

CHAPTER XVIII

Dr. Sir C. V. Raman's Address

"Being an Honorary Professor of the Benares Hindu University, I have to regard the invitation to address you this afternoon as a call of duty rather than as an honour. I might perhaps even say that the call comes as a rebuke for my having allowed nearly three years to elapse since my last visit to Benares. I will not however accuse myself by making excuses for this apparent remissness on my part. It is sufficient to remark that during a considerable part of this period, I have been, to use old-fashioned language, a peripatetic philosopher, or in more modern language a carpet-bag scientist who goes about, from place to place, lecturing here, there and everywhere, and seeing the world. My task as a traveller has not been altogether an unpleasant one. It has taken me far and wide. It has taken me twice across the American continent from the Atlantic to the Pacific and back, once through Canada and once through the United States. It has taken me through northern, western and southern Europe, and last of all it has taken me through mysterious Russia from the Baltic to the Caspian and back. In these travels it has been

my privilege to come into contact with many men of science of the highest distinction, and discourse with them on problems of scientific research and education. It has been possible for me to visit the most renowned centres of scientific research and many Universities in the two continents. These have been of the most diverse types. Some of the Universities, I visited, as for instance, Upsala in Sweden, are hoary with age, others as for instance, Chicago, are of more recent origin but might well be described as youthful giants; some Universities as for instance, those in Western Canada are the creation of the State and are run entirely by the money of the tax-payer, while others again, as for instance, Stanford University in California are the result of the philanthropy of a single man and enshrine his love of learning. As I said just now, these travels have taken me far and wide, and now I find myself once more amidst you. But, ladies and gentlemen, I need hardly assure you, that while far from Benares, in distant lands, among strangers, I was never far from Benares in thought and mind.

Many a time when travelling in America, I was called upon to speak of India's ancient civilization and of her new renaissance. They were anxious to hear of our country. When I accepted such invitations, I had to unfold a picture of our people, to paint in words India

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as she was and as she is to-day. Do you think I spoke of Madras or of Calcutta? No! I spoke of Kashi, of Benares, of the historic city on the ridge overlooking the Ganges which stands as the very heart of India, as the living centre of our ancient culture and learning. I spoke of the new University which has sprung up, so fitly, at this age-old seat of learning and is the living embodiment of the aspirations of new India. That was the message I gave to America. Coming back now here and looking round, the question naturally arises to one's mind how does our University stand to-day? I confess my feelings are a mixture of pleasure and pain. I am filled with pleasure at seeing the remarkable growth of the University, of the strides it has made forward, and is making towards the realisation of those great and practical ideals which your Vice-Chancellor has in view. I am pained because even his devotion, even his self-sacrifice and earnest labour have not completed yet the task of building up that University as he and you and I all wish to see.

You may perhaps ask me what lessons have these travels brought home to me, what message have I to give you this afternoon? You have just heard the exhortation from the lips of your Vice-Chancellor addressed to your graduates to think, speak, and act the truth. Standing here, I cannot but follow his injunction.

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Let us first look at the bright side of the picture. Many of the universities I visited are great centres of scholarship; some of them are of great age; others have the advantage of an exceptionally favourable natural situation; some again are extremely well-equipped for research; others are very richly endowed, and so on. Having seen them, I can say that the Benares Hindu University has no reason to feel ashamed of itself or to fear comparison with them. When saying this, I am referring, not to all the advantages mentioned, but to the one thing most vital to a University, that is the breadth and strength of the ideals which animate its activities. In this respect, we have nothing to be ashamed of.

But there is another side to the picture. The growth of our university has been phenomenal. The Princes and peoples of India have been generous in responding to the call when the needs of the University were urged by the Vice-Chancellor. But much remains to be done in order that the future of the University as a centre of learning may be fully assured. To mention only one very important matter, we require a dozen University Professors to be fully endowed, one in each major branch of knowledge. Such endowments would enable the services of the most eminent teachers in India to be obtained and retained for the University, and by stabilising the finances of

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the University enable its work to be carried on under conditions satisfactory to the teacher and the taught alike. I can imagine no worthier manner in which a donor's name can be associated with the University than by the creation of such endowed chairs. What more can I do than add my feeble voice to the voice of your Vice-Chancellor in appealing to all patrons of learning in India to come forward and generously support the work of the University?

