

Forward

CALCUTTA, SEPT. 24, 1926.

ELECTRICAL POLARITY OF MOLECULES

Prof. C. V. Raman's Experiments

The following note on the Electrical Polarity of Molecules by Prof. C. V. Raman and Mr. K. S. Krishnan appears in the current number of "Nature":—

(Aug. 28)

On attempting to correlate the electrical double-refraction (Kerr effect) of gases and vapours which has been measured by Leiser, Hansen and Sivessy with the optical anisotropy of the molecules determined from observations on light scattering, it is found that electrically polar molecules generally exhibit a Kerr effect which is very large in relation to their optical anisotropy. This indicates that the orientative action of the field on the molecule in such cases is chiefly due to the permanent electric doublet present in it, and is much larger than would be the case if the molecules were non-polar. In the case of molecules having an axis of optical symmetry to which the electric doublet is parallel, or is inclined at some known angle, it is possible to calculate the permanent electric moment from the value of the Kerr constant and the constant of depolarisation of the scattered light. Conversely, if the moment is known, the inclination of the electric doublet to the optic axis can be found. For example, in the case of the simple dipole molecule HCl, we may assume the optic axis to be parallel to the doublet.

The constant of depolarisation as recently measured by Ramanathan is 0.010, and the Kerr constant from the measurements of Hansen equals to 0.90×10^{-10} . From this, considering the orientative action of the field to be due only to the permanent doublet, we find its moment to be 1.06×10^{-18} electrostatic units, while if the orientative couple on the induced doublet is also taken into account as in the case of non-polar molecules, the value of the permanent moment comes out to be 1.04×10^{-18} . The recent determination by Zahn from dielectric constant measurements gives 1.03×10^{-18} , thus showing good agreement.

When the optical ellipsoid of the molecule has three unequal axes, measurements of the factor of depolarisation and of the Kerr constant are by themselves insufficient for an accurate determination of the electric moment. But if the moment is known from measurements of the dielectric constant, the data mentioned are of much assistance in fixing the position of the axis of the doublet. For example, if the Kerr constant of a substance is negative, we can assert definitely that the axis of the permanent doublet does not coincide with the longest axis of the optical ellipsoid. It is interesting to note in this connection that, so far as is known, all substances having a negative Kerr constant are polar.



The Hindu.

MONDAY, SEPTEMBER 26, 1927.

DOUBLE REFRACTION IN FLOWING LIQUIDS

PROF. C. V. RAMAN'S DISCOVERY

(ASSOCIATED PRESS OF INDIA.)

CALCUTTA, Sep. 23.

The celebrated Cambridge Physicist Mr. Clerk Maxwell, many years ago, discovered that Canada Balsam which is a viscous liquid, when vigorously stirred, exhibits, so long as it is in motion, the optical phenomenon of double refraction, which is usually observed only in crystals or in solids under strain. The phenomenon has since been observed in many other liquids, but remained without adequate explanation.

Prof. Raman, with his research associate Mr. Krishnan, has just succeeded in discovering the true explanation of the effect, and has developed a theory by which its magnitude can be calculated in advance for any specified liquid, yielding results in brilliant agreement with the observed values.

Prof. Raman's theory shows that the double refraction in flowing liquids arises from the elongated or unsymmetrical shape of the molecules. When the liquid is set in motion, the professor explains, the molecules do not bend, as has been imagined, to set themselves in the direction of their greatest length along the line of flow but rather at an angle 45 degrees to the line of flow, which is also the line of maximum tension within the fluid. The result of such orientation is, it is stated, that the fluid tends to expand along the line of tension, and contract along the perpendicular direction which is the line of pressure; thereby, these expansions and contractions of the fluid under the action of the viscous forces, furnish the motive power required for maintaining the molecules in their altered position, in spite of the vigorous thermal agitation within the liquid, tending to throw them into disarray. The orientative tendency of the molecules, which depends primarily on their shape thus comes into play to an extent determined by the viscous force within the liquid.

Taking this orientation of the molecules into account, and also from a knowledge of the optical properties, it is possible, Professor Raman says, to calculate the strength of the double refraction produced by the flow. It is interesting to note, he says, that many common oils have very elongated molecules, and therefore exhibit the Maxwell effect to a notable extent. Cinnamon oil and its derivatives, are specially conspicuous in this respect.

They Revive Our Ancient Glory

GALLERY OF INDIA'S SCIENTISTS

NEW VISTAS OF RESEARCH

The ancient glory of India as a centre of thought and culture is being revived to-day by the work of her leaders in the field of science. The achievements of these men have furnished proof—if proof were needed—that the originality and the productivity of the Indian mind have survived the vicissitudes of Indian history with undiminished vigour, writes Sir C. V. Raman in the course of an informative article released to *Blitz* through *USOWI*.

The originality of the Indian mind and its capacity for abstract thought are aptly illustrated by the career of the young Indian mathematician, the late Mr. Srinivasa Ramanujam, whose achievements and early death recall those of the famous Norwegian mathematician Abel. Like Abel, Ramanujam had to struggle against the bitterest poverty and apathy, and triumphed over them, only to be struck down by a fell disease and die a premature death. In the few years which were given to Ramanujam for his life and activity, he produced a record of work, which showed him to be the equal of the greatest mathematicians of the nineteenth century in intellectual power and originality.

