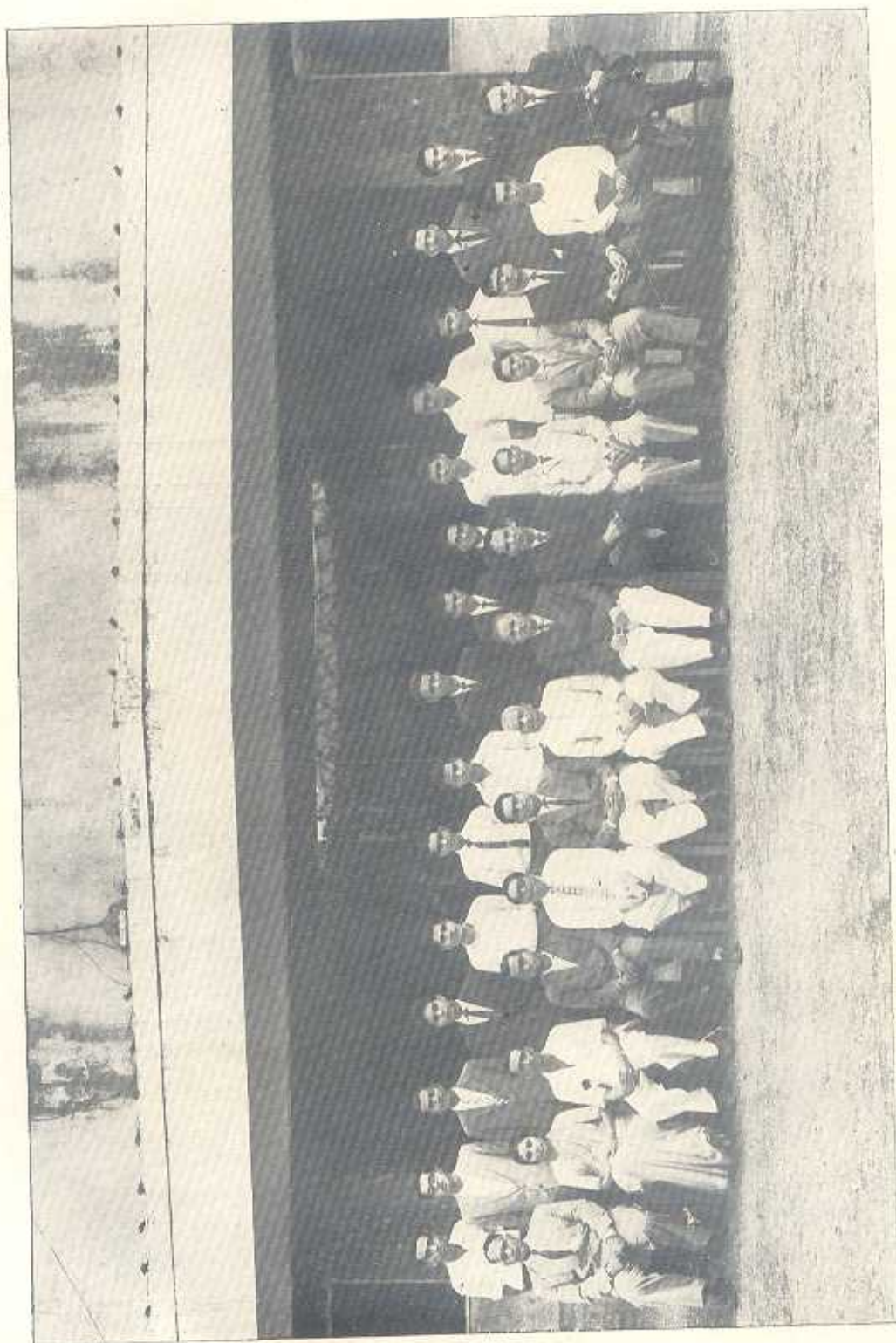
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STAFF MEMBERS OF OUR COLLEGE



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COLLEGE GYMKHANA COMMITTEE 1964-65



Standing Left to Right :—Shri V. D. Khatri, Modi, Vadhan, Hirud, Pandhi S. N., Kamat, Mehra, Popat, Naikwadi, Kuntia, Karnik, Shah, Joshi, Deshmukh Ivan.
Sitting Left to Right :—Secretary to Sri. Lalchand Hirachand, Prin. R. H. Chokharyatia, Mrs. Munshi, Shri Lalchand Hirachand, Dr. K. M. Munshi, Mrs. Lalchand Hirachand, Shri Dalat K. M., Prof. S. S. Dighe, Shri Kulkarni, Sri. I. S. Dubashi.

MAGAZINE COMMITTEE, 1964-65



Standing Left to Right :— Shri Jhurani S. A., Bhuria J. T., Pandhi S. N., Chhabria K. T.,
 Shri Pancholi B. H., Jambunathan P. N., Chandrasekhar V. S.,
 Sitting Left to Right :— Prof. S. S. Dighe, Shri. P. P. Vaidya, Shri. V. B. Singh, Prin. R. H. Chokhaviatla.

Editorial

We have pleasure in placing the First Annual Magazine "SUKARMA" in the hands of our esteemed readers. Our First Annual Magazine "SUKARMA" has a long and difficult story of its own. The College was no doubt, started in the year 1962 and the students started taking interest in the various activities of the institution. But their activities were rather diversified, and the response from the students was very much limited in this field. However, the efforts of the staff members and some of the students brought a concrete shape to the dreams of the Magazine Committee and the magazine is in your hands now.

Our Rev. Kulapati, Dr. K. M. MUNSHI, wished us success in our endeavour to bring out the College Annual Magazine and was good enough to name our Magazine "SUKARMA". The word SUKARMA, the Editors believe, is symbolic and stands for all work that is good and beneficial for the mankind. The need of imbibing the spirit of "SUKARMA" in the sphere of the activities of Engineers, who have to play an important role in the task of nation building, is the call of the present age.

It may be recalled here that whatever a man tries and does is usually his best and in this regard we have to admit that the publication of our Magazine "SUKARMA" has been due to the combined efforts of the staff as well as students of the College. A start has been made now and let us hope that this will gain more and more momentum and infuse inspiration in the students to take a keener interest in the literary activities in the years to come.

We are indebted to the Honourable Governor of Maharashtra Dr. P. V. Cherian, Honourable Chief Minister of Maharashtra Mr. V. P. Naik and our Kulapati, Dr. K. M. Munshi for blessing us on the eve of the publication of "SUKARMA" and we fail in our words to express our heartfelt thanks to them. Let us resolve to translate their advice into action and thus pay our gratuities to them in a more befitting manner.

We have to thank the students as well as the staff members for co-operating with us in bringing out this magazine. Our thanks are due to all our patrons who have willingly subscribed for advertisements in our magazine. We should not fail to record here our appreciation and thanks to the authorities, of Bhavan's Press, who have at a very short notice printed and brought this magazine with an excellent get up.

Standing Left to Right :—Shri Jhurani S. A., Bhutia J. T., Pandhi S. N., Chhabria K. T.
Sitting Left to Right :—Shri Pancholi B. H., Jambunathan P. N., Chandrasekhar V. S.,
Prof. S. S. Dighe, Shri. P. P. Vaidya, Shri. V. B. Singh. Prin. R. H. Chokhavatia,

NEWS FLASHES FOR 1964-65

THE academic year 1964-65 is an eventful year in the short history of our college. The first batch of students admitted in 1962 are now in the Final Year and the institution has become a full fledged Engineering Degree College. We have for the first time admitted 10 girl students to the first year Engineering class of our college. This has lent added grace to the institution.

Our Kulapati, Dr. K. M. Munshi and Vice president, Srimati Lilavati Munshi have been taking a parental interest in all the activities of our college. Under their able guidance, we have been able to work, for the noble cause for which the Bhavan stands, in our humble way. The Bhavan Shibir conducted in the campus under the presidentship of Dr. K. M. Munshi has been instrumental in bringing the ties closer and closer with the other institutions of the Bhavan and has helped to understand one another. The flower show arranged by our Vice-president, Smt. Lilavati Munshi was an excellent treat to the eyes. It attracted a large number of people and the whole campus was turned into a "Big Mela". It is a matter of great rejoicing to state here that our Kulapati K. M. Munshi, was awarded an honorary doctorate in law in November 1964 by the M. S. University of Baroda and Srimati Lilavati Munshi was invited by the Government of Israel to attend the International Conference on the Role of Women in the Struggle for Peace and Development. Let us all join together to pray the Almighty to bless both of them with long life.

The activities of the college have shown a remarkable phase this year. Our students took part in all the sports organised by the University. Our cricket players

won the first round of the Inter Collegiate Cricket. We could win upto the quarter final in Table Tennis in the Inter Collegiate Table Tennis Tournament sponsored by the University. The College teams took part in Volley Ball, Foot Ball, Basket Ball, Badminton, Khokho and other games. Our sportsmen have indeed shown a marked improvement in all the games. It is no wonder if our college sportsmen would be able to win many prizes and trophies in the years to come. In athletics Sri S. M. Tibrewala won the College Championship of the year. Sri A. R. Kumta stood second in athletics. In Table Tennis Sri S. K. Doshi won the championship of the college.

We are proud to record here that our College Day was a grand success. The Chief Guest, Sri Lalchand Hirachand appreciated the progress, the college has made in a short period of three years. He advised the students to take up industries and stressed the need of the industries for a growing country like ours. He stated that the economical prosperity of the country depends to a large extent on the development of industries. He maintained that young engineers with daring spirit could successfully take up the industries and help in the rapid development, as industries would provide a better and vast field for engineers to work with initiative and creative drive. He congratulated those who have shown merit in their studies and extra-curricular activities of the college.

Our students have never failed to rise to the occasion. Many students and staff members also voluntarily donated blood when the Blood Bank authorities approached us.

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The students took part in the Inter-Collegiate Dramatic Competitions under the auspices of Bharatiya Vidya Bhavan and our thanks are due to our dramatic troupe for successfully staging the dramas at a very short notice.

Many of our students attended the N.C.C. Camp and had the rigorous training. We have 200 cadets enrolled for 2nd Engineering Company and 78 cadets for 14th Maharashtra Battalion. It is a pleasure to note that our students are being trained as second line of our country's defence. The training has infused in students a disciplined life which should, in the long run, help in creating a very healthy atmosphere among the students. Our N. C. C. officer, Sri M. H. Kalra, 2nd L/t. deserves our appreciation and moral support in this respect.

Sri D. N. Upadhyaya has been awarded the rotary prize for the year 1964-65 in appreciation of his all-round distinction in studies and other extra-curricular activities. The rotary club of the Santacruz branch has been pleased to distribute token prizes to all the Secretaries of the Gymkhana and Sports' Committees. We thank the authorities of the rotary club for encouraging the students and making them know the noble causes for which the rotary club stands.

Sri K. K. Katkar and Sri M. S. Harshe of our college were sent for taking part in K.N. Ranade Inter Collegiate Elocution Competition held at Poona. Both of them fared well in the elocution competition.

We are really happy to note that all our staff members have been working together to create an atmosphere of unity and serenity. Our principal Sri R. H. Chokhavatia has been a source of strength

to many of us. We hope that the staff members will very soon have a common association under his guidance. The association is bound to bring the staff members of the different departments and office together. The need for such an association can hardly be over-emphasized. It should not only make the staff to understand one another but also help to discuss matters pertaining to the efficient working of the college with the co-ordination of all.

We have this year many new staff members amidst us and we extend our hearty welcome to them. Sri R. N. Venkatadri, Sri J. W. Kardile, Sri R. S. Dhube and Mrs. Jog resigned during this year. We wish them success in their new sphere of activities.

We are proud to state here that our colleague Sri S. S. Maneck got his Doctorate in Electronics from the Bombay University.

Sri A. G. Mhaskar and Sri P. P. Vaidya have been promoted as Assistant Professors. Many of our staff members have been deputed by our principal to undergo refresher courses with a view to keeping the staff members in touch with the modern trends in engineering and to help raise the standard of teaching personnel.

The need for post-graduate teachers has been aptly stressed by our principal and let us hope that he will evolve soon a scheme of post-graduate training for staff members under the guidance of our Kulapati Dr. K. M. Munshi and help to place the standard of teaching to a level which in no way be inferior to the best of the colleges in India.

—Editors

ORIGIN AND DEVELOPMENT OF OUR COLLEGE

THE Bharatiya Vidya Bhavan conceived in 1957 the idea of establishing an Engineering College in Bombay. The Engineering Personnel Committee of the Planning Commission had made certain recommendations for the establishment of new Engineering Colleges and Polytechnics in the country in order to increase the technical manpower. The Government of India, accordingly, had initiated a liberal policy for setting up private engineering colleges in the states. The proposal of the Bhavan to start an engineering college was very favourably received by both the Central and State Governments.

The total outlay of the project is about Rs. 70 lakhs. The Central and State Governments have released a contribution of 20 lakhs and 10 lakhs respectively. The Bhavan have contributed Rs. 28 lakhs and towards the remaining 12 lakhs, Sardar Patel Memorial Hall Committee and the Nizam's Charitable Trust have donated each 1 lakh. The balance amount of Rs. 10 lakhs has been mainly collected by grants, donations, advertisement revenues and from individuals from all walks of life.

The college is located in the Bhavan's campus at Andheri in the healthy surroundings far from the din and bustle of Bombay city and yet within easy and economical reach by rail and road transport.

The "Khat Muhurt" of the Engineering College was performed on 17-9-1961 by Sri Y. B. Chavan, Defence Minister of India (the then Chief Minister of Maharashtra) who has been taking a very keen interest in the fulfilment of this project. Sardar Vallabhbhai Patel was closely associated with the Bharatiya Vidya Bhavan from its inception. In June 1946, he inaugurated Bhavan's M. M. College of Arts and N. M. Institute of Science. Sri Sardar Patel was elected an honorary member of the Bhavan in 1946 in recognition of the keen interest he evinced in the activities of the Bhavan. There could be no better monument than to name the Engineering College after him to enshrine the memory of late Sardar Patel, the "Iron Man" of India.

The college was opened by our late Sri Jawaharlal Nehru the then Prime Minister of India on 19-8-1962. The College is now full fledged having Civil, Electrical and Mechanical branches of Engineering and is affiliated to Bombay University. The college had the good fortune of having Prof. S. B. Junnarkar as its first principal. The college is bound to make a rapid progress under the able guidance of Dr. Munshi, the president of the Governing Body of our college and will soon be one of the best colleges in the country.



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A FEW LANDMARKS IN

THE HISTORY OF

OUR COLLEGE

By Ex-officio Incharge (Magazine)

IT was on the day of 19th August, 1962, there was a large gathering at the Bhavan's Campus at Andheri—the entire campus was turned into a mood of joy and festivity; students and parents, distinguished men and women, from all walks of life were mustering in thousands to witness and take part in a colourful function. The shamiana specially erected on the Bhavan's ground for the occasion was tastefully decorated and was packed to capacity and a huge cheering crowd had to be kept out-side for want of space. It was the golden day in the history of the Bharatiya Vidya Bhavan; the Sardar Patel College of Engineering was being inaugurated by our beloved Late Pandit Jawaharlal Nehru, the then Prime Minister of India.

Shri Nehru who flew from capital specially for the occasion paid tributes to Sardar Vallabhbhai Patel, his long time deputy during the freedom struggle and after and said that he was happy to associate himself with an institution named after him.

Earlier Dr. K. M. Munshi, the Kulapati of the Bhavan welcoming Shri Nehru said, "His visit was another land mark in the history of the Bhavan". Dr. Munshi added "The Bhavan stands for the reintegration of Indian Culture. Its aim is to revitalise the fundamental value of our

land to meet the needs of the Technological age through which we are passing".

In the course of his inaugural speech, Shri Nehru dilated on various topics like publication of cheap books, cultivation of the reading habit, study of various languages and the training of a skilled cadre of Technical personnel. Shri Nehru referred to the Bhavan's publications which were within the easy reach of the people. Good and cheap books with a large circulation would increase the reading habit tremendously. He assured that Good literature is one that is simple. Referring to the linguistic fanaticism he declared "Languages grew not by living in isolation but by contact with other languages. The more contact the Indian languages retain with foreign ones the better it will be for their growth". He added "It is an accomplishment to know more than one language".

Continuing further Shri Nehru alluded to the extra-ordinary feat of the Russian "Twin Cosmonauts" and said that the world was becoming one. "All differences and distinctions which separate us will vanish", he said. He further said that education in Engineering was very important. He cited the example of Russia, Germany and Japan which, despite the ravages of war had not only been rebuilt but had also become more prosperous than before the war by the technical men and the machines. He curbed those who would believe that mere shouting would produce results and neither ability nor hard work was required for the progress. He affirmed "Trained men could rebuild a shattered country. Money can't do it. It was only hard work, intelligently directed, that produced results".

Shri Nehru referred to the perspective planning division of the Government and said that in planning one did not deal with bricks and stones but with human beings. He emphasised "Human beings

are not bricks and stones—they are different”.

The First Annual Day of our College was held on November 9th 1963. Dr. Zakir Husain, Hon'ble Vice-President of India was kind enough to be amidst us and address the gathering.

He said he felt privileged on account of the association of this college with the name of one he had held in great esteem and whose understanding and kindness he had enjoyed; the name of the late Sardar Vallabhbhai Patel. He paid great tributes to Sardar Patel, the most valient fighter for the country's freedom and one of the greatest builders of its future greatness on the firm foundation of an integrated political structure. Dr. Zakir Husain said, "His (Sardar Patel's) association with your cultural and educational work was closed and it is only mete that you have given to this college of Engineering the honour of associating with his name".

