

JADAVPUR



UNIVERSITY

The President and Members
request the pleasure of your presence at the

Annual Convocation

to be held on the University campus
on Wednesday, the 24 December 1958 at 6 p. m.

Professor Kariamanikkam Srinivasa Krishnan,

Director, National Physical Laboratory,

will address the Convocation.

R. S. V. P.

Registrar

Jadavpur University, Calcutta 32

22 DEC 1958

PROGRAMME

Ceremonial Procession

Procession of Alumni

'Bandemataram'

Exhortation

Conferment of Degrees and award of medals

Address by the President

Convocation Address by Professor K. S. Krishnan

National Anthem

The President and the party leave

Please do not bring children

Guests to kindly take seats by ~~4-30 p.m.~~ 5-30 p.m.

Kindly present the card at the gate

DAIS

JADAVPUR UNIVERSITY

ANNUAL CONVOCATION.

December 24, 1958

PROGRAMME

5-30 P.M. : The Rector, The Treasurer, The Registrar with
The Members of the University
The Chairmen of Faculties
The Emeritus Professors
The Dean of the College of Arts
Heads of Departments and Professors and
The Provost

will assemble in the Reception Samiana
and after robing will receive the President
and Professor K. S. Krishnan at 5-45 P.M.

5-45 P.M. : The President and Professor Krishnan will robe

5-50 P.M. : The Ceremonial Procession will proceed to the
Convocation Pandal

5-55 P.M. : Alumni Procession will follow

6-00 P.M. : Bandemataram by students

Garlanding

The President will declare the Convocation open

Exhortation by the Rector

Conferment of Degrees and award of medals

Address by the President

Convocation Address by Professor Krishnan

The President will declare the Convocation closed

National Anthem

The President and party leave the pandal.

Mr. President, Rector, Fellows and Graduates of
the Jadavpur University

It is a great honour indeed to be invited to address the Convocation of any University. But to an old student of Calcutta, like me, who is very much aware of the romantic background in which the National Council of Education was inaugurated, and who has watched it grow over the years to its present stature, the invitation from Jadavpur evokes more than mere appreciation of the honour. It makes me look back with a certain nostalgia to the robust idealism of those days which, among other things, made such great institutions possible, and which, alas, even in Bengal, is becoming rare to-day.

The National Council of Education typifies in many ways our idealistic outlook on problems of education. I find that the Upanishads figure prominently among the subjects taught under the auspices of the Council in the early days and Hirendra Nath Datta had been conducting these classes. So I may be pardoned if I quote from the Upanishads. We listened to the noble Exhortation by the Rector to the outgoing graduates. It is taken from the Taittiriya Upanishad. Immediately preceding these exhortation verses there is report of a small conference between three rishis which is academically extremely significant as illustrating our old ideals. They pose the question, "What is Tapas?" They have already decided that tapas is the highest ideal in life.

The first rishi 'Satyābacās' सत्यमिति सत्यवचा राशीतरः Rāthītara is the name of the first rishi and he says, "Tapas is

Satyam". The word 'satyam' does not merely connote what in English we call 'truth'. यथादृष्टार्थवसीयं हितरूपवचनम् The contents of it should be the best of one's personal knowledge but the wording of it should be such as to serve the good of humanity. It is a very noble ideal, indeed. Even the Upanishad is not satisfied with it.

The Upanishad says, with a certain delicate humour, "Remember, Rāthītara is a Sātyabacāḥ, that is, remember he is a specialist." It is like going to a dentist. Whether you have irritation in your eyes or pain in your throat he will examine your teeth first. It is the same thing with Satyabacāḥ, who is a specialist. If you ask him what is tapas, he will say 'satyam'. If you had asked him 'what is dharma', he would still have said 'satyam'. That is the specialist. तप इति तपोनित्यः पौरुशिष्टिः Poursiṣṭi is the name of the second rishi who is even a more narrow specialist. It is like asking me, "What is electricity?" Probably I will give you a long lecture for about ten minutes and then finally end with saying, "You understand what I mean, electricity is electricity".