New Vistas

The present writer has laboured for a quarter of a century to build up an active school of physics in India. Many of his former collaborators have since made their mark in widely different branches of the subject. The work of K. S. Krishnan on crystal physics and crystal magnetism has greatly enriched these fields of knowledge. His name-sake, R. S. Krishnan, has opened up new vistas of research in a field of great scientific and technical interest, namely, the optical behaviour of colloids. An active school of meteorology and geo-physics is at work today, led by K. R. Ramanathan in upper air



Sir C. V. RAMAN

ORGANIC CHEMICALS FROM PLANTS

research and terrestrial magnetism, by Sudhansukumar Banerjee in seismology, by L. A. Ramdas in agricultural meteorology, and by Vaidyanathan in soil physics.

Mathematical studies, both pure and applied, claim many votaries in India. Ramanujam has had some not unworthy successors, as for instance Vijiaraghavan at Dacca, Vaidyanathaswamy at Lahore, and K. S. K. Iyengar and Madhavo Rao at Bangalore. Statistical science is well represented by P. C. Mahalanobis and his school at Calcutta. In mathematical physics, Meghanad Saha at Calcutta, Satyendra Nath Bose at Dacca, and H. J. Bhabha at Bangalore, have achieved great reputations. Saha's theory of ionization in stellar atmospheres, the Bose-Einstein statistics of atomic particles, and Bhabha's cascade theory of cosmic ray showers are indeed familiar to all students of mathematical physics. The theoretical work of Nagendra Nath on the diffraction of light by ultrasonic waves is well-known to all specialists in acoustics.

Chemical research in India has not had the same resounding successes as mathematics and physics, but is, however, well represented by

WESTERN SAVANTS RIVALLED

SOME OUTSTANDING MEN

numerous active votaries. The outstanding name in the field of plant chemistry is that of T. R. Seshadri, who, with his collaborators, has built up a great school of organic chemical research at Andhra University and has isolated many new organic chemicals from Indian plants. In physical chemistry, S. S. Bhatnagar has been the leading Indian worker and has published a treatise dealing with the chemical aspects of magnetism. Colloid chemistry is a favourite field of research in India, the work of J. N. Mukerjee on its application to soil science being perhaps the best known.

Improved Rice

The leader among Indian biologists is Birbal Sahni of Lucknow, whose special field is paleontology, or the study of ancient plant life as recorded in the rocks of the earth's crust. He heads an active school of research in this subject and has himself contributed notably to the development of new techniques of study and to the elucidation of India's geological history. Deserving of special mention is the successful work of T. S. Venkatraman in breeding new and commercially important types of sugar-cane, and of K. Ramiah in the production of new and improved strains of rice. Indians have also made notable contributions to medical research, best known of which is the success of Upendranath Brahmachari in combating *kala azar* with the aid of synthetic organic antimonial preparations. Pioneer work in the field of Indian anthropology has been accomplished by Ananthakrishnier and by Sarat Chandra Roy, working in South and North India respectively.

What is a Metal?

Those who hold that science is a tedious and highbrow affair were thoroughly disillusioned when they heard Dr K. S. Krishnan, F.R.S., Director of the National Physical Laboratory, speak on "What Is a



Dr K. S. Krishnan

Metal?" at the Beldih Club on January 20. Dr Krishnan gave a lucid account of some aspects of modern physics, aspects like the uncertainty principle, Pauli's exclusion theory and the vital role of celibate electrons.

FUNDAMENTAL RESEARCH

ITS IMPORTANCE FOR INDUSTRY

DR. KRISHNAN'S ADDRESS AT BANGALORE

(FROM OUR CORRESPONDENT.)

BANGALORE, Oct. 12.

"We need, in India, certainly more and more of the *ad hoc* type of research intended to help the industries. Its usefulness to the industries, its importance and its calibre will ultimately depend on the strength of fundamental science behind it. We, in India, are very fortunate in having good raw materials for our industries and even better intellectual raw materials for building up first-rate science which, in the long run, will be of invaluable support to the industries. I hope our leaders will exploit both," observed Dr. K. S. Krishnan, Mahendralal Sircar Professor of Physics, delivering the Sri Krishnarajendra Silver Jubilee Lecture founded by Mr. V. Subramania Aiyar, former Registrar of the Mysore University, at the Intermediate College Hall, last evening. Dr. J. C. Ghosh, Director of the Indian Institute of Science, presided. The subject of the lecture was "The Place of Fundamental Research in Industrial Progress."

"Though the choice of the subject is determined largely by the conditions of the Lectureship Trust," observed Dr. Krishnan, "there is an appropriateness in the choice of this particular subject for a lecture before an audience in Bangalore. There is something in the Bangalore soil, probably in the Bangalore air, which makes both fundamental researches and industries thrive much better than in many other parts of India. You in Bangalore are served hot from the anvil with some of the latest results of fundamental research of far-reaching importance in the same way as you are, or will soon be, with the latest models in aircraft. There is an intimate relationship between fundamental research and industries, much more intimate than is realised in India, and it will be my endeavour in this lecture to emphasise this relationship."