Referring to the great task of building up a strong nation, he said, "The work of building it up has to continue from generation to generation. The generation that is being educated and trained here has to take its due share in this process of building up. For this work required among many other things the solutions of the problems of banishing poverty, of building up of a prosperous, industrious and strong people and the problems of economic development. These objectives create a wide and persistent demand for men who can design and construct and operate the essential techniques of the economic process; the demand for Engineers and Technicians".

Referring to the need of a cultural and scientific back-ground in engineering Dr. Zakir Husain said, "Engineering is not just a static know how. If it has to play its rightful role in man's march to

material progress, if it has to lead man to victory in the fight against a rather niggardly nature which gives us only limited span of working life and provides us only with scarce means to satisfy our unending demands and wants, it will have to depend for the improvement of its insights and the betterment of its methods on fundamental scientific discovery. Minds wedded to a routine tend to lose the elasticity which an ever-changing and ever-growing fund of scientific knowledge demands for its proper utilisation for the needs of men. The characteristic of modern technique is that it is rational and not traditional and empirical, it is dynamic and revolutionary and not static and stationary. A close relationship between Engineering institutions and seats of scientific learning and research is manifestly indicated. And not only with seats of modern scientific learning and research but equally importantly, I hold, with seats of philosophical and humanistic learning."

He further added "With the ever-growing scale of Engineering projects, the engineers have to deal not only with a growing mass of material and machines, but also with larger and larger numbers of human beings. He should understand and appreciate the urges and aspirations and limitations of these human beings. To understand labour relation, he must understand human relations and have some insight into the complicated workings of the human mind. The growing size of an engineer's usual project involves larger and larger finance and more and more effective business administration. All this the future engineer who will go out from this college, must have and it is easier to get him all this at a composite and diversified campus like yours (Bhavans)".

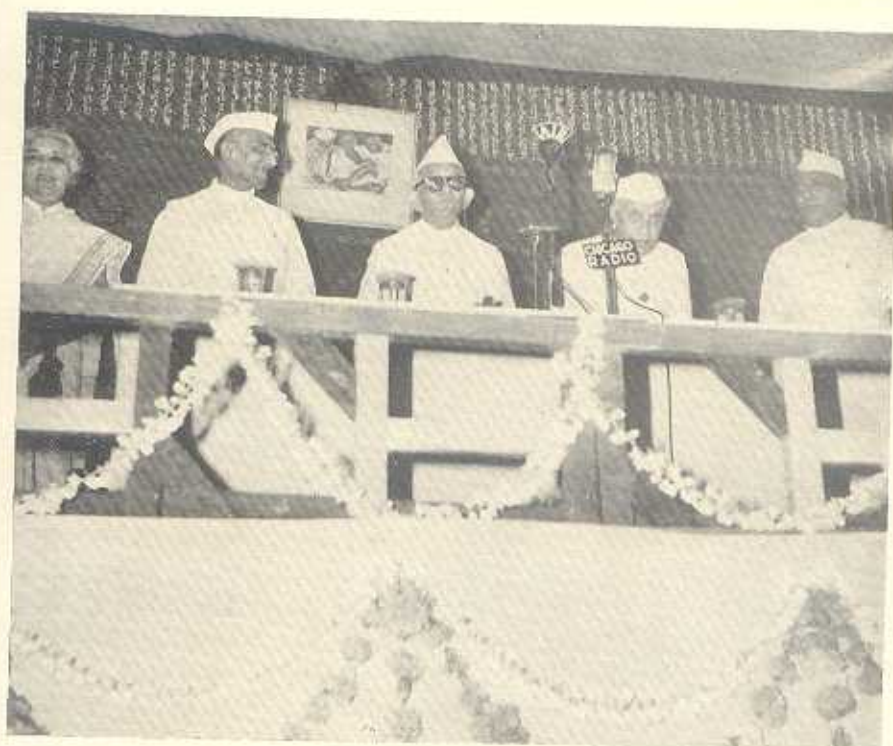
In the course of his enlightening speech Dr. Zakir Husain said, "Our Institutions of Education in Engineering will perhaps

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do well to evolve a threefold programme—a programme of basic science and engineering courses, a broad foundation in social sciences and the areas of knowledge necessary to prepare for social understanding and leadership, and programme combining periods of actual practical work with periods of theoretical study. By periodically sending students out into society and then bringing them back to their classes, we can, perhaps, create a dynamic factor welding the college and society together. The student so going out after a term or two at college to a real job will come to see life face to face, will see his people as they really are, see their diversified life in the myriad occupation of men. He will learn the basic demands and responsibilities of work. He will learn to observe critically and to observe with accuracy. He will begin to see not only the supervisor but his fellow-workers as people with whom he must get along and as people in their own right. All these things will illuminate his college text books and also afford a check on them. He will learn persistence, self-discipline, responsibility and the will to achieve. The introduction of such a work, study programme will involve close and intelligent co-operation between educational institution and industry to the advantage of both and I think it should be more easily possible at Bombay than at any other places."

Referring to the students of Engineering in our country he pointed out the tremendous task waiting to be done by them. He advised "In the pre-occupation of your absorbing work, I hope you will not for-

get to work on yourself. Don't let your Technical and scientific education go over you without giving you a certain breadth of intellectual horizon with reference to values attached to men and things. Don't let it leave you without a certain degree of lively open-mindedness and accessibility to new values and new ideas. Don't let it leave you without an inner urge towards perfection in your own person and in the society around you. You will succeed in getting all these from your years of education here and in the many fruitful years which will follow only if you plan to develop these qualities."

He concluded as follows:—

"Man shaking with fathomless fear and consumed by ineradicable hatreds is not a product to be proud of.

The poet may well ask:—

"Is this the handiwork you give to God?

This monstrous thing, distorted and soul-quenched,

How will you ever straighten up this shape?

Touch it again with immortality,

Give back the upward look and the light,

Rebuild in it the music and the dream".

You can hope to do so in the culturally saturated atmosphere of the Bharatiya Vidya Bhavan by the constructive pursuit of excellence in your own life and helping the realisation of excellence in the life around you. So help you God.

"With righteousness in the heart, there will be beauty in character. With beauty in character there will be harmony in the home there will be order in the nation. With order in the nation, there will be peace in the world".

—CONFUCIUS

SECOND COLLEGE DAY CELEBRATIONS

SHRI KULAPATI, our distinguished CHIEF GUEST SHRI LALCHAND HIRACHAND, Smt. Lalitabhen, My colleagues, Young Students, Ladies and Gentlemen:

I consider it my proud privilege of having the opportunity to welcome you all on my own behalf, on behalf of my Colleagues and also on behalf of the Students of Sardar Patel College of Engineering, on the occasion of the SECOND COLLEGE DAY CELEBRATIONS. I am extremely grateful to you Sir, for having agreed to accept our invitation at such a short notice despite your numerous engagements and busy strenuous duties. It is a great pleasure to us to have you all Sir, in our midst today on this occasion.

Shri Lalchand Hirachand needs no introduction. It would be mere impertinence on my part to say anything about him, as all of you know him to belong to the Walchand Group of Industries and Organisers of several building and Machine Industries in this great city of ours. He is the Chairman of Premier Automobiles Ltd., a large industrial undertaking, the Indian Hume Pipe Co. Ltd., Cooper Engineering Ltd., Bombay Cycle & Motor Agency Ltd., etc. and Director of the Premier Construction Co. Ltd., Hindustan Construction Co. Ltd., Walchandnagar Industries Ltd., etc. Shri Lalchand is the President of the Maharashtra Chamber of Commerce, Bombay.

Shri Lalchand was the President of the Indian Sugar Mills Association in 1943-44, and Chairman of the Deccan Sugar Factories Association for three successive

years from 1943, besides being the President of the Deccan Sugar Technologists Association from 1943 to 1950. He was the President of the Automotive Manufacturers Association of India from 1954 to 1958. Shri Lalchand was a Member of the Development Council for Machine tool Industry and of the Import Advisory Council of the Government of India. Shri Lalchand was a Member of the Rajya Sabha (Indian Parliament) from 1952 to 1957. He was also a Member of the Bombay Legislative Council in 1937. He attended the Moscow International Economic Conference in 1952.

Shri Lalchand is a Member of the Cricket Club of India, the Willingdon Sports Club, etc. He is actively interested in Agricultural, Industrial and Social activities. Besides this, he is connected with the field of Technical Education. This family had donated a large and handsome sum of money in building up the Walchand College of Engineering at Sangli. It was due to your efforts Sir that the then State of Bombay saw in the post-independence days, a new College of Engineering at Sangli. At that time there was only one College at Poona. Thirdly it is a known fact that your firm is proud to provide jobs to promising young engineers in large numbers immediately after their graduation. Thus Sir, you are in close touch with the educational institutions and are in a better position to judge our out-crops every year. Your advice therefore in developing the technical education in a period of growing industrial development of our country would be very valuable and highly appreciated.

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SECOND ANNUAL COLLEGE GATHERING
Chief Guest, Shri Lalchand Hirachand



GUJARATI DRAMA TROUPE
1964-1965



ARTISTES OF THE VARIETY ENTERTAINMENT PROGRAMME
SECOND ANNUAL SOCIAL GATHERING



Top Row Left to Right :—Shri Nimkar, Gosar R. V., Thakkar, Chhabria, Jhurani S. A.
Middle Row Left to Right :—Shri Godania, Thakkar, Diwadkar, U. U., Hutangiri, Harshe, Karle, Bhutia J. T.,
Bottom Row Left to Right :—Miss Gandhi M. B., Pai S. V., Athavale S. V., Kolatkar A. K., Devnani M. C., Samant A. V.
Sitting Row Left to Right :—Shri Sahdev, Soni, R. H., Pandey, Prof. S. S. Chokhastan, Prof. S. S. Chokhastan, Prof. S. S. Chokhastan

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Sitting Row Left to Right :—Shri Sahdev, Soni, B. H. Pancholi, Prin. R. H. Chokharyatia, Prof. S. S. Dighe, Dalal,
 Mehta R. B., Pawar.

I shall say briefly how we have achieved this position. The Government of India on the recommendation of the State Government sanctioned the establishment of the College of Engineering by Bharatiya Vidya Bhavan in June 1961 and immediately thereafter the foundation stone was laid in August 1961 by Shri Y. B. Chavan, the Union Minister of Defence. The construction work commenced from December of 1961 immediately after the necessary preliminaries were gone through. By June 1962 we had the office wing and the western wing completed, so as to be able to start the College, by admitting 120 students to the First Year. The workshop building was gradually coming up to the roof level but due to the Chinese invasion of our country, we could not cover it till July 1963. Order for equipment required for Second and Third years were placed in October/November 1962 and materials started reaching us by April/May 1963. The admission to the Second year students was made and a fresh batch of 120 students was admitted in June 1963. We struggled hard to accelerate the progress of construction work especially the workshop, instal the workshop machinery, arrange for power supply and shift the Electrical Laboratory to its permanent position as the machines had to be installed. Due to difficulties in foreign exchange, our material testing laboratory was equipped sufficiently only by January 1964 and Hydraulics Laboratory also was got ready by that time, sufficient for Second Year instructions. In June 1964, a fresh batch of 180 students was admitted. (This year the Government of India on the recommendation of the State Government sanctioned an increase intake from 120 to 180 to meet the growing need of Defence and Industries). Thus in the third year of its establishment the College has acquired the status of a full-fledged degree College from June 1964 and we are now in a position to send out our first batch of

engineering graduates in May 1965. Out of the 120 students admitted to our College in 1962, we have today in the final year 33 in BE (Mech.), 11 in BE (Elec.) and 20 in BE (Civil) making up a total of 64 students i.e. 53 percent of students first admitted to our College. This is a creditable work done by our College, in the initial stage of its existence due to the unceasing and untiring efforts of Principal S.B. Junnarkar and the great interest evinced by our Kulapati in building up this College and guiding its destiny. We have at present a total strength of 364 students of whom 10 are lady students. These are distributed as under:—

F.E.	187
SE (Mech.)	39
SE (Elec.)	36
SE (Civil)	38
BE (Mech.)	33
BE (Elec.)	11
BE (Civil)	20

We are trying hard to build up our Electrical and Mechanical laboratories to equip them to meet the instruction needs of the final year. We are pleased to declare that today we have almost everything that we need for the three years degree course; with the exception of a few items of equipment that has yet to come from abroad. Slowly and gradually the Government of India is releasing for our College foreign exchange required for precision instruments, and it will be possible for us to procure them before March 1965.

We have spent so far Rs. 25,17,502 on building alone excluding the cost of land and its development, Rs. 13,09,920 on equipment, Rs. 4,25,436 on hostel thus making a total of Rs. 42,52,858. Of this the Government of India have given us a non-recurring grant of Rs. 18,85,000, and an interest-free loan of Rs. 3,60,000/-. The Maharashtra State Government have given us a non-recurring grant of Rs.

9,00,000/-. The Bharatiya Vidya Bhavan has contributed so far Rs. 21,07,900 including the cost of land and its development. Thus the total expenditure on the project is Rs. 52,52,900/-.

Teaching Staff:

We have today a total teachers' strength of 41 comprising of 4 Professors, 4 Asstt. Professors, 13 Lecturers, 2 Part-time Lecturers and 18 Asstt. Lecturers and Demonstrators, against a total strength of 380 students. We have therefore a very satisfactory staff students ratio of 1 to 10. Although we have a full compliment of staff there are only three staff members with post-graduate qualification. This has to be increased to raise the standard of teaching from next year.

Results:

Results of University examinations held in April this year are:

F.E.: 140 appeared and 51 passed fully with 6 in I Class, 43 were granted terms, total 94 that is 67%.

SE(M): 31 appeared, 14 passed, 10 granted terms, total 24 i.e. 77%.

S.E.(E): 27 appeared, 4 passed, 4 were granted terms, total 8 i.e. 30%.

S.E.(C): 37 appeared, 9 passed, 11 were granted terms, 20 total i.e. 54%.

Results of the November examinations are:

F.E.: 81 appeared, 65 passed, 4 granted terms, total 69 i.e. 85%.

One secured First Class.

S.E.(M): 17 appeared, 17 passed. Result 100 percent. One secured First Class.

S.E. (E): 23 appeared, 13 passed, 4 granted terms, total 17 i.e. 74 percent.

S.E.(C): 26 appeared, 14 passed, 6 granted terms, total 20 i.e. 77%.

B.E. M & E.: 44 appeared, in part I Examination, one withdrawn and 43 passed, total 43 percentage 100.

Results were quite satisfactory except for S.E. Electrical at the April examination and they compare favourably with those of V.J.T.I.

Shri Mandania A.M. has been awarded Shri Pruthvish Narayandas Killavala Prize for securing highest marks in S.E(E): and Shri Sane S.S. has been awarded Shri Pruthvish Narayandas Killavala prize for securing highest marks at F.E. and joining S.E. Electrical class at this College. He secured I class. He is first in the Class. Shri J.J. Shah has been recommended 'Kulapati Gold Medal' for the best merit student of the College. He secured 78.16 percent marks at the Inter Science examination. Shri D. N. Upadhyaya has been recommended 'Kulapati Silver Medal' for being the First all-round student of the College during the academic year. He is also selected for the Rotary Club Prize this year.

Gymkhana:

Our College students are participating in the various sports organised by the University, such as Cricket, Table-Tennis, Kho-Kho, Badminton, Foot-Ball and Basket Ball. Our students won the first round of the Inter-Collegiate Cricket match. In athletics Shri S.M. Tibrewala has won the maximum points and is declared 'Champion' of the College, this year and Sri A.R. Kumta as the runner-up. In Table-Tennis, we won upto quarter final. Shri S.K. Doshi, once the National Junior Champion, has won the Championship of the College. I congratulate all those who took part in the various events and especially those who won the 1st or second prizes.

N.C.C. having been made compulsory by the University of Bombay in view of the situation created by China's Aggression, our college had N.C.C. Rifle Unit in the year 1963-64. This year the Government of India has revised the policy and

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decided to enrol the Engineering students
for 2nd Engg. Company with a strength
of only 200 cadets. This would have been
adequate, if the admission would have
been continued as per last years' strength.
Owing to the necessity of increasing the
intake from 120 to 180 for increasing the
defence potential of the country, some of
our second year students had to be en-
rolled for 14th Maharashtra Battalion. We
have today 204 cadets for Second Engg.
Company and 78 for 14th Maharashtra
Battalion.

I have tried to give you a brief review
of the various activities of the College
students; and to state that we have
achieved all these due to very close co-
operation between the members of the
staff and the students for which I am
highly grateful to them. I am highly

grateful to our President and Vice-Presi-
dent Mrs. Lilavati Munshi for their in-
spiring words and most valuable advice
in guiding the destiny of this College. I
take this opportunity to pray to Almighty
for the long and happy life of our Kula-
patiji who is entering the 78th year. I also
pray for the long life of Mrs. Munshi so
that both together could render very epoch
making role in building up this College
as one of the best Institutions in the coun-
try. It is our earnest wish that this Insti-
tution develops as a Research centre in
Technical field and play a very useful role
in the life of this great city of ours.

In the end I welcome you all and our
Chief Guest and Smt. Lalitabhen Lal-
chand in particular and thank you very
much for making this function a great
success.



— G E M S —

Character is power, character is in-
fluence; it makes friends; creates funds;
draws patronage and support; and opens
a sure and easy way to wealth, honour
and happiness.

It is only the great-hearted who can be
true friends; the mean and the cowardly
can never know what true friendship
means.

He who neglects learning in his youth,
loses the past and is dead for the future.

The measure of success is not always
how many men we have been able to com-
mand, but how many men we have been
able to serve.

It is not what you take but what you
give that makes you rich.

What we do for others is the test of
power; what we suffer for others is the
test of love.

Insults are like bad coins; we can not
help their being offered to us but we need
not take them.

The past can not be changed; the future
is in your hand.

The only people, who never commit
mistakes, are those who do nothing.

Collected—By Kirit M. Shah, B.E.(Mech.)