He is a taponitya. He does not quite understand significance of the question. After all, by what more appropriate word you can describe tapas. He says, "Tapas is tapas". तप इति तपोनित्यः पौरुशिष्टिः । स्वाभ्यायप्रवचने एवेति आह नाको मौद्गल्यः ।

The next rishi to express his views is Nāka - Mudgalya's son. So he is Maudgalya and he affirms स्वाभ्याय and प्रवचन,— they and they alone constitute the tapas. By स्वाभ्याय we mean study by any one of the numerous methods that we know—it may be by research, it may be by listening to discourses, it may be by contemplation, it may be by meditation—any one of the numerous methods by which we acquire knowledge. प्रवचन, again, is imparting knowledge to others by any of the numerous methods.

स्वाध्याय and प्रवचन,—they and they alone constitute tapas according to Nāka. The Upanishad is very careful to refrain from saying that he is a specialist. The Upanishad could have added स्वाध्यायप्रवचननिरतः नाको मौद्गल्यः. It does not say any of these things. It just let him affirm. But, lest there be in the audience someone who has no sense of humour and could not even take such a broad hint, the Upanishad does not want to take any risk and so it shouts out by raising the hands “तद्धि तपः तद्धि तपः” —“that certainly is tapas, that verily is tapas.” That is the affirmation. It is one of the noblest ideals for a University—स्वाध्याय and प्रवचन, they and they alone constitute tapas which is the highest ideal in life. In fact, in the exhortation that follows—स्वाध्यायान्मा प्रमदः । स्वाध्यायप्रवचनाभ्यां न प्रमदितव्यम् And finally it uses all the numerous nuances of the language to beseech the students and to impress on them the nobility of the ideal—एष आदेशः—एष उपदेशः and so on. It uses the different ways of exhortation.

The Upanishad also prescribes a certain discontent which is sometimes described as divine as an essential prerequisite for enlightenment, i.e. for a proper understanding of things of permanent value. That discontent was there in a large measure, during the formative years of the Council. I started with the thesis that the National Council of Education typified in itself our idealistic approach to problems of education, namely, that the type of education that was being imparted in those days was not in consonance with the great academic traditions of the country. Judged by the best academic standards these traditions of ours are today as modern as they were nearly three thousand years ago when they were getting established.

Strong adjectives like “Śatānic” came to be applied to the old types of education, by which I mean the type of education that was prevalent at the time when the National Council of Education was started. This adjective was applied at a much later date.

The National Council of Education was the people's answer to this challenge and a galaxy of very distinguished teachers like Rabindranath, Aurobindo and Ananda Coomarswamy and many others volunteered to do service of the Council. Its major objective as you must have heard several times from this platform but is worth repeating was (I am quoting) "to impart education—literary and scientific, as well as technical and professional—on national lines, and exclusively under national control, not in opposition to, but standing apart from the existing system of primary, secondary and collegiate education, attaching special importance to a knowledge of the Country, its literature, history and philosophy, and designed to incorporate with the best Oriental ideals of life and thought, the best assimilable ideals of the West, and inspire students with the genuine love for, and desire to serve, the country". A noble ideal indeed, and very much in keeping with the spirit of the times.

The movement had its so-called "realist" too who pinned their faith on technological progress as the remedy for most of the ills of the day. The facilities that were then available for technical education were very poor, much poorer than the facilities available for general education, and that, in the opinion of this "realist" group, needed immediate rectification. The Society for the Promotion of Technical Education in Bengal, and the Bengal Technical Institute, organised under its auspices, were the obvious answers from this school to the challenge.

I wish to draw your special attention here to a very significant third group, which, judging from the scant references made to it in the current histories of this movement, is not as well known as it should be. I am thinking of the group represented by the great Mahendralal Sircar, who had devoted considerable time and thought to problems concerning the cultivation of the sciences. He had the correct scientific outlook, rather rare in his days, and rare even today, and his annual addresses to the Indian Association for the

Cultivation of Science, of which he was the Founder President, were models of clear thinking and exposition, and show how far ahead of his many distinguished contemporaries he was.