“Sir, I have been asked by you to address the Convocation. May I remind you that the Convocation includes the Vice-Chancellor, and venture therefore first to address you particularly? I hope you will not take it amiss. We in all parts of India—I am now talking as a Calcutta man—have followed with great admiration the success you have so far achieved in building up this University. We regard you as one of the greatest of those who have helped to make India what she is to-day. Sir, you have rendered conspicuous service to India in many different capacities. This is not the time or the place to speak on all that you have done in these capacities. But I may venture to tell you that there is nothing for which you are responsible which is more remarkable than the creation of this great centre of learning. It stands as a unique achievement which entitles you to a very

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special place in our esteem and gratitude. I now appeal to you, Sir, with all the force that I can command, that you should put every other task aside and devote yourself wholly to the carrying out that work forward to completion and making that great vision which inspired your labours an accomplished fact in all respects. In saying this, may I venture to remark that there are others, younger than you, who have the strength to guide the destinies of India in the other fields of your activity and can be trusted to shoulder those burdens. But there is none, if I may venture to say so, other than yourself who can undertake this task of making the Benares Hindu University what it ought to be. Sir, in giving praise where praise is due, one should also have the courage to criticize where necessary, though, in order to be useful, such criticism should be constructive. If in the course of my address this afternoon I have occasionally to use forcible language, pray do not for a moment imagine that I am guilty of any feeling of disrespect to our people or our institutions.

I cannot address you in a better way than by telling you a story of my visit to England in the year 1921. I went to Cambridge and met by appointment Sir Ernest Rutherford, the great Cambridge Physicist—whose name is honoured wherever science is studied. He

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received me with great cordiality and showed me over the Cavendish Laboratory. We then walked home to his house through the streets of Cambridge. It was a bright sunny day and a great many students were playing in the College grounds. I remarked to Sir Ernest, a little mischievously,—“It seems to me Cambridge is a place for play and not for study”. Sir Earnest turned round and said: “We do not try to grow bookworms here. We train men who can govern an Empire”. That was his spirited reply, which I shall not easily forget. Those words may well be the motto of a University. It is not the function of a University to grow book worms. The function of a University is to train men to serve their country and above all to train those who can become leaders, leaders of science, leaders of Industry, leaders in all other fields of activity.

Let us be frank and ask ourselves “Are the Universities in India merely nurseries for book-worms, or are they really trying to train men for the highest functions which they may be called upon to perform?” Before answering this question, let me tell you another story, this time from the Pacific Coast in California. I was invited by R. A. Millikan, the great American physicist, not merely to visit his laboratory at Pasadena but also to accept an appointment on the Professorial staff of the California Institute of Technology for a whole

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term. I may mention that the physical laboratory attached to this institute is the foremost of all such laboratories in the United States. I accepted the invitation and lived in the Club attached to the Institute and lectured every day in the same way as other members of its staff. I had thus an opportunity, such as rarely comes to a casual visitor, to come in direct touch with the true American temperament, life and outlook. I was profoundly impressed during my stay at Pasadena with the attention paid to the military training of the students, and the results of such training. Rarely a day passed in which I did not see in the campus of the Institute at all hours, groups of students marching, drilling, learning to shoot and perform the duties of a soldier. Indeed, it might have seemed that the students were training to become professional soldiers, and not, as in reality they were, electrical engineers. The conviction was borne in upon me by actual contact with the students of that Institute that nothing helps a young man to acquire physical stamina, discipline and a right outlook on life so much as military training. I regard military training as an essential part of any scheme of education in a University. Nothing is more necessary at the present day than the introduction of compulsory military training of an intensive type for every student in our Indian Universities. I have no doubt that if this is

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done, the experiment would prove an absolute success and do more to build up the character and strength of the rising generation than the study of a whole library of books. Pray do not imagine however, that I consider the function of a University to be the training of soldiers. I advocate military training purely as an educational measure bearing in mind its benefit to the individual on the physical side, for without a solid foundation of physical strength and stamina, no strenuous activity of any kind is possible. I have no doubt myself, however, that if all soldiers were University men thus trained, they would be just as good soldiers and we should hear less of the brutalities and horrors of war.