THE primary aim of education in general is to prepare young men and women to meet the growing needs of the society. They should be trained sufficiently to develop their *initiative and originality* so that they may be in a position to understand the complexity of the problems, the growing social order poses before them.

It is in this perspective that the Technical Education imparted to the younger generation by Institution and University be judged. Before Independence under the British rule, the object was to create a

Technical

class of people who would serve as overseers and do accounting for the ruling class. All problems of design and other complex problems were referred to the foreign firms of specialists and experts. This suited the foreign rulers. As a result, the technical growth in our country was stunted. The number of Technical Institutions and teachers was very limited. Some of our young engineers did acquire higher skill in the field of technology and engineering but as there were no opportunities to put that skill to practical use, the technical skill could not develop in this country.

With the independence of the country, the problems of technical education grew immensely. On one side there was national planning and growing industrialisation in the country with or without foreign collaboration. The demand for engineers and technicians grew at a very rapid rate while the training institutions did not grow to that extent. Our young people today are face to face with the every day problem of production, shortage of foreign exchange, shortage of raw materials and shortage of skilled personnel. On one

side new institutions are built up but the required staff is either obtained from the existing institution or from fresh inexperienced graduates. When the new institutions come up, they have to face the problem of building up laboratories in a period of shortage of foreign exchange. Local industries have not developed to a stage adequate to compare with the quality of the equipment from abroad. Despite efforts by Universities, College Authorities and the Central Government, the fact remains, and the reality has to be faced that is in these circumstances that the technical college and polytechnics have to undertake the task of training young men.

Naturally the examination system that was in vogue in the pre-independence

Education

days cannot suit the present times. Various new Universities that came into existence in post-independence era and some of the old Universities in the country have during the last ten years introduced several reforms in the system of examination but none of these could claim cent percent success. Besides, the entire system of examination is in the process of evolution even today.

The main reason why the various systems of examinations introduced in the country have not fully succeeded so far lies in the basic defects in the raw material of students, and their training at the primary and secondary stages. The strong super-structure on which the country has to be built needs strong foundations. They are weak in Mathematics, weak in understanding English which is the medium of instruction in all the technical institu-

● By Principal

tions. The Universities positive results of our Universities claimed from

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From the e ous Universi are suggested

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Principal

tions. The reforms introduced in other
 Universities have brought about certain
 positive results and are worth trying in
 our University. The benefits that can be
 claimed from these reforms are:

- (i) Students are compelled to pursue
 their studies regularly rather
 than prepare for the examination
 during the last two months.
- (ii) The discipline in the college is con-
 siderably raised.
- (iii) Those below the average calibre
 needing special attention could be
 easily located.

From the experience gained from vari-
 ous Universities, the following reforms
 are suggested:

1. The students should remain at tech-
 nical institutions for a minimum of four
 years and sufficient weightage of 30 to
 40 percent of marks should be given to
 induce them to study regularly. During
 the whole academic year there may be
 two or three tests conducted by the col-
 lege and marks allotted should be added
 to make up the University result.

HOW TO GET THE MOST OUT OF A BOOK

1. Skim through the assigned reading
 so that you will know what it is you
 are to study.
2. Read the text carefully. Do not for-
 get that many important ideas are
 presented in graphs, diagrams or
 maps.
3. As you read, stop now and then and
 recite to yourself, in your own words,
 the important ideas in what you have
 just read.
4. Make brief notes in the margin. These
 will serve as cues for subsequent self-
 recitation.
5. Mark important or key passages for
 later review.
6. Review the material at least once
 between the first time you study the
 assignment and study for exams.

2. Attendance at the college should be
 raised to 80 days in a term. All holidays
 during the term should be cut out to ob-
 tain continuity of education mood and an
 accumulated addition be made to the
 vacation period. This period should be
 utilised for advanced studies, teaching and
 research work by students and staff.

3. Splitting up the examination to
 Semester system as in U.S.A., will not
 be practicable in this country at the pre-
 sent stage when no useful purpose would
 be served if the students who fail are
 permitted to continue their studies in an-
 other Semester. Our entire pattern of
 education in that case has to be adjusted
 to Semester system. This cannot be done
 at present since doubling of teacher's
 strength is impracticable.

4. Students have to be induced to
 stay in hostels where there are more read-
 ing facilities. Two periods per week
 should be devoted for discussions in small
 group of 30 between the teacher and the
 students on topics of interest, and modern
 development.

Make use of your marginal notes as
 cues for self-recitation.

7. Remember that a little relearning is
 necessary each time you wish to use
 what you have learned for an exa-
 mination, a related course, or for in-
 dependent study. If you use the
 author's headings, marked passages,
 and brief notes for cues it will help
 you relearn easily.
8. Coordinate what you read with what
 you learn in the classroom. Keep
 well-organized lecture notes. Lecture
 notes that are legible and accurate
 will, like your textbook, serve in the
 years to come as quick and inexpen-
 sive keys to the knowledge that you
 are acquiring.

—Collected from *The Psychology of Learning*

FIELD ENGINEERING

By

Major L. S. DUBHASHI, Engrs. (Retd).
B.A. (Hons), B.Sc., B.E. (Civil), M.I.E.

INTRODUCTION

MODERN Engineering comprises of various Branches of Engineering out of which some are taught in our College of Engineering, such as Civil, Mechanical and Electrical etc. In any of these Branches, you may be surprised to find no reference about Field Engineering. Our College is hardly three years old and during this short span of time it has made good progress so far and taken long strides. In years to come many more branches may be added but there is no likelihood of getting the present subject introduced in our College unless Government of India (Ministry of Defence) decides to train Army Engineers here.

What is then Field Engineering? Is it some wonderland in Engineering? And so many questions you may ask on this wonderful subject. Wait a minute. Go on reading and you will find the answer yourself. On having that answer some of you may be thrilled so as to get crazy to join the vast fleet of the Army Engineers and for that they may be lucky to undergo training in this Branch at the College of Military Engineering at Kirkee, Poona.

In our College, you learn theory of Civil, Mechanical and Electrical Engineering subjects and so on and do Projects and Practicals. After obtaining theoretical proficiency in some Branch under the seal of the Bombay University, some of you may be absorbed in Government Services, some in Government Undertakings like Heavy Engineering, Hindustan Steel Plant and Fertilizers etc., some may find jobs in the Municipal Corporations and Engineering Firms, depending on your luck and the line of approach. Those of you who are lucky to be selected for Commission in the Corps of Engineers or Corps of Mechanical and Electrical Engineers or Ordnance Corps, will be able to enjoy the thrill of Field Engineering and later get varied experiences in Military Engineer Services popularly known as M.E.S. Naval Engineering and Air Force Engineering have their own contribution to Field Engineering.

SCOPE OF FIELD ENGINEERING

As the other Branches develop, this Branch also keeps pace with them. All inventions, discoveries and Research Work find their way to this novel Branch. All sorts of unimaginable expedients do creep in here, making it more interesting for Army Engineers. Hence its scope has no bounds and like cement it has great covering capacity and binding properties.

DEFINITION

By this time you must have already got some idea on Field Engineering. Just juggle the words and say 'Engineering in the Field', i.e. Field of Battle or the field of activities by Army Engineers. These activities are nothing anew but novel and practical application of Engineering tactically to suit the situation and circumstances prevailing in the field, just what you learn in our College. They are the Engineer Tasks in the restricted time and

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ENGINEERING

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MATERIALS & LABOUR

Army Engineers have not to worry about materials but they are definitely required to scratch their heads in preparing the list of items they need and placing the demand on the nearest Engineer Park or Engineer Stores Depot through the proper channel. Many of the likely items are kept ready in the Engineering Dumps or they may be part and parcel of the stores and equipment allotted to the Field Units. To prepare the list is no easy job. There are certain yardsticks coupled with experiences of senior Commander Engineers. Field Units have their transport to take the materials to the site or the Army Service Corps is at their disposal to transport the materials with immediate priority to the place and at time decided. All these transport movements go in convoy on day and night, keeping the Supply Personnel very busy.

In the meantime Army Engineers get cracking with the preliminary arrangements to see that everything is ready at the site for reception. Field Units are placed at their disposal and Jawans get joyfully ready for the Engineer Tasks allotted to them. Materials are ready and Jawans are anxiously waiting for the appropriate time to come. Then under the cover of darkness as per scheduled time and without enemy's knowledge Jawans carry out the tasks strenuously and complete it before daybreak to the surprise of the enemy. No noise and no hulla gulla. Each party of Jawans works like a clock and each knows his job. Discipline is there. Morale is there and definite aim is there. Thus the task is completed, and the Army is ready to carry out further manoeuvres.

PREAMBLE TO ENGINEER TASKS

In the Army tactics, resolute aim, strict compliance with orders, rigid discipline, absolute coordination, strict adherence to time, complete faith in their commanders and high morale are the essences of successful engineer tasks connected with those tactics. Army Engineers are required to be very alert, to possess a very balanced mind and to be very quick in taking the decisions to use the proper expedients appropriate for the occasion. In olden times during the day only fighting used to go on, that too individual duel fights with hand weapons like swords etc., observing particular rules for the fights; then pistol fights peeped in. As Nobel has revolutionised the fighting nature by introducing 'Nobel Oil', the present tactics came into existence culminating in disastrous effects. In olden times the engineer organisation in war was practically non-existent except the aid which was required in the matters of arrangement for military camps and provision of water supply. As soon as it was dusk, fighting for the day used to be over and continue next day at day break. But modern war tactics do not permit observance of the above rules and Army has to be alert and on guard day and night. To assist the Army in their aim, Army Engineers have to be busy all the time to find out ways and means to get over the enemy quickly before he gets the opportunity to do so. To achieve this object Army Engineers have to be in constant touch with the Intelligence Corps to obtain up-to-date details about enemy movements by hazardous means through Patrolling (which means to go into the enemy area in disguise as a spy or under the cover of darkness and concealment. The selected and well trained party approaches enemy camps very slyly and watches their movements with a view to get the useful information). Hence Army Engineers have

to take a great deal of initiative to decide particular engineer tasks.

Modern tactics as a result of a tense situation prevailing at the time tend to movements such as Advance, Attack, Defence and Retreat. In Indian History retreat was considered to be a disgraceful action. But now a successful retreat is considered to be a great achievement as it should not be meant to be a defeat but the preparation to get ready for fresh attack soon. Typical example of Burma Campaign may be cited here. In that when Japanese made successful thrusts in Burma, British and Indian Armies had to retreat in 1942, but this was a temporary movement to make preparations for strong attack against Japanese in 1943. They were pushed back and war ended in 1945 in victory for the allies.

According to the situation prevailing, Army Commanders go into a secret conference to decide the particular tactics to be followed strictly and the 'D-day and the zero hour for the same. Accordingly the Army Engineers (Commander Engineers) are given the particular aim to carry out the Engineer Tasks. They are to work out the time backwards and arrange the different stages of engineer tasks accordingly. In that, due time required (to be minimum possible) for completion of engineer tasks at various stages is necessarily taken into consideration and thus the tasks are successfully completed at the appointed time and place.

ENGINEER TASKS

When Army advances, Army Engineers are called upon to carry out the following Engineer Tasks in advance—(a) Roads and Bridges (b) Water Supply (c) Temporary Camps (d) Sanitation by way of providing latrine seats for deep and shallow trench latrines (e) Air Fields or at least Auster Strips and (f) Any

emergency expedients necessary in the way of advance. During the attack, the Engineer Tasks are normally (a) Construction of Bridges or any crossing expedients on the river (b) Filling of craters formed due to enemy bombing and due repairs to the road (c) Clearing of mines and bombs (unexploded), Clearing of obstacles, if any (d) Any other expedients necessary to cut the enemy water supply lines etc. After attack the captured ground is to be held and the defensive measures are necessary. For that, area in the surroundings is to be mined, temporary camping arrangements are necessary, strong defence is essential to include the construction of Pill Boxes, and other fortifying measures are to be carried out. Blast walls are constructed for protection against blast from bombing. In retreat Engineer Tasks are mainly systematic destruction of all engineer plants, bridges and roads, air fields, cutting the water supply off and all other expedients supposed to be used by the enemy and all these tasks are particularly meant to cause the delaying action by the enemy in order to get as much time as possible for repulsing the attack or to take defensive position at some place decided in advance in the planned retreat and prepare for the fresh attack on the enemy. In all these tasks Field Engineers play an important role. Germany and France had fortified their boundary lines by constructing Siegfried Lines and Maginot Lines respectively during the last war. All these had emanated from the wonderful brains of the Army Engineers. Whether it is peace or war it does not matter for the Engineers. In both the roles, the engineers play an important part and carry out their duties marvellously.

Army Engineers do not necessarily belong to one branch of engineering only. Among them are Mechanical and Electrical Engineers too. It is their duty to keep

the army all sorts carriers, purification wheels, other machines. Moving rollers in order for air fields ed for th too to ca cles and pumps maintain particula ties.

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the army quite mobile, by looking after all sorts of transports, gun carriers, troop carriers, tanks and tank transporters, purification and filtration plants on wheels, all machinery equipments and all other mechanical and electrical appliances. Also they are to maintain all earth moving plants like bull dozers, scrapers, rollers and motor graders etc. in working order for the construction of roads and air fields. A mobile workshop is maintained for that purpose and heavy workshops too to carry out major repairs to the vehicles and machines. Different portable pumps and other appliances are also maintained. Jeeps and ambulance cars get particular attention in the field activities.

Jawans need special attention regarding their ration and health. Supply of ration, medical aid and continuous supply chain of ammunition, clothing and equipment keep the other services quite busy in their respective roles. Besides, good communication among all the units is at all time maintained by Signal Corps by wireless and telephone means. When one Battalion moves to the field, it has to be dependent on Engineer Corps, Service Corps, Ordnance Corps, Medical Corps, Signal Corps, Intelligence Corps, even Air Force and sometimes Navy for coastal defences. Then just imagine the tremendous work involved in the field activities.

When the Field Commander communicates his aim for particular manoeuvres in the secret conference to his Formation Commanders and Unit Commanders and explains the role to be played by the different formations and units, it automatically means that it is one man's show behind which full coordination is there, strict adherence to orders and strict maintenance of discipline are there and complete confidence in the leadership is

there, to put up the successful fight. No hustle and no bustle. No disorder and no strike. Absolute calm and quiet in preserving the order to carry out the desired engineer tasks without any grumble as each realises his responsibility and everybody is duty conscious. As soon as the aim and method are explained by the Field Commander, Army Engineers get on their heels to carry out 'recces' (reconnaissance) for crossing the obstacle or river and prepare the list of materials required in particular for the tasks. Particular Zero hour on D-day is laid down by the Field Commander and time is worked out back-wards for various Engineer Tasks to be completed by that time, taking into consideration the time required for the recces and transportation of stores and actual construction. In case of attack, bridge or river crossings are done overnight to facilitate the attack by dawn to the surprise of the enemy.

NATURE OF ENGINEER TASKS

As the aim of engineer tasks is meant for successful operation, naturally the nature of engineer tasks is such that these tasks would serve to be useful during the particular operation only. Automatically these must be of semi-permanent nature and of portable type, i.e. folding type so that they are carried wherever necessary and re-assembled with ease in quick time. Hence these expedients consist of standard components which are easily transportable. They are stocked setwise and demanded accordingly as per the needs.

TYPICAL ENGINEER TASKS

Construction of Bridges—Particular types of Bridging equipments are—

- (i) Bailey Bridge, Bailey Pontoon Bridge and Bailey Suspension Bridge,
- (ii) Tubular Bridges,

(iii) Stock Span Bridges and various other types, like trestle types, etc.

In Bailey Bridge, the various components are panels, transoms, stringers, ramps, braces, chesses, ribands etc. Construction is very interesting. Panels have male and female ends alternately through which specially made steel pins called panel pins go and when they are linked together, they form a girder, each panel being 10 feet long. These girders are formed according to the spans in combination, single, double or triple and single tier, double or triple tiers. When the stream is small, grillage foundations consisting of sleepers or cribs are used on the banks. When the river is large and waterway is quite deep, the pontoons consisting of three pieces, viz. centre and two end ones, are used. Over them the bridge is taken over. Panels support the transoms over which the stringers are spread and over these stringers the chesses are put in position to form a 10 feet wide roadway with riband as guides for the vehicles going over the bridge. While launching the bridge, a launching nose is attached to the panel girder which is rolled over the rollers till it reaches the other bank of the river, where the proper seat is prepared. In case of pontoon bridges, set of three pontoons bolted together is used and the necessary sets according to the width of the waterway are spaced apart and anchored to keep them in fixed positions. In suspension bridges the towers are constructed and made of panels erected vertically. These Bailey bridges are linked to the approaches by means of ramps and the roadway is formed and ready for use.

Provision of Water for the Camp—The nearest source is found out and portable Purification and filtration plant is used to pump out river or well water and deliver water in filtered and purified and also chlorinated condition direct to various water posts where canvas reservoirs of

desired capacities are arranged, through series of pipe lines consisting of victaulic pipes coupled together by standard couplings with washers. In a quick time these pipe lines are laid. Screwed pipe lines take rather longer time for laying and therefore they are used when time permits.

Construction of roads through sands or softer soils—Sommerfield tracks or Army tracks are spread one after another in the road width to form a roadway. These tracks are thick wired nets duly reinforced by M. S. Bars or made up of channels crosswise welded together. These afford necessary friction for the rolling of vehicle wheels and vehicles move over them smoothly without skidding. These are useful to a great deal to cross over the sandy bed of the shallow river.

Construction of Air Fields—Sommerfield tracks or Army tracks or Pierced Steel plankings are used to construct the air fields after having a levelled surface for a desired length according to the requirements, whether for Auster strip or Dakota strip or any other air strip depending upon the type of planes. Pierced steel planking is nothing but steel planks with pierced holes as reinforcement to make them very stiff to take the loads of the landing planes. Sometimes prebituminised hessian is used to make the landing strip waterproof of laying them in single layers or double layers properly jointed together. These P.B.S. (prebituminised surface) rolls come in 35 yds. length and in 32 inches width. These are very useful for waterproof tent floors also.