Though the major ambition of Mahendralal in founding the Indian Association for the Cultivation of Science, namely that it should be an active centre of original scientific research, had not yet been fulfilled—indeed it had to wait to a later generation of scientific workers who have since made great history in the laboratories of this Association. Even so, 210, Bowbazar had already established great tradition as the premier institution for the dissemination of scientific knowledge. The well-known Friday evening lectures, organised on the model of the evening lectures at the Royal Institution in London, and delivered mainly by himself and by Father Laffont, over several decades had become very popular and were attended regularly by some of the elite in Calcutta. Mahendralal Sircar generously offered the resources of this great institution to the new movement. This generous offer was not accepted and it was not even properly appreciated at the time. The reason given was very significant, namely, that what was needed to serve the cause of the new movement was an institution for technology and for the applied sciences, and not an institution for the pure sciences, as the Indian Association for the Cultivation was.

The distinction between the pure and the applied sciences was at that time nearly as pronounced as the distinction between Gentlemen and Players at the Lords, or between amateurs and professionals in tennis today. This was so, not only in India, but in other countries too which had much wider background of scientific experience. Mahendralal was one of the notable exceptions. That was why I referred to him as having been far ahead of his contemporaries in the scientific outlook.

The well known toast for Mathematics, namely, "May it be of no use to anybody at any time" is typical of

this outlook. The great mathematician Gauss, who will rank with Archimedes and Newton as one of the greatest the world had ever produced, is reported to have claimed that if mathematics were entitled to be called the Queen of the Sciences, then Arithmetic, by which he meant the theory of numbers, should be regarded "as the Queen of Mathematics" and he went on to add very significantly, "because it is the least useful".

One of his very distinguished successors in Gettlingen Professor Klein, realised the value of close contacts between the pure and the applied sciences and he periodically arranged for visits by the pure mathematicians to technical colleges, in order to establish such contacts. Klein was due to lead the group of pure mathematicians on one such visit, when he fell ill and his place was taken by the very distinguished Mathematician Professor Hilbert and he had been specially requested to emphasise the main purpose of the visit namely the value of close contacts between the pure and the applied sciences.

In the course of the visit Professor Hilbert took occasion to assure the technical people somewhat like this: "Many people talk loosely of the antagonism between the pure and the applied sciences. I want to assure you of this that there can be no such antagonism between the two. How can there be any antagonism when there is nothing in common between the two, when the one has nothing to do with the other?" I must add, immediately, that it took several new visits before this damage done inadvertently by Hilbert could be rectified.

There is some point in the pure Mathematician who resents the intrusion from outside and wishes to be left alone, expressing some such exclusive sentiments. But the same sentiments would obviously be quite inappropriate as statement of an educational policy.

I should mention in passing that there is hardly any branch even of the purest mathematics, that does not ultimately find application. At a gathering of mathematicians in the United States, many years ago, this question was posed and the theorem of partitioning of numbers was mentioned as a typical example of a branch of Mathematics that is extremely unlikely to find application. To the surprise of many in the audience a physicist from the Bell Telephone Laboratory announced that he had been applying it, applying the theorem, to the splicing of cables. I have since looked up the Bell System Technical Journal and there are two papers by this author which describe in detail the application of the theorem of partitioning of numbers to the splicing of cable.

Again as a typical example of how the development even of pure mathematics is influenced by its applications, I wish to quote from an Egyptian papyrus, nearly four thousand years old, which claims to be a copy from a much earlier document, which gives the formula for the volume of a pyramid, "Multiply the area of the base by the vertical height, and divide the product by three."

To the Pharaoh this was a live problem to know the volume over the truncated pyramid which was growing, which was yet to be built, to be able to estimate how long it would take to complete, and in particular to know whether it could be completed in time to receive him on his death.

The Mathematician must have watched the pyramid go up layer after layer, each of same thickness, but whose base areas were progressively smaller, the volume of each layer is easy to calculate, and to hence the total volume of all the layers. To extrapolate from thence the total volume to the limiting case where the layers are infinitesimally thin there is a major step in mathematics. The clue to the solution must obviously have come from observation.

This is merely to illustrate how the development of even pure mathematics is greatly influenced by its applications. The Fourier series which plays an important part in many branches of engineering was discovered in the process of trying to understand some problems on the conduction of heat. So was spherical harmonics. So was the theory of groups.

If mathematics, which is the purest of the sciences, is so influenced by the applications, the influence on the other sciences would obviously be even more pronounced. Thus the pure and the applied sciences go hand in hand, and help each other to grow.