On the intellectual side, the development of the faculties by use and not the mere acquisition of knowledge should be in the forefront as the object of education. This distinction is most vital and its importance is greatest when we reach the University stage of education. Speaking of it, I am reminded of another great Indian who is no longer with us but who did wonderful work in advancing the intellectual outlook of our Indian Universities. I am referring to the late Sir Asutosh Mookerjee. He realised that the function of a University is not merely to train students to be book worms. In case you do not realise what I mean, I will ask you to remember that a

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bookworm consumes books but produces only dust. A true scholar does not merely consume knowledge but also produces knowledge. He does not merely absorb but also radiates. Sir Asutosh understood this and set before himself as his life-work the task of creating an organisation that would teach men to become radiators and producers of knowledge. His great work has not perished. But there is a danger that the new spirit which he tried to infuse into our Universities may die for lack of nourishment. Our Universities are so engrossed today with the task of conducting examinations and with innumerable meetings of Boards and Faculties, Courts and Councils, Senates and Syndicates that they have no time or energy left to perform the highest function of a University which is to stimulate intellectual activity and advance knowledge. There is a danger today of its being forgotten that examinations and Faculty meetings are only means to an end and not an end in themselves. There is a danger to-day of the production and advancement of knowledge receding into the back-ground in the intellectual outlook of our Universities, of their being regarded as something beautiful and great, like the white snow in the top of the Himalayas, to be admired from a distance but not to be grasped or touched. I think this idea prevails today not only amongst those outside academic circles but also amongst some

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of those who claim to control our Universities and ought to know better.

Let me remind you that we live today not in the age of the Vedas and the Upanishads, we live in a modern age, we live in an age of research, a period of intense striving to create new realms of thought, to penetrate the mystery of Nature by the use of all intellectual and material forces under human command. During the last hundred years vast fields of new knowledge have been discovered and cultivated, and everything points to an increasingly vigorous advance into regions as yet unknown. We in India as a people cannot afford merely to stand by and be passive spectators of this remarkable outburst of human activity. To stand aside would be to confess ourselves an effete and worn out people, fit only to be laid on the shelf and suffer economic and political extinction.

Though this is an important consideration, yet it is not the only one to be taken into account. I ask you to look at research from another standpoint. What is research? It is the seeking after knowledge, and must therefore be of the most fundamental significance in all schemes of education. You must remember that knowledge at the present day is not a dead knowledge enshrined in books but a living and growing knowledge

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with which we are all concerned. Can you imagine for a moment that living knowledge can be procured, can be obtained merely by the study of books by turning your teachers and students into bookworms? No, Your teachers and your students have to take part in that stream of human activity which I have referred to. A University is not a University if this is not understood, if this is not daily practised. A University is not a University but only a high school if the advancement of knowledge is not continually kept in sight as a duty of teachers and students alike. It is in the attempt to discover new facts or new relations between known facts, which we call research, that a true insight into a new and growing body of knowledge is obtained. You must be one of the seekers, or else you will get left behind. There can be no sitting on the fence. You must be in it or out of it. You cannot tell the depth of the river or learn to swim in it by standing on the bank and watching it flow by, but must pluck up courage and plunge into it. So long as our teachers and our students are not inspired in their daily work by such ideals, so long as it is not research but administration that dominates the outlook of our Universities, we can hope for no great advance either in the intellectual output of India or the quality of the work done in our centres of learning. The encouragement and development of research forms one

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of the most urgent problems facing us today in India.