Many other engineer tasks are there which can be accomplished in a short time to help the operations and make them successful. Many expedients are there to achieve the success in the engineer tasks and words are not sufficient to describe them here. One has to experience the thrills and enjoy them wonderfully and

actually in. Just think is made up paulins. Th time. Even hangars to planes are

Some ty here for you war in Bu bombing on wide and 11 in 12 hours Railway Br converted it to the rail long in 23 wooden br strengthened by giving ad baulks, in t rivers were brushwood stations, rice and saw mill Railways we peace time th upon in aid water supply reasons, to r put the irrig even to repair

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Just think of the mobile workshop. This
is made up of tubular scaffolding and tar-
paulins. This can be erected in a short
time. Even a big structure like Bellman
hangars to afford the shelters to the aero-
planes are constructed in a short time.

Some typical examples may be cited
here for your information. During the last
war in Burma Campaign, in spite of
bombing one stone jetty 70 ft. long, 12 ft.
wide and 11 ft. high was constructed with-
in 12 hours on the Sittang River. One
Railway Bridge on Mytinge River was
converted into a road bridge by decking
it to the rail level about a thousand feet
long in 23 hours continuously. Many
wooden bridges near Meiktila were
strengthened to allow the tanks to go over
by giving additional supports of big timber
baulks, in two days time. Many shallow
rivers were made passable by using
brushwood bundles. Power houses, Gas
stations, rice mills, water supply stations
and saw mills and even sections of Burma
Railways were successfully run. Even in
peace time the Army Engineers are called
upon in aid of civil power to restore the
water supply got damaged through some
reasons, to repair the damaged roads, to
put the irrigation channels in order and
even to repair the breaches in the dams.

Army Engineers are always required
to keep abreast with the latest techniques
in the expedients. For example, RADAR
equipment with its necessary implements
enables the Army Engineers to detect the
approaching aircraft or seacraft within
two hundred miles range. Even their ap-
proaching path and direction are seen on
the instruments just like television, mak-
ing it possible for the Coastal Batteries or
vigilant squads on duties to be alert to
get in readiness for eventual action. Bom-
bay harbour is guarded by such Batteries
on the Coast. Some of you might have
seen gun splashing and colourful trajec-

tories of tracers pointed towards dummy
floating targets during the training given
to the Coastal Batteries. As soon as any
invention is there, Army Engineers lose
no time in grasping it. Even Technical
Development Departments are there to do
the Research Work and improve the pre-
sent equipments, thus keeping it upto
date. Latest techniques in road construc-
tion have enabled Army Engineers to
undertake the construction of Tribhuvan
Path in Nepal and border roads in Hima-
layas. Even Baby Tractors have been
flown to the distant areas to construct the
roads in mountain ranges or in the area
like Ladakh. Army Engineers go on con-
structing while advancing or in the attack,
but it is surprising to note while retreat-
ing that these constructions are destroyed
to cause the delaying action to the enemy.
This technique is also a systematic one as
it is to be affected very tactfully.

ENDURANCE TESTS

In order to become able Army Engi-
neers for hard engineer tasks, they are re-
quired to undergo very rigorous training
and hard tests. They must be able to
locate the point from the map to the
ground and from the ground to the map
even during the night. You find the sub-
mission work difficult to be submitted in
time having at disposal a couple of months,
but Army Engineers have to submit a
complete project in two to three sheets
showing complete details and tables giving
methods to carry out construction, in
manhours or mandays, within 36 hours at
a stretch, having no sleep at all in be-
tween. Without these tests Army Engi-
neers do not become fit for the higher pro-
motions and successful in the Army
career of Engineers. As these hardships
are there, Army Engineers do take pride
in keeping up the prestige and will never
shirk from any eventualities.

CONCLUSION

If one is charmed to go through the above lines, he will develop his aptitude for Field Engineering. If any of you has developed such aptitude and if you are bestowed upon with good physique and sound health and have strong determination of mind and jovial sportive character,

and also ambitions with daring spirit, it would be worthwhile for you to find surely a good field in the Field Engineering to enjoy the thrills and wonderful tickling sensations in your career. You will certainly derive many benefits and get good experience of achievements worth telling to your posterity. Then wish you the best in your career.

In Praise of Jawahar

By

V. LAXMAN, F.E. II.

Under the maze of stars and twinkling
heaven,

The moon, half behind the silvery clouds
She stood; that little lovely girl and sang;
The endless saga of the Immortal Soul.

The song of the Eternal Rose; every night
I heard her sing in the moonlit night,
A Rose, so scented, so full of life and light
Now faded, alas! Behind the twilight.

"No", She sang, "the light shall not fade!
For it belongs to the immortal ashes
scattered
Despair not; it'll lead us to our aim,
To the endless height of glory and fame.

"Every night, shall I sing to the silent sky,
To you the echoes shall fly".
So she sang; the little lovely angel
The endless ballad of the Immortal Soul.

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while for you to find sure-
in the Field Engineering
thrills and wonderful tick-
in your career. You will
many benefits and get
of achievements worth
posterity. Then wish you
career.

"THE SUMMER GAME"

By

IVAN L. DESHMUKH

Second Year Elec. Engg. S.P.C. Engg.

CRICKET, Lovely Cricket' wrote Ian Wooldridge and how true these words are. Cricket has become an art these days and no department of the game lags behind in this respect. Over the years, batting, bowling and fielding have improved so much that we can say they have each reached a peak of perfection.

Cricket is essentially an English game and we find a mention of it in some early thirteenth century writings. However it was in Hambledon, in the Hampshire hills, that cricket was first played seriously. Many fine players were born in these parts and for many years they comprised the best team in England.

The period 1820-1870 has been called the 'Middle Ages' of cricket. The ancient heroic days of Hambledon had become a memory and the headquarters of cricket had shifted from Hampshire to London. In its main features, cricket had assumed the form we know at present. Except for the underarm bowling law, the laws were much as they are now although many amplifications and modifications were slowly introduced. The original two stumps and a single bail had given place to three stumps and two bails well back in the eighteenth century. The straight bat had succeeded the curved club as soon as length-bowling came in. Pads, batting gloves and wicketkeepers' gloves had not yet appeared but it was not long before,

overarm fast bowlers made their use compulsory.

Wickets in the first half of the nineteenth century were appalling. Grass was cut by any primitive method available. Rollers were unknown in those days. Wickets were pitched at the start of play on the stretch of turf decided by the winner of the toss. We see now how the result of the toss could swing the game either way. Lords, surprisingly, was one of the worst grounds at that time. Consequently, in a period of low scores, we find those at Lords among the lowest. On such pitches fast bowlers were a terror. One wonders how the batsmen, without any form of artificial protection, managed to stand up to them at all. Bowlers like Alfred Mynn often made balls rise over the batsman and wicketkeeper and into long-stops' hands. Wicket-keepers rarely attempted to stop balls down the leg-side. Thus we need not wonder why long-stop was considered a place of honour allotted to the strong and brave.

Let it not be imagined that the underarm fast bowlers were not above medium pace. Of George Brown it was related that once in practice he was bowling with a man stopping the ball behind the wicket with a coat in his hand: one of his fastest balls went through the coat and killed a dog on the other side. Bowling in these days was not all sheer speed. Length, ac-

curacy and intelligence counted most while the pitch usually did the rest. It is interesting to note that although slow bowlers could be as devastating as fast bowlers, spin was not relied upon because of the state of the pitches.

Batting like bowling was simple and straightforward. Generally, a batsman was either a forward player or a back player. Keeping the ball out of the wicket on the rough pitches called for infinite skill and resource. Thus a regular hitter could not be relied upon to be a regular scorer. The principal scoring strokes were drives and cuts. The pull and hook were frowned upon. The draw and under-leg stroke have long disappeared from cricket after the introduction of pads. Scoring was slow and thirty runs an hour was considered as being a good rate. The slow scoring trend can be attributed to the state of the pitches that usually demanded watchful defence from the batsman. Another fact that contributed to the low scoring rate was that no boundaries were declared. Batsmen had to run all the runs they scored and this obviously slowed them down. Despite this, high scores were made occasionally. Grounds in those days were unenclosed and fielders had to retrieve the ball from the crowd while the batsmen continued running. Needless to say many fights occurred during this process when the fielder was a bit too rough in doing his job.

Players in those days wore long trousers, unpressed and supported by a belt or braces; white or coloured shirts with a stiff collar; black or brown shoes or boots and top hat. Bowlers in old paintings are generally shown wearing a top hat but we assume that the fast bowlers removed them on duty. Batsmen however batted with the top hat on and there are a few instances in score books where a batsman has been given out 'hat knocked on wicket'.

Cricket was a rustic game. Most grounds were in small villages and there was high feasting in the neighbourhood when one of the not over-frequent matches took place. Cricket followers swarmed into the village from miles around coming on horseback, on foot, or in carriages. Taverns did a roaring business. Spectators sat on benches or on the grass under the trees with mugs of ale by their side. Rowdy scenes were not infrequent and matches sometimes had to be abandoned owing to angry spectators invading the field and preventing play.

Lord's fully partook of the rustic atmosphere that prevailed. St. John's wood was not yet a built up area and there was not a single house in the neighbourhood of the ground. The Tavern was there from the date of opening in 1814, but the pavilion, which had been burned down in 1825 and since rebuilt, was little more than a large shed. There were two ponds on the ground and a flock of sheep was penned in one corner. The sheep were used to keep the grass cropped.

No dogs were allowed on the ground. However horses were in a different category. Noblemen and gentlemen rode or drove onto the ground and stabling was provided. Here, however, things often got out of hand and in 1834 we actually read of two persons who rode in a carriage through the centre of the ground. As the report goes 'they were justly backed astern by Dark, the proprietor, amid the cheers of the gentlemen present.'

The changeover from underarm to overarm bowling was a slow process. In the early days of cricket all bowling was underhand and till almost the end of the eighteenth century nobody attempted any other method. At first it was all along the ground; then the Hambledon men led by Richard Nyren and 'Lumpy' Stevens began to bowl to a length. The curved club

COLLEGE CRICKET TEAM



Standing Left to Right:—Shri Mistry, Naraspura, Nagarkatti, Kamat, Patkar, Mahale, Potkar, Shete.
Sitting:—Avarsekar, Phiroz, Shri. L. S. Dubashi, Prin. R. H. Chokhavatia, Prof. S. S. Dighe,
Shri Kumta, Rane.

COLLEGE TUG-OF-WAR TEAM [S. E. CLASS]



Standing Left to Right:—Shri Maheshwary, Joshi, Rawal, Mahtani, Phiroz, Katkar.
Sitting Left to Right:—Shri Dalal, Patil, Krishnan, Prin. R. H. Chokhavatia, Prof. S. S. Dighe,
Sahdev, Saijwani Amorsingh

CONQUEST OF AIR

By
NALINKUMAR L. SHAH,
B.E. (Civil).

HOW nice it would have been, if we were able to fly like a bird" was a dream of generations of human beings, even before the history commenced to be written. To conquer air was their will. For many years man has thought of traversing through space, but any scientific approach to the problem was effected fruitfully only in the last few centuries.

In the ancient Greek history there is a story of Decadalus and Icarus, which represents, in the most primitive manner, the conception of flying. Icarus, with the help of wings made of feathers and wax flew too near the sun. But alas! the approach to the sun caused the wax to melt and he was crashed into the sea.

The idea of flapping one's way through the air like a bird, was clearly, the first conception of artificial flight. But in 1680, Borelli exposed the fallacy and stated that a man's "horse power" is totally inadequate to maintain flight in still air. Thus when it was realised that human beings could not fly "under their own power"; they turned to think over mechanical means, but even then efforts to imitate nature were unsuccessful. There were some men who believed in "lighter-than-air" crafts (i.e. balloons). Although balloons still have their uses, the general opinion of aeronautical engineers favours the power-driven "heavier-than-air" crafts.

Sir George Cayley, regarded as the father of aeronautical engineering, in 1796, carried out many researches on lift-

ing surfaces and glider-models. He refused to accept any idea of human flapping. He suggested fixed "wing" and justified the advantage of cambered over flat surfaces. He studied all the possible models of power-driven air crafts and suggested vertical and horizontal surfaces. He also gave the idea of "dihedral angle" i.e. the upturning of wings to give transverse and lateral stability. The experiments which he made with the big model gliders which proved to be stable; were so to say an unparalleled contribution to what is now to be regarded as a science of aeronautics.

Penaud, in 1872, invented a "motor" (which he called as the twisted-elastic-motor) which was very suitable for model aeroplanes. He presented a practical model aeroplane with main plane and tail plane, equipped with a propeller, driven by the motor he invented, at the front. This model flew successfully and consequently Penaud gave completed plans for a "heavier-than-air" power driven aeroplane, but no suitable motor was available at hand and like most other inventors, he lacked finance.

Lilienthal was another aeronautical engineer who presented for the first time his man carrying glider experiments in Germany and thus created a hope to conquer air. He worked on his gliders mostly between 1893 and 1896, when he died after his biplane gliders nose dived. Unquestionably, the success achieved later by the Wright brothers was largely due to Lilienthal's work.

The brothers Wilbur and Orville Wright, the greatest pioneers were the

By
KUMAR L. SHAH,
B.E. (Civil).

and glider-models. He refused any idea of human flapping. He fixed "wing" and justified it by cambered over flat surfaces. He tried all the possible models of air crafts and suggested horizontal surfaces. He also tried "dihedral angle" i.e. the wings to give transverse and lateral stability. The experiments which he made with the big model gliders which he built were so to say an unbroken contribution to what is now a science of aeronautics. In 1902, he invented a "motor" as the twisted-elasticity was very suitable for model flying. He presented a practical design with main plane and tail with a propeller, driven by a motor, invented, at the front. He successfully and consequently completed plans for a "power driven aeroplane" motor was available like most other inventions.

Another aeronautical invention for the first time in glider experiments in 1903 created a hope to control on his gliders mostly in 1896, when he died. His gliders nose dived. Unsuccessful achievement later was largely due

Wilbur and Orville
pioneers were the

first men to fly in a powered aeroplane. These American pioneers studied the work of Lilienthal and in 1903 built a glider which they tested at Kitty Hawk, California. Their approach was scientific and they had built a small wind-tunnel to test their theories. They finally fitted a petrol motor to an improved glider and on 17th December, 1903, they made their first powered flight.

"The conquest of air was at last achieved"! A flight of well over 24 miles was accomplished in October, 1905. By the end of 1908, they had made a series of spectacular flights on either sides of the Atlantic. But by now they had competitors in Europe. Santos Dumont made his flight in 1906, the peculiarity of his flight being that he used a wheeled under-carriage, whereas the Wright brothers' aeroplane had skids and was launched from a rail by a kind of cata-pult arrangement.

Year of progress:—The year 1909 was, so to say, the vintage year of flying progress. Great work was being executed by other pioneers. We have the Antionette monoplane with its "tractor" air screw in the front; we have also the Bleriot monoplane which crossed the channel on 25th July, 1909; this machine is perhaps the earliest to resemble the modern monoplane and was undoubtedly a design on the right lines. Many biplane designs were destined to follow but, after many years, the monoplane proved to be the most satisfactory type.

Modern Plane:—The modern aeroplane has become extremely conventional in design. In modern planes we have a single large aerofoil or wing in front and a tail assembly at the rear. This tail assembly consists mainly of another horizontal "plane" similar to that at the front one, but much smaller in size; it is also provided with a vertical fin with a movable flap ("rudder" as it is called) at the end for steering.

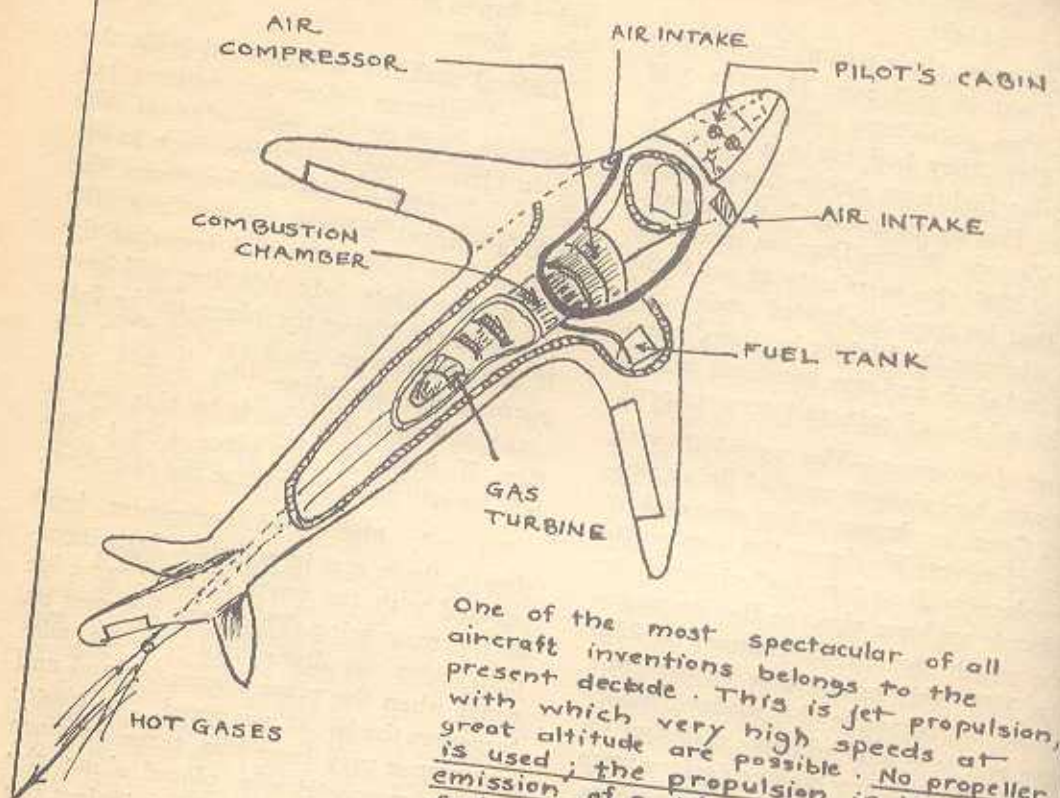
How an aeroplane climbs and dives:
The horizontal tail plane has a hinged flap which can be raised or lowered. This is called the "elevator". When the elevator flap is raised by the control cables connected to pilot's control column, (or "Joystick" as it is called) the air pressure on its upper surface forces the whole tail down and the plane itself tilted becomes upwards and will climb. If the elevator flap is lowered the tail rises and the plane dives.