In attempting to develop technology without developing adequately the background of the pure sciences, we would be very much in the position of my favourite philosopher Prutkov. Prutkov is a pseudonym under which many Russian authors like Alexis Tolstoy have expressed some bright sentiments. Prutkov poses the question "Which is the more useful, the Sun or the Moon?" and himself supplies the answer "Of course the Moon, because it gives us light" during the night when we most need it."

That was where Mahendralal scored, and later events at the National Council of Education have amply justified the stand which he took.

Nearly twenty years ago I had the honour of giving the foundation day address at Jadavpur. It was then an Engineering College. Today it has grown into a University, with a Faculty of pure sciences—which ultimately sustains technology—and a Faculty of Arts too, for their cultural value and for their humanizing influence which the technologist greatly needs; and in due course, I am sure, you will have other Faculties too.

Indeed, in the early years of the movement, more than fifty years ago, we spoke loosely of a National University, without

realising its full implications. We are realising that ideal today. If the offer made by Dr. Mahendra Lal Sircar more than 50 years ago of the resources of the Indian Association for the Cultivation of Science for this movement had been accepted the realisation might have come much earlier.

I spoke about the humanizing influence of the arts and their cultural value. The sciences have a cultural value too. Science and Culture is the title of a famous essay by the great Huxley, and our experience during the intervening period has greatly confirmed the sentiments expressed therein. The utilitarian value of the Sciences have tended in some measure to cloud their cultural value. As I mentioned elsewhere I am reminded of a touching episode in Valmiki's Ramayana. In the Atri Asram, Anasūyā asks Sitā the question "What is the secret of your being such an ideal wife?" Sitā feels genuinely embarrassed. She says "My husband happens to possess all the virtues in the world. I wish he had none of them, just to be able to demonstrate that I would behave towards him exactly the same way as I do now". I sometimes feel the same way about the Sciences. I wish we could forget for a moment the utilitarian value of Science, in order to be able to appreciate better its cultural value, which is very real, and is comparable to the cultural value of the best music, or the best literature. Since you in Jadavpur grew from an Engineering College and you know exactly why you added a Faculty of Arts, I would like you to remember that the Science Faculty has its cultural side too besides being so helpful to technology.

There seems to be a vague feeling even among some of the engineers that the pure sciences are high-brow and for some reason the Engineering Sciences are not. Professionally, of course, the engineers are much better off. I am told that the alumni of Jadavpur College have been able to collect a lakh and a half for the College fund. A distinguished visitor to Mount Wilson

Observatory, after seeing its large quadrangle, is reported to have remarked that it was spacious enough to accommodate the automobiles of all the mechanics and the walking sticks of all the astronomers. The non-highbrow feeling of the Engineer might be a result of the old Puritanic dictum that what is comfortable, convenient or profitable is suspect. It may also be part of our heritage from a slave-owning past world, namely that knowledge for its own sake is superior to any human activity which involves physical labour.

Many of you must be familiar with the name of Professor Alfred North Whitehead. He was a great mathematician, and collaborated with Bertrand Russell in writing the well known treatise of the foundations of mathematics entitled "Mathematica Principia" which has since become a classic. He is even greater as a philosopher and better known as such. But it is not so well known that he was deeply interested in problem of education and wrote several essays, which have been collected and published under the title "Aims of Education". Speaking about the purely educational or cultural value of technology—I am speaking of technology and not of the pure sciences,—he considers it superior to the pure sciences and superior even to the humanities, and the arts; and for the following reason. Technology manages to combine on one side the Platonic ideal of knowledge for its own sake with what Whitehead calls the Benedictine ideal of joy, of useful work. Technology is a marriage of the two ideals, of thought and action, a coordination between which is regarded as an essential requirement of a truly integrated education. This is what technology manages to achieve. It not only enables a man to know something, but enables him also to do something. Coming from one of Whitehead's eminence and his background, which completely rules out any unconscious leanings towards technology, I would accept this flattering compliment to technology without questioning. If even as a means of acquiring a liberal education

technology—not as it is usually thought but as it should be—is superior to the other disciplines and, in addition, so useful to humanity that it is double blessedness; and we have no right to ask for more from technology, except of course, that it shall not hold up its nose.

Technology has a great future, particularly in the service of our country. Allow me to felicitate you, the young graduates, on your entering such a useful career in the service of the country.
JAI HIND !

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