What is necessary now is an awakening and a realisation of the immense importance and urgency of the problem and the creation of a new outlook in our Universities. We must mobilize the human and material resources available for the development of research in India. To pay mere lip-service to the importance of research is of no use. We have to devise practical measures by which it can be made an essential part of the work of our Universities.

The record of intellectual activity in India during the past fifty years, depressingly small though it be, yet shows some signs of hope for the future, some indications of the dawn of a new era. Looking back over the period, perhaps the brightest ray of light that meets our eye is the remarkable, though to our sorrow, all too brief a career of the late Mr. Ramanujan. His work bears the unmistakable stamp of genius, and in its quality is not unworthy of being set side by side with that of the greatest mathematicians of Europe. Any practical scheme for the development of research in India must be based on a knowledge of the facts concerning research known by experience of the last century. The human factor in research dominates all others. The

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case of Mr. Ramanujan is one illustration of the striking fact revealed by the study of the careers of scientific men during the past century concerning the relation between the age of a man and the character of his scientific work. A very remarkable proportion of all strikingly original work has been done by comparatively young men. The reason for this is not far to seek. It is the young man, receptive and enthusiastic, who brings to bear on the problems of science a fresh outlook and ventures to enter with courage and energy, fields where the caution of the older worker may draw him back. Speaking broadly, it may be said that a man's most brilliant ideas come to him when he is young, say between the age of twenty-five and thirty-five. The later period, up to say middle age is largely taken up with following the trail blazed out in the earlier years and the work done in it makes up by maturity of judgment resulting from wider experience anything that it may lack in brilliancy or originality. Even at middle age, however, exceptional individuals with a favourable environment, may show great intellectual power and brilliancy. Sooner or later, however, age begins to tell and with the weakening of the receptive faculty so essential to the investigator, the power to make significant contributions to knowledge wanes. Experience teaches that men of sixty often make admirable statesmen and administrators.

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But they hardly count as leaders of scientific research. At that age, there is only one thing for a University Professor to do, and that is to retire with honour from his chair and become a Vice-Chancellor.

Science then teaches us the gospel of youth. Rightly viewed one sees here a great encouragement to our young men fresh from our Universities to exert themselves and to exercise their intellectual gifts while yet there is time and before they grow rusty from disuse. These facts have also an obvious lesson for our publicists and others who control the funds available for research. To be really productive money should be spent in providing opportunities for the work of men who are comparatively young or else are yet in the prime of life and have given proof of possessing originality and power to initiate new lines of advance. Any well-thought out scheme for the promotion of research in India would include the provision of National Research Fellowships on an extensive scale for young men between the ages of twenty-five and thirty-five who have given proof in their University career of real originality and power to do independent work. Such fellowships would enable young men, who would otherwise drift to some kind of routine employment, to devote themselves to research during the best years of their lives. They would form the nucleus from which could be recruited

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the Professoriate of our Colleges and Universities and the technical staff required for the development of manufacture and industry.

I can hardly think of any better way in which money can be spent today in India than by the payment of scholarships and fellowships to highly-qualified young men capable of doing independent original work, and the payment of money actually required for the equipment of research laboratories and research libraries. Money spent on these objects will sooner or later repay itself manifold. The promotion of research should be an urgent and insistent claim both on the generosity of private donors, and on the liberality of those responsible for the administration of public funds in India. At the same time, it is well to urge that the utmost discrimination should be exercised in the award of such financial assistance. Particularly with regard to the expenditure of public money it is necessary to prescribe such safeguards as would ensure the available funds being distributed in the most economic manner so as to secure the maximum of results.

It would be well to form an Advisory Council for Research in India composed of scientific men both official and non-official, whose advice would be sought with regard to the distribution of grants to individuals or institutions. Such a Council may be trusted

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not to overlook the claims of the capable but comparatively less known workers whose work may be of equal scientific importance but, unlike that of the better-known men, is hampered by want of even the slenderest resources. It should also be laid down, as a general principle that whenever State aid is given for research to an institution, it should be made the first condition that fully audited accounts of such an institution are published, and that the fullest details are furnished in the accounts of how the grants given are expended. Failing such stringent audit control, there is a great danger that funds allocated for research are not expended on the purposes for which they are granted and are thus diverted from channels in which they can be more profitably utilized.