Lateral stability is achieved with the help of ailerons which are nothing but movable flaps on the rear edge of the main plane body; and these work in opposite directions; the cables from the pilot's control column raising, say, the flap on the pilot's left and lowering the flap on the pilot's right, this then will have the effect of tilting the plane to the left. If for any reason, such as a sudden air current, the aeroplane tilts over to the right, the pilot rectifies it by this operation. If, however, the plane tilts to the left, he will have to reverse the operation.

To help high-speed aeroplanes land slowly, there are, in addition, flaps incorporated with the parts of the rear edge of the main wing. These are lowered on both sides simultaneously (unlike ailerons) when the plane comes to land and increases the lift at low speed. The bigger aeroplanes may have two, three or more engines symmetrically placed along the front edge of the main plane; in fact the propellers are the "tractors" as they draw the plane forward.

An aeroplane, generally, has two front wheels and one wheel or skid under the tail. The engine and propeller draw the plane forward along the ground until it reaches a velocity of, say, 80 km/hr. (about 50 miles/hr.) at which the lift becomes sufficient for the whole body of the plane to leave the ground. On landing it is usual to throttle down the engine and

LATEST AIRCRAFT DEVELOPMENT: JET PROPULSION



One of the most spectacular of all aircraft inventions belongs to the present decade. This is jet propulsion, with which very high speeds at great altitude are possible. No propeller is used; the propulsion is by the emission of a jet of air with burnt fuel gases at a tremendous velocity from the rear end of the plane.

Sketch by
Nalin Kumar L-shah
B.E. (Civil)

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T'S CABIN

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glide in without the use of the engine or with it adjusted to low power. As the plane runs along the ground the engine is adjusted to minimum power, the brakes being gradually applied to the wheels and the machine is then brought to rest. An automatic arrangement is made so that as soon as a plane takes-off, all the wheels are retracted into the spaces provided under the main plane so that the "drag" or the air-resistance is minimised during flight.

HOW THE PILOT'S CONTROL COLUMN (OR "JOYSTICK") WORKS:

The pilot, who usually sits in an enclosed cabin, controls the engine or engines and also lateral and horizontal inclination of the plane. His control column is like the steering wheel of a car. In its simplest form it is simply a stick with control cables attached to its lower end. A movement to either side by moving the ailerons, tilts the machine to that side. A movement forward or backward by moving the elevator will cause the plane to dive or climb respectively. In bigger machines the lateral stability is achieved by rotating a "steering" wheel at the top of the column instead of the movement of the "stick" side ways. True steering with the rudder is effected by a rudder bar pivoted in the middle. The pilot has a foot resting on either end. If now, he wants to turn to the right, he presses with his right foot and if to the left, with his left foot, the other controls being simultaneously applied as a plane has to "bank" while turning to counteract the centrifugal force and to reduce the bending moment experienced by the shafts of propellers.

This is more or less a standard design and as possible modifications to this, we can expect engines and passengers to be accommodated actually inside. Single engines vary in horse power from about 100 to 1200 H.P. according to their pur-

pose and many advancements have been made in increasing the horse power.

USE OF "JET PROPULSION: There is, however, a great likelihood of wide development of jet propulsion, which eliminates the propellers altogether and shoots out towards the rear end a stream of gases with tremendous velocity. The explosive engine is fed with fuel e.g. petrol and air the latter being from the atmosphere. The reactions against the air surrounding the machine sends the 'plane forwards. Wings are used to support (only) such aeroplanes.

Rocket Propulsion: Rocket propulsion is not exactly the same as above; the rocket would carry all its own explosive materials and the required reaction would still take place even if there is no air or if the air is very thin as is the case at greater heights. A rocket travels in vacuum and requires no wings—it of course requires a high exhaust velocity. If anyone ever travels to the moon, it will be no doubt, by rocket.

Jet propelled 'planes are being successfully flown and they fly at great speeds. Experiments are being made in the direction of making them more economical of fuel.

Practically all types of planes may be fitted with floats so that they can take off from and alight on water in emergency. As regards the commercial use of planes, which have to fly in all weathers radio navigational aids have undergone enormous changes and improvements and they will contribute more and more to safety.

Fundamentally, however, except as regards the jet and the rocket propulsion, the modern plane has undergone little changes. From the days of magicians and priests, we have now entered an era of engineers and scientists and to them we may safely entrust the future development of air travel.

"PRE-STRESSED CONCRETE"

By

J. T. BHATIA, B.E. (Civil).

STRUCTURES started springing up as early as the prehistoric days. The oldest form of structure was the cave of the apemen. Gradually it came to be replaced by huts, cottages and finally buildings. This was the outcome of tremendous progress achieved in the use of new materials for construction. The buildings were originally constructed of timber and later on of bricks. Then concrete came and almost revolutionised the field of construction. The deficiency of concrete, however, in taking up tension resulted in engineers' further research and improvement. And, one fine day, R.C.C. took birth, endorsing the adage, "Necessity is the mother of Invention". The Man, however, is never satisfied and now he has come up with a new phenomenon known as "pre-stressing of concrete".

As concrete is weak in tension the reinforced concrete beam develops cracks even at ordinary working stresses. However it is possible to avoid these cracks and to get sound concrete in tensile zone, by what is called pre-stressing. Pre-stressing, as is clear from the name is to induce compressive stresses in the zone which will be tensile under external loads. The basic principle of prestressing is the induction of stresses in a concrete member before the dead and live loads are applied, so that these stresses act in the opposite to those developed by external loads. When the loads are applied,

the resulting stresses from external loads will be superimposed on the prestresses.

Procedure: The pre-stressing may be done either directly on the concrete or through the steel reinforced bars enclosed in concrete. In the direct method the steel plates are kept in contact with the ends of beam and the compressive force is induced in the concrete with the help of jacks. This type is usually used in arched construction where the two halves of arch are cast separately, leaving a gap at the centre. Due to shrinkage and dead load, the arch ribs droop down and press hard against the framework. In one system, the steel bars are threaded at the ends and provided with plates and nuts pressing the concrete. When the steel is stretched and nuts are rotated so as to press the plates against the concrete, the compressive stresses are induced in the concrete. This method is called pre-stressing without bond. Fig. 1 shows the method of pre-stressing without bond.

PRESTRESSING WITHOUT BOND

Another method of creating the necessary pre-stressing force is referred to as pretensioning. Pretensioning is accomplished by stressing steel wires called 'Tendons', to a predetermined amount. While the stress is maintained in the tendons, the concrete is poured into the formwork. After the concrete has hardened, the tendons are released. Now the concrete which had developed good bond with tendons is prestressed, as a result

CONCRETE"

(Civil).

stresses from external loads imposed on the prestresses.

The pre-stressing may be done directly on the concrete or indirectly by using steel bars enclosed in the concrete. In the direct method the tendons are kept in contact with the concrete and the compressive force is applied to the concrete with the help of a jack. This type is usually used in precast concrete where the two halves are cast separately, leaving a gap between them to allow for shrinkage and dead load. The tendons are threaded at the ends with plates and nuts. When the steel is cast, the tendons are rotated so as to prevent the concrete, the stresses are induced in the concrete. This method is called pre-tensioning. Fig. 1 shows the method of pre-tensioning without bond.

WITHOUT BOND

of creating the necessary force is referred to as pre-tensioning. This is accomplished by using steel wires called tendons of a predetermined amount. The tendons are kept in the form of a loop in the concrete before it has hardened. Now the concrete has hardened, the tendons are developed good bond with the concrete, as a result

of tendon to regain their original length which they had before they were stressed.

The tendons are also pretensioned with the help of hydraulic jacks.

DESIGN:

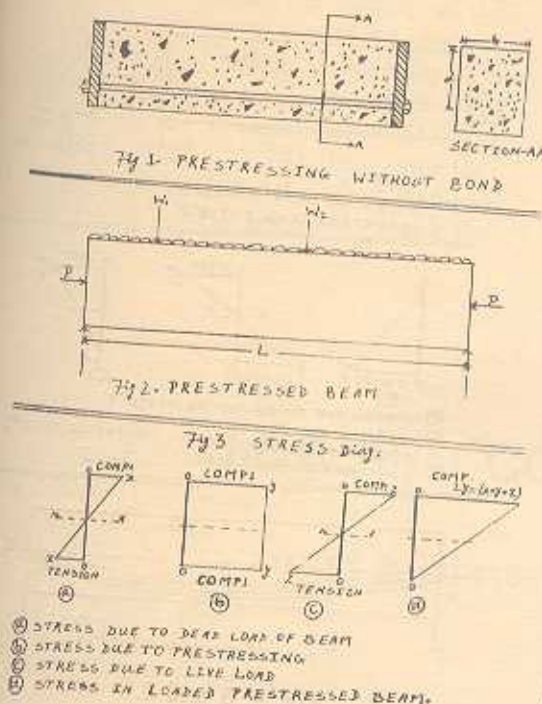


Fig. 1. 2 and 3.

PRESTRESSED BEAM

Consider the beam as shown in Fig. 2. The stresses induced in beam due to live load and dead load are shown in Fig. 3 (3a and 3c). The combined effect of these loads are to induce compressive stress of value $(x+z)$ in the top fibre of the beam and tensile stress of value $(x+z)$ in the bottom fibre. But as I have already mentioned that concrete is weak in tension, it will practically take nil tensile stress. So to get rid of this tensile stress equal to value $(x+z)$ in bottom fibre we apply the compressive force 'P' of such a value

that it induces the compressive stress of value $y=x+z$ through out the section of the beam as shown by fig. 3b. When we combine all these three diagrams 3a, 3b and 3c, the net stresses are represented in the fig. 3d. The fig. 3d represents that there is nil tensile stress in the bottom fibre of the above beam and compressive stress of value $(x+y+z)$ is in the top fibre of the beam and concrete can easily take this compressive stress.

From above it is clear that the tensile stresses induced due to the live and dead loads i.e. external loads, should be less than or equal to the compressive stress induced due to prestressing otherwise tension will be again there in the bottom fibre.

When the prestressing force is applied centrally it may be possible that the compressive stresses induced in the top fibre after loading may be greater than permissible. Hence we should play a trick so that tensile stresses are induced in the top fibre and compressive stresses in the bottom fibre when prestressing force 'P' is applied i.e. due to prestressing force 'P', opposite stresses should be induced than those induced by the dead and live loads. For that we have got only one way, that is to apply force P not centrally but eccentrically. The prestressing force should be applied below the centre in order that the combined stresses, due to direct stress and bending stress will be tensile in the top fibre and compressive in the bottom fibre. Now let us see upto what eccentricity we can apply the prestressing force 'P'. Let 'e' be the eccentricity of the force 'P' with respect to the centre.

Assuming two equal and opposite forces act at centre, the forces acting on the section of beam are force P at centre

and moment (Pxe). The stress due to direct force 'P' will be $\frac{P}{A}$ compressive throughout, where A is the cross sectional area of beam. The stress due to moment ($P \times e$) can be easily found out from the equation:

$$\frac{f}{y} = \frac{M}{I} \therefore f = \frac{MY}{I} = \frac{P \times e \times y}{I}$$

Let the depth of the beam be 'd' and breadth be 'b'. Then moment of inertia of beam (I) about neutral axis is $\frac{bd^3}{12}$ and $y = d/2$

$$\therefore f = \frac{P \times e \times d \times 12}{2 \times bd^3} = \frac{P \times e \times 6}{bd^2} = \frac{6P \times e}{A \cdot d}$$

$$\therefore \text{Stresses in bottom fibre due to direct and bending stresses} = \frac{P}{A} + \frac{6Pe}{A \cdot d} \text{ (Comp.)} = \frac{P}{A} \left(1 + \frac{6e}{d} \right) \text{ Comp.}$$

$$\begin{aligned} \text{Stresses in top fibre due to direct and bending stresses} &= \frac{P}{A} \text{ (Compressive)} \\ &\quad - \frac{P \times e \times 6}{A \times d} \text{ (Tensile)} \\ &= \frac{P}{A} \left(1 - \frac{6e}{d} \right) \end{aligned}$$

For the zero stresses in the top fibre

$$\left(1 - \frac{6e}{d} \right) \frac{P}{A} = 0 \text{ i.e. } \left(1 - \frac{6e}{d} \right) = 0 \text{ or } \frac{6e}{d} = 1$$

i.e. $e = \text{eccentricity} = d/6$

Hence the prestressing force 'P' is applied at an eccentricity of $d/6$ with respect to centre i.e. at a distance $d/3$ from bottom so that the stresses induced due to prestressing force will be Zero at top

$$\text{and } \frac{P}{A} \left(1 + \frac{6e}{d} \right) \text{ or}$$

$$\frac{P}{A} \left(1 + \frac{6}{d} \times \frac{d}{6} \right) = \frac{P}{A} (1 + 1)$$

or $2P/A$ compressive in the bottom fibre. This is twice than that obtained when the force P was applied centrally. Now we can apply dead and live load on beam to

such an extent that the stresses induced due to them in bottom fibre should be of value $\frac{2P}{A}$ tensile and in top $\frac{2P}{A}$ compressive. So the resultant stresses in the beam will be Zero in bottom fibre $2P/A$ compressive in top fibre as shown in fig. 5.

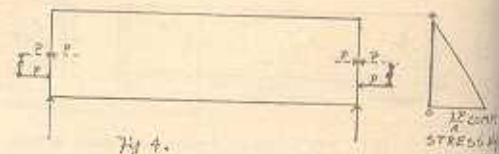
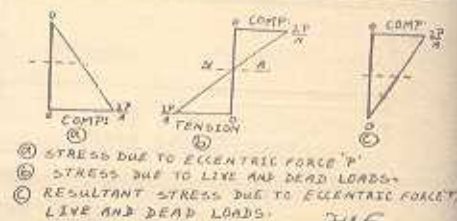


Fig. 4.
ECCENTRICALLY APPLIED
PRESTRESSING FORCE 'P'



(a) STRESS DUE TO ECCENTRIC FORCE 'P'
(b) STRESS DUE TO LIVE AND DEAD LOADS
(c) RESULTANT STRESS DUE TO ECCENTRIC FORCE, LIVE AND DEAD LOADS.
Fig. 5



Fig. 6. BENDING OF CABLES

Fig. 4, 5 and 6.

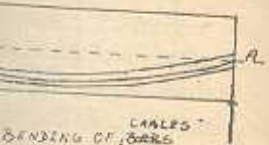
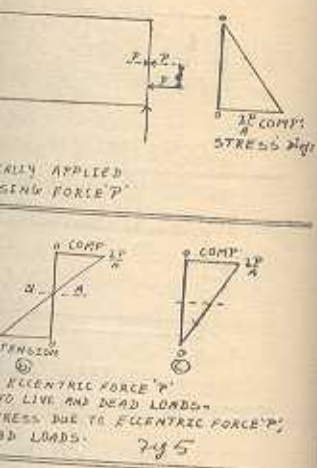
If we compare the first case when the force 'P' was applied centrally to the second case when the force 'P' was applied eccentrically we find that the compressive stresses induced in bottom fibre due to the second case are double than those induced due to the first case. Hence always the prestressing force is applied at $1/3$ rd depth from bottom, and the stress due to prestressing force 'P' above are generally combined stresses due to a direct load 'P' and bending ($P \times e$) resulting from an eccentrically applied load.

Bending of cables and shear in pre-stressed beam:—

In the case of prestressed beam it is

essential shown in straight, tensile stress of the beam. Hence it free curve beam the i.e. $1/6$ th Zero. In are bent the middle bars are above and

at that the stresses induced in bottom fibre should be of tensile and in top $\frac{2P}{A}$ compressive. The resultant stresses in the beam are zero in bottom fibre $2P/A$ in top fibre as shown in



5 and 6. In the first case when the force 'P' was applied centrally to the beam, the compressive stress in bottom fibre due to the force 'P' was double than those in the first case. Hence when the force is applied at the bottom, and the stress in top fibre due to the force 'P' above are double than those in the first case. Hence the resultant stresses due to a bending ($P \times e$) resultantly applied load.

and shear in prestressed beam it is

essential to bend the bars at the ends as shown in fig. 6. If the bars are kept straight, prestressing would induce high tensile stress in the top fibre at the ends of the beam.

BENDING OF BARS

Hence it is necessary to bend the bars in free curves so that at the middle of the beam the eccentricity should be greatest i.e. $1/6$ th of depth while at the ends it is zero. In the above fig. 6, the three bars are bent to the greatest eccentricity at the middle of the span. At the corner two bars are bent, each by the same distance above and below the neutral axis and the

middle bar is upto the neutral axis. Hence the eccentricity at the end is zero. The maximum bending moment is usually at the centre of the span. Hence the eccentricity at the centre is kept maximum.

As prestressed section does not develop any appreciable tensile stress and avoids cracks, it helps to resist the shear also. Due to bending of bars above the neutral axis at the ends of prestressed concrete beam, the end sections are subjected to uniform compression. Usually in the case of prestressed concrete beams as the diagonal tensile stresses are small, no special shear reinforcement is required for it.

* *

LIFE AND COCA-COLA

By

KISHAN T. CHHABRIA, B.E. (Civil).

Life is like
A drink of Coca-Cola.
Delicious they are, both
As long as they last.

Every sip
Is a major incident of life;
And its relish
Symbol of its feeling.

The bore of straw
Is like the passage of time;
Life flows through it
In a steady vein.

The level, gradually,
In the bottle, recedes.
So does
The span of life;
Until
At the climax of time
The "Wine" disappears
And life flies away.

The empty bottle,
The bent straw,
The lull in the air,
All pose
As a sad reminder
Of the last,
Immobile remains
Of the shattered life.

SPACE EXPLORATION & U.S.A.

By

S. K. PATEL, S.E. (M).

AMERICA'S man in space project is part of an overall programme of scientific exploration of space. The man in space programme is divided into three projects:

(i) Project Mercury (ii) Project Gemini and (iii) Project Apollo.

PROJECT MERCURY was designed on October 5, 1959 with a single objective to verify the ability of man to function in space. The purpose outlined for United States National Aeronautics and Space Administration (NASA) was the development and operation of vehicles capable of carrying instruments, equipment, supplies and organisms through space.

Alan B. Shepard made the first sub-orbital flight in May of 1961. "Freedom 7" spacecraft reached an altitude of 184 kilometers, landing safely in Atlantic Ocean fifteen minutes after liftoff from Cape Canaveral, America's Primary launching centre located on the eastern coast of Florida. This feat was duplicated by Virgil I. Grisson two-and-a-half months later.

In February 1962 astronaut John Glenn's orbital mission utilising an Atlas launching vehicle realised the major Project Mercury goal demonstrating that an astronaut can work effectively even in weightlessness and manual control is hence feasible. The next astronaut M. Scott Carpenter found that he could navigate by the stars alone and that human depth of perception is workable in space. Six orbit flight of Walter M. Schirra, Jr. established techniques for longer flights. During his 34 hours and 21 minutes aloft next astronaut Leroy Gor-

don conducted some experiments, at three times, slept seven hours and took some 5,000 photographs. The astronaut and his support system functioned successfully that on May 16, 1963 the announcement was made that after the passage of five years, by the launching of more than twenty unmanned satellites, two suborbital and four orbital manned satellites Project Mercury had accomplished its mission.

PROJECT GEMINI: While the concepts developed in Project Mercury have proved successful, it became obvious that there would have to be some project to bridge the gap between the current state of science and the problem of moon flight.

Thus, to project Gemini are assigned two important missions:

1. The development of techniques for bringing together two vehicles in space.
2. The operation of orbital flights lasting from a few days to a week to carry out a variety of scientific investigations that require man's participation and supervision. The two-man Gemini capsule externally resembles Mercury crafts. It provides about 50 percent more cabin space and weighs about 7000 pounds. In contrast to Mercury, many components will be outside the crew compartments and arranged in easily removable units thereby facilitating check-out and maintenance. It will be launched by a Titan II booster, which has a thrust of 530,000 pounds, almost double that of Atlas.

The significance of Project Gemini lies in mastering the techniques of causing two vehicles to meet together in outer space—the so-called orbital rendezvous.

& U.S.A.

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EMINI: While the con-
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Thus U.S. lunar programme Project Apollo, calls for a rendezvous in orbits around the moon.

PROJECT APOLLO: is the next step after Gemini in the U.S. manned space flight programme. The spacecraft is designed to carry its three man crew on trips lasting upto two weeks. First will be the orbiting of large laboratory spacecraft. Then succeeding crafts are to journey around the moon.

There are three stages of the Saturn V launch vehicle with a capability of almost 9 million pounds of thrust. It will develop $7\frac{1}{2}$ million pounds of thrust on take-off from its first stage burning conventional propellants. The second and the third stages will both use hydrogen and oxygen high energy propellants. The Saturn V launch vehicle will place the Apollo spacecraft in a trajectory towards the moon.

The U.S. Apollo spacecraft is built like a pyramid. At top is the command module with the service module below it. The lunar excursion module is beneath the service module.

When the capsule approaches the moon, engines will be fired to place the entire Apollo system into lunar orbit. Two of the astronauts will descend to the surface of the moon in the lunar excursion module. After one or two days on the moon the lunar excursion module will be launched into a lunar orbit and rendezvous with the mother ship. The men will return to the command module and begin the journey back to earth.

RANGER VII PHOTOGRAPHS THE MOON

America's Ranger VII spacecraft successfully accomplished its mission providing the world's first close up photographs of the moon. The Ranger pictures were transmitted back to earth and received at Goldstone, California, tracking station and were recorded on magnetic tapes.

Project officials at the jet propulsion laboratory in Pasadena, California which built, tracked and guided the Ranger said that the television cameras went to full power about 13 minutes before impact and receiving system at Goldstone got "excellent video signals" without interruption until within half a second of impact. The cameras were turned on some 1300 miles above the lunar surface covered an area of about 300 to 400 square miles. These pictures were roughly comparable to moon photograph taken through earth telescopes. The final picture recorded in the moment before crushing into the sea of clouds covered an area of about 60 square feet. These photos show an object as small as an automobile. The impact area was on the lighted side of the moon near the equator.

The main object of the Ranger probe was to observe the moon surface closely to see if manned landing would be possible. NASA expects the pictures to provide valuable information for future unmanned exploration of moon and the Apollo manned landing by 1970. Geologist Eugene Shoemaker said just after Ranger's impact that there is enough new information in the pictures to keep scientists busy for three years. Meanwhile, the space age goes on, and so do Ranger and other programmes aimed at exploration of the moon.

Thus in this fast moving world of aerospace research and development, yesterday's science fiction is tomorrow's history. Man already knows much about the bleak, beautiful, mystery laden globe, the moon, from his centuries of observations, from skilful photography and shrewd deduction. Now we have a further promise. By the end of this decade man will land on the moon.

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STUDY TECHNIQUE FOR UNIVERSITY EXAMINATIONS

By

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GOD, the Omnipotent Power, has created this wonderful machine of human body, having a brain control at the top well protected within the hard skull. The creation is so marvellous and perfect that we human beings do not appreciate its functioning and do not take its advantage to the fullest extent. So many compartments of this human brain still remain undiscovered. Its structure is very much intricate. It has perfect communication system and wonderful automatic telephone exchange so much so that if even a slight touch or pin prick is there, brain gets the message like a flash and instantly gives the order to ward it off. This is known as nerve centre located in the rear of the neck just below the brain. Even if a fault to the slightest extent is developed anywhere in the brain, it gets disturbed or distorted, resulting in insanity or loss of memory according to the intensity of the shock. Hence the study of this wonderful human body as far as study technique is concerned is absolutely essential here to understand its technique and working.

2. Master of the brain called mind resides in the brain and it controls the whole working of the human machine. But the supreme commander is the soul which gives the energy to the whole body and curbs the mind also. The movements of the soul rest in the hands of God or the Creator of the whole universe. These movements are the subject of philosophy, theosophy and spiritualism which are beyond the scope of the present subject to be dealt with here. Now coming to the

mind, it is upto you to control your mind from going astray and get the best out of it. For this, self control, determination and constant study are necessary. If you achieve these qualities, matter is much simplified to follow the study technique. Hence study first your habits, character, likings and dislikings, aptitude and also inheritance. Character once moulded in childhood is very difficult to change and whatever inherited generally and automatically stays permanently but these can be toned to a certain extent if you have perseverance, patience and determination coupled with deep study. Then the remaining items are adjustable by self control and determination. Nothing is difficult or impossible to achieve your goal or aim even for the ordinary brain but the determined mind and self control in the form of study are necessary. When you learn this art or technique, you are in a position to mould your habits, your likings and aptitude in the desired form and have inspiration for Arts or Engineering aptitude.

3. If you ask any doctor as to how the brain is like and what its characteristics are, he would give the answer thus—It is a very tender white creamy like substance very irregularly shaped looking like a rumble tumble prepared from the egg. It is then surprising to imagine as to how such a creamy like substance should be able to contain or treasure so much knowledge and experience acquired in your life time. Whatever that secret may be, the fact remains that whatever impressions are communicated through your

By

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to you to control your mind stray and get the best out of self control, determination and study are necessary. If you have all these qualities, matter is much easier to follow the study technique. First your habits, character, aptitudes, likings, aptitude and also your character once moulded in your mind is very difficult to change and is fixed generally and automatically permanently but these can be changed to a certain extent if you have patience and determination with deep study. Then your habits are adjustable by self determination. Nothing is impossible to achieve your goal with the ordinary brain but self control and self control in your mind are necessary. When you start or technique, you start to mould your habits, aptitude in the desired direction, inspiration for Arts or Science.

any doctor as to how the character of what its characteristics are the answer thus—It is like white creamy like subliminally shaped looking substance prepared from the rising to imagine as to what like substance should be or treasure so much experience acquired in whatever that secret may be as that whatever imprinted through your

five sense organs (which develop into 24 qualities as per 'GEETA') are well received by your brain and retained. This storage of impressions by your brain constitutes your power of memory, getting deeper and deeper when repeated through your sense organs, adding to your intelligence or understanding capacity.

4. Let us now analyse this memory procedure. Take any book for study. You run your eyes on the printed lines of the pages of the book. A faint impression is recorded on your brain. If the atmosphere is quiet and pleasant, that impression is a little deep. Otherwise noise of the passing vehicles on the road, or of the trains or of the adjoining workshop is recorded side by side in the brain resulting in a blurring sound when the record is played. This means that when you read the particular para in your book with intent and understanding in the quiet surroundings, you make deeper impressions on your brain and you understand the subject under reading very well. So far you have used your one sense organ only. While reading, if you read just aloud, just audible to you, two more sense organs i.e. ears and tongue come into action and deeper impressions are recorded. While understanding your lesson or studying, if you take just brief notes or points, or solve examples in relation to the subject side by side, impressions get still deeper by the use of your hands. If you read without any worry to your mind i.e. your heart beating is steady, then you bring one more remaining organ into action i.e. nose. All these sense organs in a very good combination make the impressions so bright that you get satisfaction of having done the study to the extent of 40 per cent. Subsequently if brushing up is done by two or three more revisions you are absolutely ready and get strong confidence to pass the examination with distinction or at least in the first class. Each

revision means 20 per cent additional power to your memory. Now judge yourself as to how far you are in a position to do that to get your aim achieved. Of course you should have a determined aim to pass the examination with distinction or at least in the first class.

5. When you intend to stage a drama in drama competitions, naturally with a curb in mind you take a deep interest in it. Whatever that part may be, you perform that part so intently with the help of your director that all your five sense organs function to the fullest extent unknowingly. Thus within two or three actions you confidently perform rehearsals and appear in the final so well that you come out successfully getting good cheers from the audience and prize too. What does this indicate? If you can do this performance well, then you can surely do your part in the examinations as well. This means the application of the following factors in sequence—

- (a) A determined aim,
- (b) Aptitude for the subject i.e. deep interest in the subject,
- (c) Very intense reading to understand the subject,
- (d) Very good reading with concentration bringing as many sense organs as possible into action,
- (e) Noting your difficulties down, if anything is not understood, while doing so,
- (f) Getting them solved with the help of your fellow students or paying particular attention in the class thus getting them solved with the help of your teaching staff,
- (g) Revising the lessons subsequently,
- (h) Getting finally ready for examinations with confidence, at the same time observing the health rules normally to see that you do not get

sick or get nervous at the eleventh moment,

- (j) Reading the question paper calmly and ticking the questions in order of priority for which you seem to know the answers very well,
- (k) Thus finally coming out successful with distinction from the examination.

6. There are three types of students in general as under—

- (i) One who keeps himself in studies in advance of the class and sees that his points already noted down while studying, as not understood by him, are made clear in the class.
- (ii) One who just manages to keep himself abreast of the class and undertands the lessons.
- (iii) One who does not worry about his lessons and always lags behind the class with the result that he sees the mountain of studies before him and gets confronted as the examinations approach nearer and nearer.

Then you yourself ascertain as to what category you come in. Some of you might ask as to how to study so many subjects of engineering and some subjects in which you have no interest or may be, your parents might have compelled you to take a particular branch of engineering or have been given a particular branch of engineering compulsory under odd rules, against your wishes. Yes, there is appropriate answer to that and you will be able to get it if you read this article carefully. Whatever that may be, once you are put in a particular line of engineering career whether against your wish or according to your wish, you are duly bound to complete your task allotted to you by your

destiny through your parents, successfully and take full responsibility to prove your worth. No surrender in your undertaking and nothing is impossible for you to attain the grand success in your educational career if you are determined in your aim and act accordingly. Think of the plan set before you and adjust yourself, and get set for the task. By perserverance and dint of hard effort in your studies, you will be surprised to see that your goal has been achieved one fine morning.

7. So far you have learnt about the brain and its working. But this brain requires energy to function properly. This is given by circulation of blood from heart to brain. Blood comes as a result of food you take and digest by observing normal health rules. In order to have good supply of blood towards your brain, some artificial measures are necessary. These are (i) deep breathing in the open air, (ii) just sufficient exercise to keep you fit, (iii) good outdoor sports to keep you always sportive and buoyant, (iv) properly regulated diet, (v) relaxation and adequate rest but not to get lazy, (vi) just a little recreation through indoor games on holidays or reading light literature, but no exciting stories or pictures till you achieve your aim at least and (vii) proper timetable of your studies, duly adjusting to fit in your college timetable and your journey time.

8. Let us go through these items one by one briefly. In deep breathing, a sort of 'Pranayama' if performed in a particular way, i.e. inhaling through one nostril, retaining air for some time and exhaling through other nostril in proportion 1 : 4 : 2 respectively and back in the same way, thus making one cycle complete, is involved. If this cycle is repeated a couple of times, your blood gets good circulation in a regulated manner and you begin to feel some kind of pleasing sensation of energy. This can be done conveniently

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after cold water bath, for a few minutes. In exercise 'Shirshasan' is included and that too for a minute or two and not more and that too at a particular time only, once a day. Also brisk push ups, or 'Namaskars' and stomach exercises are necessary, just sufficient to keep you fit and not more so as to get sleepy. In sports, take keen interest in the outdoor games you like just enough to keep you active and do not get over-enthusiastic. Three quarters of an hour is sufficient and finish it by deep breathing and complete relaxation so as to get ready for resuming your studies. In diet you have to regulate your habits in eating. Restrict eating spicy preparations at least till you finish up with the examinations. In the long vacations you may enjoy such preparations and pictures. Do not overeat but eat just to the extent so as to get no drowsiness and after due rest you should be able to resume your studies. You should eat plenty of vegetables and fruits whatever you can get, at least you should have bananas, oranges and lemon juiced water. Restrict rice eating and more of wheat preparations should be included in your meals. Eat two or three morsels less than your appetite. Take your meals at the scheduled time only and eating between meals should be restricted. Only a glass of milk or cup of light tea with just one slice of bread is enough. Morning breakfast should consist of milk or tea (light), a few slices of bread preferably coupled with one or two raw eggs mixed with sweetened milk or half fried eggs. Now in relaxation, you should completely forget yourself for a while or if necessary you imagine mother's smiling figure before your mind in the loving attitude or any other figure dear to you, but allowing no gap in the meanwhile so as to take you to the dreams. After little exercise in the morning after bath, after meals and after your return from the college and also from the sports ground have rest for some

time just to get prepared for your studies. If you are in the final year, utilise this resting time in the light descriptive reading so as to cause no strain after a few minutes rest. Go to bed at 22.00 hours and sleep for seven hours only and get up at 05.00 hours. This sleep equivalent to nine hours sleep as one hour sleep before mid- night is considered equivalent to two hours sleep after midnight, is quite ample, to get refreshed for the next day's work and studies. Avoid excitement and do not see such pictures or read exciting stories or novels as these are apt to disturb your sleep after midnight and cause some undesirable dreams likely to lead to ill health. If you happen to see some pic- tures once in a while, do not think about it at all. Never allow your mind to ap- preciate your nude body before the mir- ror in the bath room as these are likely to distract you and lose your vitality in some form or other causing you some kind of ill health, which is not conducive to study. You have vitality currents flow- ing in your body and these currents have its graph going up till maturity, and stable for some ten years or so and start going down after that. Hence you are re- quired to take the full advantage of it during your educational career. In that career only whatever you learn is retain- ed in your memory well and you learn with ease. In the advanced age that ease is not there but experience is there to understand the subject. You should have, therefore, no worry for more subjects, only thing being that you are to adjust yourself accordingly. Conserve your energy by not allowing any dissipation of vitality through bad dreams and excite- ment. Because you are young you do not feel it but the effect is there on your brain by way of not understanding the subject under study very well with ease.

By regulating your habits, your diet and hours of studies according to your

personal time-table, get yourself tuned to the way of studies as heretofore described. Mind that your body is a wonderful creation. Whatever service you do to the body, and care you take for it, it would equally give the good response to you. For example, say, you have taken lunch today at 13.00 hrs., while going to bed at 22.00 hrs. you intend to get up at 05.00 hrs. and such other things you do at particular time with intention, necessarily your body will suggest to you the craving for lunch at the very moment i.e. 13.00 hrs., getting up at 05.00 hrs. and some other time as intended by you through some means of thought or otherwise. Only thing is that you should be able to pick up that message. Just try it and see yourself. When you pick up the suggestion or message and act accordingly, that will become your good habit. Stick to it and you will appreciate its good consequences. By constant study, you can develop good control over your sleep. Napoleon Bonaparte had dual control over his sleeping time. He could sleep at a particular time and get up at the desired time, even when the duration of sleep was 15 minutes.