I would urge on patrons of learning throughout India that they should found in connection with the Benares Hindu University, suitable research fellowships in different branches of science. Such fellowships would be a great accession of strength to the academic work of the University and enable Benares in due course of time to take rank with the leading Universities of the world.

Something can be done by our Indian Universities for the promotion of research even with the existing resources. In my opinion no person should be appointed to teach

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science to College classes who has not spent at least two years in an approved research laboratory studying modern developments and presented a thesis embodying the results of such study. Such teachers as already hold College appointments and have not had experience of modern developments in research should be encouraged to take study leave for a year and deputed to work under some eminent specialist or other. Such men when they return to their College should be encouraged to continue their work in a selected field of research and thus to remain in touch with the living spirit of science. It is a mistake to imagine that research cannot be carried on except with resources and materials altogether beyond the financial resources of an ordinary College. Much can be done even with modest resources by men who have obtained the necessary knowledge and skill by working in the more highly organized laboratories. A little assistance given to such men in aid of their work will often go a very long way.

The ethics of scientific research is a matter on which but little has been said or written in India. This subject has many phases some of which are of vital importance. One aspect of the ethics of research touches upon the relations between a professor and his students or assistants. It is fatally easy for a scientific man who has reached eminence to

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reduce the workers in his laboratory to a position of complete intellectual subordination and in fact to turn them into mere mechanical assistants. Much depends on the type of workers chosen. Unless they are youngmen of real brilliance and independence of mind and are allowed the greatest freedom in the exercise of initiative, the degeneration of so-called research scholars into routine assistants is almost automatic. Scientific men are not unknown who in choosing "scholars" regard independence and originality as disqualifications. Such men do not found schools. Usually however when both professor and student are men of high calibre, the relations between them are of the happiest and are beneficial to both.

Another important aspect of the ethics of research is the attitude of the man of science towards the results of any of his work. Research is best carried on for its own sake. Indeed the history of science teaches us that research may confer benefits of the highest importance on the human race, as witness the work of a Faraday or of a Pasteur, and that such benefits often accrue when they are not specially sought for. There is nothing sordid however in the investigation of Nature directly with a view to harness her forces for practical benefit. I would warn my young friends very specially against regarding research as a

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pathway to self-advertisement and self-glorification. Self-advertisement, for whatever reason it may be pursued, soon becomes an end in itself, and its results are most evil when seemingly it is most successful. The man of science who habitually indulges in it soon comes to believe in his own perfection and infallibility and loses that clearness of vision and power of rigid self-criticism essential to an investigator. Self-praise is scientific suicide.

There are other aspects of the subject on which I could speak. I must remember, however, that your patience is not unlimited, and will therefore conclude my address with a few words regarding the Benares Hindu University. I see in this University which seeks to bring together our ancient culture and the knowledge of the new age, a great instrument for the up-lifting of the new age, a great instrument for the uplifting of our country and for cementing together the people of India into a single nation. I see in it a centre of learning with the greatest potentialities for the intellectual, moral and material welfare of our countrymen. I would urge on you, graduates, to remember with pride that you are the alumni of a University which is truly a National University of India, a University in which students and teachers from all parts of India learn to live and work together. I would urge you, Sir, and every one present

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here, not to rest, until you have done your utmost to make our Benares the greatest and most truly Imperial University in India, a centre of culture such as we should all justly feel proud of, to make it what you and I and every one else would wish it to be. I recall with pleasure and pride that what is now the University with its magnificent colleges, hostels and residences and with its avenues and roads was, not many years ago, just open fields. Much has been done. But much still remains to be done. I earnestly appeal to the Princes and people of India, to the Imperial and Provincial Governments to be generous to an Institution which can justly claim to be the most outstanding effort of educational idealism in the modern history of India, and to help to make it worthy of the Indian people.