One interesting aspect about the body and mind is its endurance. Army engineers are required to undergo the endurance test and it is necessary for you also to test your endurance power occasionally. For final year students such endurance power is a boon to them as they would be able to revise their studies a great deal, particularly the designed structures and their calculations. Without any ill-effect on your health, you should be able to work for the whole night continuously till 06.00 hrs. when you should take a short nap to absorb the tiresome effect due to strain. This short sleep is very sound and you get refreshed on getting up. Then go for the bath and you are quite fresh as ever. This can be repeated once in a fortnight safely, thus making

you have wonderful stamina either for post graduate studies here or in foreign countries or for your daring enterprise in your professional career. Such night for your endurance tests may be best utilised in solving the examples in Mathematics, problems in Mechanics or structural problems in your submission work for the Project set for the examination.

In view of the facts explained here about your brain, mind, body, their control power and capability, you should be able to prepare your own timetable embodying college timetable. It should not be rigid but somewhat flexible to adjust the odd events that happen to come in your programme. The following time table is given here to give you necessary guidance. Just see how far you can adjust yourself accordingly—

05.00—Getting up for the day's work.

05.00-05.45—Morning rites, bath, exercise, and prayers.

05.45-07.30—Start study—choose rather a difficult subject like Mechanics or structures, as you are fresh and can concentrate better in quiet, pleasant and cool atmosphere (1½ hrs).

07.30-07.45—Glass of milk or cup of light tea with two slices of bread and raw egg as explained before and also a little rest.

07.45-09.15—Study again. Take a medium easy subject like Hydraulics, M & S etc. (1½ hrs).

09.15-09.45—Morning meals and a little rest for about ten mins.

09.45-10.45—Going to the College and attending lectures (to be adjusted according to distance and time).

10.45-13.00—College periods and lectures or practicals.

13.00-13.45—Recess time during which lunch may be arranged instead of morning meals or reading newspapers

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13.45-17.30—College periods or practi-
cals.

17.30-18.30—Sports (outdoor games).

18.30-19.30—Going home.

19.30-19.45—Relaxation and rest (deep
breathing).

19.45-20.30—Study. Solving some ex-
amples or reading descriptive subjects.
(¾ hr.).

20.30-21.00—Dinner and some rest.

21.00-22.00—Study—Solving examples
and lay out of next day's programme,
depending upon the lectures finished in
the class (1 hr.). Total study hrs. are
therefore 5 hrs. excluding College hrs.

22.00-05.00—Going to bed and sleep
soundly after reciting prayers and
thinking the outline programme of
next day's study etc.

On holidays and Sundays, you get Col-
lege hrs. for study. On those days study
hrs. may be curtailed a bit giving more
time for relaxation and rest and enter-
tainment including picture or drama once
in a blue moon. But no overindulgence.
By this time with table of your own and
endurance strain once in a fortnight you
should be able to complete your studies
of the year with at least two to three re-
visions, thus giving you satisfaction and
good confidence to achieve the grand
success in the examinations.

First reading is the foundation read-
ing. Prepare the good base first. Study
the syllabus and find out what you are to
study. Copy out the syllabus of each sub-
ject and attach it to respective note book.
Thus you will be able to see the scope
of your study every time and aim at the
target properly. Study with concentra-
tion and determination in cheerful mood.
Concrete should not be porous or honey
comb. Hence do not leave any point or

gap in ambiguity. If any point or portion
of your subject is not understood, make
brief notes of your difficulties in the note
book and get them solved in the class
when your teaching staff explains that
portion, or discuss the point with one of
your fellow students who may be able to
clear them. Mutual discussions on the
subject are very helpful. When all your
points or difficulties are solved, go
through the subject once more intently,
thus making it easy for you to go on with
the superstructure. You have now under-
stood the particular portion of the sub-
ject and when you find some time during
the recess, get another book on the same
subject and have a casual reading and see
if you can get any new points to multiply
your knowledge on that subject. Develop
that habit of jotting down the new infor-
mation which will be surely useful to you
in the long run. If you can get hold of
magazines or periodicals on the subject
you are required to study, go through the
particular article and do not waste your
time in reading unnecessary things. This
will help you keep abreast with the latest
trend of engineering. When any particular
point is taught with intentional stress in
the class, underline those points in your
note book. Note books are to be of loose
leaf type as it is possible to group the in-
formation together to make it easy for
you to get particular reference at any
time. Otherwise it becomes jigsaw puzzle.
Go through the question papers of pre-
vious years and acquaint yourself with
the type of questions generally expected
in the examinations. Many a time short
notes are asked. Prepare a separate note
book and collect these short notes, group-
ing them subjectwise. Now you are equip-
ped with strong base and start the first
revision. This will give you missing links,
if any and your memory will be quite
fresh on the subject, so much so that you
will be in a buoyant mood to answer the
questions even when the surprise tests

are held in the college. This buoyancy will get multiplied when the second revision is done. Every minute is valuable and you cannot afford to lose it. By this time it will be the month of February and start the third revision in a flying way, as this will brush up your memory to get prepared finally for the examinations. Do not read or study till the last minute of commencement of the examination but have complete relaxation at least for half an hour before examination time, otherwise you will get confused and do the jumbling magic in the examination. Keep your mind very calm and take your meal just sufficient to give you energy and no drowsiness in the examination. Do the prayer for a few minutes and take blessings of your parents and grand parents and go cheerfully to the examination hall.

In the examination hall as soon as you get the question paper, go through it carefully and while reading it you make priorities as to in what order the questions should be answered and do not forget to allot the time to each question, according to time prescribed for the whole paper. Read the question thoroughly and study the data to know thoroughly what the examiner wants exactly from you. Write neatly and to the point. Draw neat sketches with details possible and explain briefly. If it is an example, write down the data systematically and find out what is missing to get the correct answer. Some point may be a concealed one which may be found from the N.B. given in the beginning. Go on solving the questions one after another, visualising the answers at the same time just like a television. Think of nothing else but answers required from you in the paper. Legible handwriting in the systematic way with neat sketches gives the examiner a very good opinion about you and the first impression formed by him is retained till the last minute, tending to give more marks to you. Some-

times calculations go wrong at some stage and ultimately answer is wrong. But if the systematic method is followed, it becomes easy to revise and to trace the mistake. Even when the mistake is not traced still you should not get disappointed as you have tried to solve the question in a neat systematic way, and the examiner is bound to give you decent marks. Thus you stand a good chance of passing the examination with creditable success.

All subjects may not be interesting. Hence you are to find what nightmares are there to make them not interesting. Answer is necessarily found and develop the particular faculty which is dormant in you. By little study you will be able to overcome that difficulty and bright chances will be there to arouse that interest in you to study the subject very intently.

To pursue the studies correctly and diligently, it is necessary to maintain good health throughout the year. As described before, if you adhere to the programme laid by you, strictly, nothing should go wrong normally. If any slight irregularity is there, that may upset your tommy (stomach). Hence you should not eat unreliable food in the wayside hotel as far as possible. If possible, drink boiled water made cold. Just enough exercise is absolutely necessary and plenty of fresh air and deep breathing whenever you find convenient. You should have good bowel motions at particular time at 05.05 hrs. preferably twice a day second on return from the college in healthy condition. If you find something wrong in it and if you get natural sneezing, you should take necessary care to remove the fault and maintain a sound health. Drink plenty of water to flush your system in the body and do not put extra burden on your tommy by over-eating at odd time. Once in a way purga-

tive may be on Sunday.

Whatever paras is in words. All actually placed before diligent through quite success but two at creditable October career. When average be possible brains in stand the bring the

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lations go wrong at some step. The answer is wrong. But if the systematic method is followed, it becomes easy to revise and to trace the mistake when the mistake is not traced. You should not get disappointed if you tried to solve the question in a systematic way, and the examiner is not giving you decent marks. Thus you have a chance of passing the examination with creditable success.

Exercises may not be interesting. Try to find what nightmares are and make them not interesting. Answer questions as they are found and develop that faculty which is dormant in you. By the study you will be able to overcome that difficulty and brighten up. Be there to arouse that interest to study the subject very in-

terest. Study the studies correctly and it is necessary to maintain interest throughout the year. As desired, if you adhere to the program by you, strictly, nothing goes wrong normally. If any slight change is there, that may upset your system (check). Hence you should not eat the food in the wayside hotel. If possible, drink boiled water. Just enough exercise is necessary and plenty of rest and deep breathing whenever convenient. You should have exercises at particular times, preferably twice a day. On return from the college in the afternoon. If you find something and if you get natural sneezing, you should take necessary care to rest and maintain a sound system. plenty of water to flush out the body and do not put pressure on your tommy by overeating. Once in a way purga-

tive may be necessary on some holiday or Sunday.

Whatever has been described in above paragraphs is not a mere advice to you in words. All points stated so far have been actually put into practice and good results experienced. Hence for your benefit actually experienced things have been placed before you. With tactful, hard and diligent efforts it was possible to get through the university examinations quite successfully, not only one at a time but two at a time one after another with creditable success. Examinations held in October never arose in the educational career. When this has been possible with average bright student, why should it not be possible for you then? Hence use your brains in the best possible way, understand the technique of study fully and bring the good name to your College.

Even the cases of exceptionally bright students are known where they were very bright in the school career but that brightness faded on account of overwhelming pride in the college career. On the contrary average clever students, though found to be very ordinary in the beginning of the college career through lack of proper guidance, did exceptionally well in the examinations by constant, sincere and hard efforts on their part. Hence normal average student should not

get disappointed. It has been proved that because of ignorance some compartments of their brains remain in darkness or unexposed and they do not shine in their career. But if they take keen interest in self study and try to remove the faults in them, they would be surprised to find some bright ray in them in the form of some latent power and come in the limelight in the examinations. Hence do not worry about the examiners and do not go in wilderness after question hunting. If you sincerely wish to shine in your career, never mind about your college whether it is this or it is that, focus your attention on self and follow the study technique. Do not worry in what position you are. You worry about your own self and try your best to remove the faults in you to discover your talents out of your dormant compartment in your brain. Wake up and come to the limelight. God helps those who help themselves. Follow diligently what you have been told. Pick up the pearls of thoughts to be woven into a nice necklace of grand success and bestowed upon you by the university. Let your instinct be awakened from the deep slumber of inferiority complex to wait for the day to see your beautiful names shining in the results of the examinations and thus bring the credit to our College.

Cheerio! Good Luck to you all!



JOKES:

The fat man and his wife were returning to their seats in the theater after the intermission.

"Did I tread on your toes when I went out?" he asked the man at the end of the row.

"You did" replied the man grimly expecting an apology. The fat man turned

to his wife. "All right, Marry," he said, "this is our row."

A gentleman was gazing rapturously at "spring", a large oil painting of a shapely girl dressed only in a few strategically arranged leaves. Suddenly the voice of his wife snapped "well, what are you waiting for—autumn?"

By M. R. Patil, B.E. (C.)

TOOTH FEVER vs. DENTIST FEVER

By

K. T. CHHABRIA (B.E. Civil).

AT last, I had to give up. The wavering tooth had played havoc with me to the maximum extent and it had to be pulled out, be it by hook or by crook.

The mere thought of pulling out my tooth always brought the picture of that bespectacled and merciless dentist in front of me and I went pale. However, there being no other alternative, I decided to prepare myself for the trying job. It was indeed a tough job and I had a pretty hard time doing it; but, when at last I succeeded, I felt myself a real victor. At last, I had been able to cast off my fear and nervousness and the sight of the dentist now seemed less repulsive to me.

The very next day, I was seen walking majestically towards the dentist. But, as I walked, I seemed to make an important discovery: that the fear and nervousness in a patient (like me) was inversely proportional to the distance from the dentist's abode. For, as I neared the dentist's "temple", the fear which I had been able to cast off after a long spell of hard work, began to increase steadily and by the time I reached the dentist's, I felt myself to be like a candidate, who has forgotten all the formulae just at the time of examination. My legs were almost trembling and I thought it better to "look before I leaped". In fact, at that crucial moment, a tug-of-war seemed to go on

between the two maladies of which I was the victim: tooth fever and dentist fever. Both parties being strong, it was a tough fight and I was the worst sufferer. At last, however, tooth fever appeared to have emerged victorious for I directed my feet towards the dentist's waiting room.

Here, my condition was the most pitiable. I could see nothing but that merciless dentist extracting the tooth ah! and a shriek almost ran out of my mouth as I was full of perspiration.

Just then, the door opened. No, it wasn't the dentist. A boy of about my age entered. I was alarmed. Ah! the time of execution had arrived! I struggled to get off my seat.

Just then, the boy announced: "I'm sorry, Sir. But the dentist's time is over. You can come tomorrow at 11-00 A.M."

I wouldn't have jumped higher if the boy had announced that I've won the first prize in Rs. 100 denomination prize bonds. Next moment I was out of my seat with my face lit up like a flash-light. I still remember the look on the bewildered boy's face as I patted him on the back and darted for the door.

On gaining the road, another pleasant surprise greeted me: the pain of the tooth had temporarily ceased!

FEVER

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PROF. THAKKER ADDRESSING ON THE FIRST ANNUAL SOCIAL FUNCTION



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VANMAHOTSAVA



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GYMKHANA COMMITTEE 1963-64



Sitting Left to Right :- Prof. Bhirud, Prin. R. H. Chokhavatia, Mrs. Lilavati Munshi, Prof. Thakkar, Dr. K. M. Munshi, Prin. Junnarkar, Shri A. S. Pradhan, Prof. Dighe, Mr. Khatri,

Standing Left to Right :- R. Mandrekar, R. B. Mehta, Karnik, Chawla, K. M. Shah, S. Naik.

FIRST ANNUAL DAY—1963-64



GUJARATI PLAY

Left to Right:—
Shri Sunil Naik,
R. K. Mehta,
Purohit.

MARATHI DRAMA

Left to Right:—
Miss S. Ketkar,
A. S. Pradhan,
Gadkari.



HINDI DRAMA

Left to Right:—
Shri J. T. Bhatia,
S. M. Verhani,
S. A. Jhurani.

Sitting Left to Right:— Prof. Bhirud, Prin. R. H. Chokhavatia, Mrs. Lilavati Munchi, Prof. Thakkar,
Dr. K. M. Munshi, Prin. Jumarakar, Shri A. S. Pradhan, Prof. Dighe,
Mr. Khatri,
Standing Left to Right:— R. Mandrekar, R. B. Mehta, Karnik, Chawla, K. M. Shah, S. Naik.

COLLEGE DEBATING COMMITTEE



Left to Right :—Shri Katkar, Modi, Prin. Chokhavatia, Prof. Dighe, Shri Pancholi, Harshe.
COLLEGE KHOKHO TEAM



Sitting Left to Right :—Shri Harshe, Naikwadi, Marathe, Prin. Chokhavatia, Prof. Dighe, Kale, Avarsekar.
Standing Left to Right :—Maheshari, Indrajit, Rajamani, V. Fernandes, Patil, Patil.

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ANAND

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Pancholi, Harshe.



Prof. Dighe,
I. Patil.

Wilderness in the multitudinal multitude and the philosophy of Life

Contributed by:

ANAND VIJAYKUMAR, S.E. (Elec.)

FROM the hurry and scurry of everyday-mechanical life, which leads to the path of dusty death of ease and grace, if you step into the wilderness of the kingdom of greenery, with its freak multitudinal multitudes of expressions, which even an expert artist cannot depict effectively on his canvas, you have so many surprises.

The weeping Willows, the fragrant pines, the silver Elms and the naked oak and the murmuring of the innumerable bees and whispering cluster of bamboos have its own stories to tell you, which you will have to read out of their expressions, drawn against the gloomy horizon touching the heights of eternity. The multitudinal multitude of their expressions, if interpreted with effective skill, will elucidate equivalent philosophical elements of humanity which indeed will move the most delicate fibres of your mind.

The tall graceful palms stretching erect across the blue canopy of the sky swinging and dancing in tune with the melody of the crisp, fragrant forest-breeze, will induce in the human mind, feelings of enthusiasm and the spirit to fulfil the ambitions of life. Meet the silent singer of the forest. Here you can literally see the melody of music. The widespread

network of bare foliageless trunk of tree resembles the skilful fingers of a musician gliding on strings of music. A symphony takes shape in the depth of wilderness. You can feel the melody and soft feelings rising from the depths of the heart, make you realise the significance of love and life and may leave in your heart a tenuous thread of sweet sadness. These elements are sure to metamorphosise your pattern of life momentarily if not permanently. Gazing at eternity, and thinking of the deepest secrets of unfathomed depths and canons of life there stands the magnificent Oak—A philosopher. This symbolises the cream of the philosophy of life. It moves in your optimistic realism, which would help you attain the heights of life. There again exists yet another desolate tree segregated from the young trees with thick heavy green fascinating foliage. It is a symbol of indifference—Indifferent to the flavours of life. It is a saint who has exuded all luxury of life and retired to the seclusion of the remote corner of hard life. Here is an example where, human endurance is tested to extremes. The calibre and quality of human life and its significance is tested and confirmed at this juncture. To man, thriving in luxury, this may appear absurd and he may harden his face on studying this phenomenon. But it is the only way to achieve peace on earth and you can build up your own heaven on earth adapting to a saintly life.

Oddly enough, there, against the shady, gloomy patch of grey clouds, stretches a hard, deformed, tarnished, skeleton of wood—a tree with a glorious past and sad and pitiable present. The remembrance of the pomp and splendour of the past adds to the present miserable condition. This symbolises the insignificance of short living, pomp and splendour of life. Nothing is permanent in this perennial-

ly perishing world and therefore it is not for one to be too proud of one's, once-attained position in life, for, it may fade and faint with the advance of time and precarious strokes of destiny. The advancing time would bring down its massive arm of destruction and what follows is colossal heap of ruin as solid proof of the phenomenon of nature to the future generation. Turn your eyes toward that vast stretch of sand expanding to the horizon. There stands the defaced statue of Ozimandias amidst the colossal wreck and ruin ever man witnessed in the past centuries, but symbolises the once-attained power, pageantry and potent elements. Of course, to some this sort of interpretation sounds absurd and impractical. But, then it is the nature that depicts, dumbly, this expression and we have got to interpret it correctly. If we explore the unfathomed depths of human mind we can find the truth of the above-mentioned philosophy of life.

Here again I introduce, the symbol of spring. The tree with blooming spring in its heart presents a view. With its thick green heavy foliage studded with globules of Spring and flowers opens the door to the seventh heaven—the world of pleasures, luxury, melody and fragrance. It presents a picture of colours in the life of man.

Have a glance at the tall thin silver Elm standing erect among the other trees and it is conspicuous by its colourscheme on the bark. It is the monarch symbolised with its many splendoured facets. The pageantry and richness and the velvety-mellowness and softness all synonymised to a single word.

The cluster of whispering bamboos rekindle in you, the desire of living successfully. In a crisp afternoon wind, the cluster of bamboos whispers and murmurs and the very melody of this makes you feel the significance of life.

The grand Banyan tree stretches against the shady background of dusk, spreading vast shadow beneath. Before it we feel ourselves small. It induces in you a submissive feeling, which makes you think, at least momentarily, how insignificant you are, in the vast expanse of the universe.

The wilderness changes phases with the advance of time. From the change in seasons the expressions of trees and other facets shift and assume an entirely different pattern. In the case of human philosophy of life as its general aspect is taken into consideration, this multitudinal multitude of the metamorphosis and transformation of image is readily explicable. But individual philosophy of life, when singled out and deprived of generality, cannot be explained effectively under the light of the metamorphosis theory of multitude of expressions, because one can have one and only one definite philosophy of life. Here comes selective phenomenon. One concentrates on a certain principled philosophy of life. Of course there may come, at times, a temporary deviation but will be corrected automatically by virtue of discrimination.

Thus nature, through its multitudinal multitude of facets depicts the glory, eloquence, diversity and privations of human life. Man, if he is smart takes initiative and makes comparative study and adjusts himself to the adapted philosophy of life; it is taken for granted that he can achieve success in the mechanically merciless world with its cruel edges, sharp as cold winter wind.

For this we have to go deep into the wilderness of the forest to witness, answer the calls of the wilderness and to study the expressions provided by them. A nightingale soaring high up to unbelievable heights returns to its modest nest at dusk. This implies the importance

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of the kindred elements of life and the
love you feel for it.

One hot summer-evening, perched on
the stool by the window gazing blank at
the busy street, you coax yourself, un-
awaringly to a reverie, where you meet
with the white blundering bulks of polar
bears in icy coolness of the glacier-infest-
ed polar region. Even the minutest thing
you observe in nature, has its effect on
the life of man. Man has affinity for plea-
sure, luxury and high things of life. So

if it is not available or accessible then your
mind gets the apparent satisfaction of be-
ing possessed with such elements.

Here is the link that connects the phi-
losophy of life and the facets of nature.
Nature and man are closely related. If
you answer the calls of the wilderness
you add to your life some good things.
Here is where we discover the link that
intermingles the subtle philosophy of life
with the multitudinal multitude of the
wilderness.



AN APPLICATION OF A BACHELOR

By

H. N. KHUMBATTA, F.E. II

My dear Adoration,

Most worthy of your estimation, and
after long consideration and much hesita-
tion, I have a firm inclination to become
your relation by a wedding celebration.

As to my education and qualification,
it is no exaggeration or fabrication of
imagination that I have passed the Matri-
culation Examination—no doubt with
distinction and with little preparation.
What do you say therefore to the solem-
nization of our marriage celebration ac-
cording to the rules and regulations and
glorification of our modern civilization.

On your appreciation of this applica-
tion, I shall make every preparation to
better my situation and if such obligation
is worthy of consultation, it will be an
augmentation of our joy and exultation,
of our dissimulation.

Thanking you in anticipation,

Yours to the End of creation,
Infatuation.

COMPUTERS and INDUSTRY

By

T. M. TOPRANI,
B.E. (Elect.) Asst. Lecturer.

THE rapid development of automation in industry as well as in commerce has created a good deal of interest in electronic computers which due to their spectacular achievements and speed of operation are popularly known as electronic brains. A new trend in mechanisation, namely mechanisation of mental work, has begun to appear due to computers.

Computers have been utilised in design of large and complex machines and systems for optimisation and also for studying the effect of variations of one or more design factors on the final design. In the field of control a machine tool might be accurately positioned and controlled by a computer. For example in an anti-aircraft gun a computer may sense the direction and magnitude of the velocity of enemy aircraft and control the horizontal and vertical angle of the gun so that a charge starting from the gun will reach the anticipated position of aircraft after completing its trajectory. A speed as high as that and an accuracy of finding obtainable with the help of a computer are far beyond the human thoughts. They are however also utilised for management purpose and control problems which could otherwise be solved by laborious human efforts. For example the probability of winning of a candidate in an election can be found by a computer on the basis of initial poll. The methods

used are well known in statistics but on the computer the time for calculations is reduced to a negligible fraction. In exchange operations and in banks it can be used for complex and long additions and multiplications with an accuracy of more than ten digits. In interesting case of controlled machine tools and processes, the computer simulates the human mind and sense organs in the sense that the process is fed to the computer and it maintains a desired sequence of operation. A computer is having a memory as well as command or logic. Thus we can make it do all human functions like seeing, hearing, touching etc. except smelling.

In spite of its splendid achievements as far as the technical side is concerned, a computer presents a number of problems to a commercial organisation introducing the computer. Here we shall confine ourselves to some of the points on the social and organisational aspects likely to arise as a result of introduction of computer in a commercial enterprise.

With the growth and expansion of industries the urge is always felt to go in for more and more mechanisation. Automation to a certain extent is found beneficial because it relieves the monotony of work; and above increases efficiency, accuracy and speed to a considerable extent.

The possible consequences of the introduction of computer on human rela-

tions within the firm cannot be ignored. There is natural fear among the staff that the computer will reduce their importance and some of them may be rendered surplus and even retrenched. The uncertainty of job results in the hostile attitude of the staff to the acceptance of computer.

When clerical procedures are transferred to the computer, the requirements of jobs are greatly changed. Feeding the computer requires standardisation of documents and data with little room for initiative or discretion with the result that work becomes monotonous and boring. This necessitates the training of the staff for the changeover and creating an atmosphere of confidence. The staff has to be persuaded and convinced that the mechanisation in reality reduces the effort and increases their efficiency and productivity.

On the part of the management, there is a tendency to expect radical results when a computer is installed. It may be pointed out that with the introduction of the computer, manual labour cannot be reduced overnight. In the initial stages, the transfer of work on to computer takes considerable time. The changes can be brought about only gradually, and during the trial period which may be anything from 6 months upwards, (depending upon the nature of the business of the firm) both, the manual processes as well as feeding the computer on trial and error basis, become inevitable. Hence the work is rather slow and duplicated, resulting in excess requirements of staff for some time.

Another important feature is that a computer, not merely takes up the work of a particular department or unit, but because of its higher capacity, the work of the other departments as well as units may also be transferred on to computer so as to obtain maximum advantage. This

might give rise to changes in interdepartmental relations and responsibilities as well as duties and the departments whose work is transferred to computer may feel that their importance is very much reduced, whereas the prestige and importance of the department having computer under its control may be very much enhanced. This may create disharmony among the departmental managers or executives. Unless the things are seen in proper perspective in the spirit of co-operation for the benefit of the organisation as a whole, there might be ill-feelings and disharmony resulting in lack of co-ordination and loss of efficiency.

All these factors point to the need of understanding and acceptance from top management downwards to the rank and file, to the desirability of introduction of a computer in an organisation. The automation cannot be introduced for its own sake. Those working on the computers and data processing machines must realise that mechanisation is not an end in itself, but it is an aid to human effort in the process of management of an organisation. Machines should be adapted to the requirements of the objects of an organisation and procedures be so devised as to leave no room for the feeling that the men are to be adapted to the requirements of machines.

Now it is interesting to see the application of above observations to the conditions in our country. We have a population much larger than needed for industry or agriculture. We could therefore justifiably employ human mind for whatever it is worth. It is a controversial point whether we should introduce more automation in textile, tea, oil, sugar and other industries producing consumer products. Automation may bring improved quality at cheaper rate and reduce the human labour. With a proper system of distribution of wealth, the automation may bring more pleasure to the society.

We have electronic computers with Atomic energy commission and I.I.T., mainly for academic purposes. Recent proposal to introduce electronic computers in life insurance corporation, for work which was being previously handled by branch offices throughout the country has resulted in almost a nation-wide strike of clerical workers. The introduction of computers may result in better facilities being made available to the policy holders but will need over-centralisation of many job which is considered as undesirable by a section of opinion.

However computers are almost indispensable tools in many fields. We have to keep in pace with the advancement of

technology and we cannot isolate ourselves in this fast advancing world of today and to-morrow if we want to keep ourselves competitive in the world markets. The introduction of the computer therefore seems to be essential but at the same time proper precautions may be taken to thwart any undesirable consequences on the social and organisational aspects of industry.

Any change has its disturbing elements but these can be minimised if careful thought is given to strategies for getting the change accepted. In this connection it is necessary to remember that the introduction of E.D.P.M. (Electronic Data Processing Machines) should not result in Every Damned Problem Multiplied.



LIFE

By

MOHAN S. IYER, F.E.I.

Tis a short merry game
Full of honour, love and shame;
You play it right or you play it wrong,
It's you that receives the final gong.
The rules are clear, soon and fine,
They goad you along like a herd of kine,
You think you're right but you are wrong
For tis He that sings the final song.
All types you find, some drips, some beats,
Some yodlers of jazz, some readers of
Keats,
But they are the same old bunch of mules
That win this witty game of Fools!



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'FROM BOMBAY TO BOMBAY'

By

J. T. BHATIA, B.E. (C).

K. T. CHHABRIA, B.E. (C).

ONE fine morning (Saturday the 7th of Nov. '64 to be exact), a band of 20 young men attacked V. T. Station. And before Poona Mail glided out of the station, they were all seated comfortably in a compartment, laughing, singing and dancing. Every face bore the freshness of flower of dawn and the merriment was writ large across it. Everyone, everything, including the fast moving wheels of the engine, was agog with excitement. The Final year tour of the B.E. (Civil) class had begun!

The itinerary was fixed before hand and a mere glance at it indicated that it was a very crowded one. We had to visit about 10 to 12 places in a matter of only 16 days. All the same, we were quite optimistic. Noon of the day saw us at Poona. Soon, we were seated in a comfortable bus which showed us around the town—its gardens, the famous Shiva temple and the Planetorium. We were of course, unlucky to miss Khadakvasala due to unavoidable circumstances.

*8-11-64 The second day found us at Karad. The object was to visit Koyna project. We did so with much enjoyment and enlightenment but not before going through an ordeal of having to travel about 100 miles from the Station in 3 different buses. (And, of course, back to the station in the same manner). Koyna Dam is quite a large one, being about 3200 ft. in length and 280 ft. in height with an overflow section of 200 ft. with. The Hydro-electric works are situated underground and have a total generating capacity

of 4.8 lakh Kw. The total cost of the project is about Rs. 130 crores.

*9-11-64 The venue for the third day's visit was Ghataprabha. Here, we visited the Gokak Falls and the Ghataprabha River Project.

*10-11-64 The fourth day was a literal waste. We were in Belgaum where there was nothing to be seen except the ruins of an old fort and a movie (Kashmir Ki Kali) which we saw with sleepy and dreamy eyes in a night show.

*11-11-64 B of Belgaum was followed by another B of Bhadravati. But, thank God, the 'w' of waste was not repeated.

Here, we visited the Mysore Iron & Steel Factory and also the Cement Factory. The former manufactures Steel and C.I. pipes with a production capacity of 40-50 tons of steel per shift and the latter has a production capacity of 250 tons of cement per day. We also visited the dam on Bhadra river, which irrigates about 3 lakh acres of land. The Power House consists of 3 generators producing 40,000 Kw.

*12-11-64 Sagara. The most interesting item on the day's menu was Jog Falls. Falling from a height of about 1000 ft. and rising into an exhilarating mist, it is a sheer beauty. An ideal setting for a film shooting. And coincidentally, one was actually going on. The visitors flocked around Gemini Ganeshan, Devika,..... Cameras clicked in dozens, scores.....

Sharavati Valley Project. Said to be the biggest in Asia. Fall: 1000 ft. Generating capacity on completion: over 1 million

Kw. 10 penstock pipes, 10 generators.
Total cost Rs. 120 crores.

Mahatma Gandhi Hydro Electric Works. The interesting part was the trolley drive down a steep gradient. The over-enthusiastic collected the technical data of the trolley, too: Gradient 1 in 1.43, Length 1700 feet, etc.

*13-11-64 Mysore. A beautiful city with cool climate, wide spacious roads and pleasing serenity. It was a rest day. Therefore, we slept and went out shopping.

*14-4-64 Visited the Chamundi Hill and the famous temple. Bird's eye-view of the town was superb. Lalit Mahal revived thoughts of old grandeur. The zoo was decidedly one of the best in India. The most interesting place was the Krishnaraj Sagar Dam and Brindavan Gardens. The scene at night—the greenery, the fountains, the coloured lights—is one to behold again and again and remember for ever. In the words of a poet,

The arrow of nectar the fountain shoots,

High up into the colourful sky:

*It returns back to the same low bow,
Once again to be shot up so high.*

Again, an ideal setting for a film shooting. The producers have exploited it but someone has yet to exploit it fully by producing "A Night at Brindavan Gardens" (Analogous to "Evening in Paris").

The notable thing about the Krishnaraj Sagar Dam has been the use of Sir Visveswaraya's automatic gates.

*15-11-64 Ooty. Ah! the famous hill station at last. It was not the "season" and we feared a severe chill. However, our fears were dispelled as soon as we reached our hotel. It was cool, cold, a happy relief from the heat of Bombay but not that cold which would bite you. Botanical Gardens was a fine blending of greenery, scenery and a variety of

flowers. The lake was another beauty spot and we did a bit of boating ourselves.

*17-11-64 Ah! The beautiful, busy city! Cosmopolitan like Bombay but much cleaner. A visit to Tata Institute in a fine luxury bus was both interesting and instructive. Vidhansoudha is a fine building, constructed on the pattern of Dravidian architecture. Nevertheless, easily one of the best in India. Lal Bagh was greenery infinity. "Flowers" were aplenty.

*19-11-64 Secunderabad. Historical city. The most interesting visit was to Hyderabad. Salar Jang Museum, considered to be one of the best in the world. Unique collection indeed. Fully justified its reputation. Golkanda Fort and Hyderabad water works were equally interesting.

*20-11-64 Nagarjunasagar Dam. We were reluctant at first to visit this dam for fear of having to travel 100 miles in a bus. However, the visit proved so enjoyable and instructive that we forgot our trying journey. This is still under construction but when completed, will be the second highest dam in India and third in the world. (560 ft. high and 3 miles long). It will irrigate 35 lakh acres of land and the power house will generate 4 lakh Kw. It was better to see the actual construction going on as compared to the completed dams we had already seen.

*21-11-64 Aurangabad. This was the last venue. The targets of visit were Ajanta and Ellora Caves. The former consisted of unique paintings and few carvings in stone related mostly to Buddha while the latter was fully devoted to sculpture, Real heritage of India. A challenge to modern artists and sculptors.

*23-11-64 Back to the pavillion. Home, sweet home at last!

Late news:—Rs. 40/- refund to each student.

(Hip Hip Hurray)!

CONQUEST OF THE MOON

By

S. N. PANDHI, F.E. II.

ONE lovely morning, when I switched on my radio for the Washington Station, I heard the announcer say, "We will now present major John Earnest of the U.S.A., the co-pilot of major E. Polinin of the U.S.S.R. to describe his successful trip to the moon".

This was the first joint venture of Soviet Russia and America in space research. I had read about this return trip to the moon in newspapers, but I thought it would be very thrilling to listen to a cosmonaut himself giving the account of his space travel, and so I pulled a chair near the radio set, flung aside the newspaper which I was holding in my hand, and sat in the chair intently listening to the speech of Maj. J. Earnest.

"At last after completion of so many days of rigorous training programme, came the day of fulfilling my desire to reach the moon", said Maj. Earnest. "After going through the routine physical check up and having dressed in special pressurized "shirt-sleeves" suit, I and my partner Maj. Polinin were escorted in a two-men capsule. The capsule had a tapering cylinder at the top which housed folded wings. These wings were inflated at the end of the return trip to use them as parachutes for landing.

The rocket capsule was housed in a 23 story steel-and-concrete structure, as it required 1.5 million lb. thrust to haul up. We heard from the instruction office '10 seconds to go, 10, 9, 8, ...', I and Poli

shook hands and greeted each other. '6, 5 0,' came the voice, and our rocket zoomed. It went up with tremendous speed.

As it was morning time, we saw many beautiful attractive colours in the sky as the rays of the sun passed through different stratas of the atmosphere. We saw many luminous bodies pass our capsule. We had electronic equipments for observation, navigation, communication and survival lining the craft's shell, helping shield it from radiation and meteorites.

We continuously received instructions from the earth station and were relaying back the informations. When our craft was out from the sphere of the earth's gravitation, we experienced weightlessness for sometime until we were in the sphere of the moon's gravitational attraction. During this time we had taken liquid food once.

The craft was now nearing the moon. The first manned vehicle to reach the moon, made a descent with the retro-rockets cushioning the landing, backed slowly down on to the harsh-lit loneliness of the moon.

And the next moment, from the hatch hanging just above our couches, we climbed and stepped out to finish half of the extraordinary endeavour undertaken. Poli and I, hugged each other for a few seconds and planted the tiny flags of our nations and a flag representing our friendship and the dear Earth.