CONTRIBUTION OF SCIENCE

After referring to the contribution of science to "the intellectual and cultural development of mankind and, even in a larger measure, to the material prosperity of man", Dr. Krishnan spoke of the great scientists of the past who were "content to do science for its own sake and did not bother about its applications." Some of their works, he said, were little gems, which gave the same aesthetic pleasure as the best poetry, music or painting. They were as they should be. "If art is the imitation of nature, science is nature herself unveiled."

Dr. Krishnan proceeding said, "While discussing the misapplication of scientific researches, often times, the responsibility has been laid at the door of the scientist. The accomplishments of science, as Saranoff once said, may be an adjunct of war, but they are not the causes of war. Belligerency is a state of mind and not of matter, and, therefore, the scientist is not concerned with it."

"If science had done nothing more than help us to understand nature and to give us intellectual and aesthetic pleasure in pursuit of it it would have wholly justified itself. But science has done very much more than that. In practice, fundamental science is not so wholly isolated, so far removed from human activities as the creators of the science would wish us to believe. The influence of fundamental science on general human activities is immense. Darwin's theory of evolution, which is a product of pure research, has wrought more changes in the general social outlook of man than any of the major evolutions in history. If you take the researches that followed the discovery of the Wireless Waves, X-Rays, the Electron and the rare gases, they have not only completely revolutionised the face of physics, but they have also contributed immeasurably to human welfare. They have also revolutionised our industries. There is hardly any industry to-day, except some which are as old as man, which is not directly based on some of these discoveries."

SCIENCE AND INDUSTRIES

"We can understand the attitude of the pure researcher to be left alone. We must appreciate and encourage it. In these days, when there is so much lip sympathy given to intellectual freedom, it is refreshing to find that there are at least some who actually appreciate that freedom and maintain it. The fundamental researcher belongs to this small class. But for that freedom, scientific research would be impossible. It is no exaggeration to say that there is hardly any branch of either mathematics or physics which does not find an application in other branches of science and ultimately in the industries. Even abstruse branches of mathematics like the theory of numbers find application in physics. For example, splicing of electric cables requires the application of the theory of numbers. Many modern industries are based on fundamental researches made on Photo-Electricity, X-Rays Electron Tubes, etc., all of them made in the laboratory in response to the inner urge for creation and without any consideration of the possibilities of their applications. In order that these results of fundamental research may reach industries, we naturally need groups of scientific men fully equipped with the available knowledge of fundamental sciences, who will apply them for industrial purposes—that is, *ad hoc* researchers who will take up problems as they arise in the industries and tackle them. They serve a very important part and it is to them that we owe the gradual filtration of the results of fundamental science and the spreading of the fruits of science to various human activities. Particularly, in India, where industrialisation is so backward, we need more and more of them. But it must be remembered that in the background of all this *ad hoc* research, there must be a considerable amount of fundamental research. In fact, the strength of the *ad hoc* research depends wholly on the support it derives from the fundamental side."

NEED FOR INDUSTRIALISATION

"One has merely to look round to be reminded that we are living in a scientific age. Whether we like it or not, science has come to stay, and it is to science that most countries in the world owe their present high standard of living. If, in India we want a similar high standard, if our aim is to provide more creative leisure for all men—a privilege which is now enjoyed by only a few—then it is inevitable that there must be some kind of organised production of the needs of man, that is, some kind of industrialisation. India, if she is to take her place among the progressive nations, has definitely to take to industrialisation and in this industrialisation, naturally, the scientist will play a very important part. There will be great need for the routine scientist for organising and developing the industries and also for *ad hoc* researchers who will tackle problems as they arise and find solutions. I do not want to minimise the importance of *ad hoc* research of this type. Probably, the best representative of such *ad hoc* research is Edison, and his genius consisted in choosing problems which were

most likely to find immediate application and in making a frontal attack on those problems. He frequently succeeded in solving them. But such a frontal attack on problems is not always easy. Nature has to be wooed in a hundred different ways before she can be induced to part with a secret. One has to cultivate her company for a long time to understand her ways and her workings. That is why fundamental research, in the long run, is likely to be much more helpful to the industry than *ad hoc* research.

CHINA'S UNFORTUNATE EXPERIENCE

"Great industrialists do not stint to spend money on research, whether of the *ad hoc* type or of the fundamental kind. They are particular about fundamental researches being carried on, because they know by experience that ultimately fundamental research pays even more than research designed to solve particular difficulties. Here, one may learn a useful lesson from the unfortunate experience of China. At one time, China was industrially very progressive. Porcelain, silk and paper industries had been greatly developed there. But, to-day, we find that she has to depend on other countries for many of the products of industry. This has been attributed by the historians of science in China to lack of initiative in fundamental research."

Dr. J. C. Ghosh then decorated Dr. Krishnan with the Krishnarajendra Gold Medal amidst cheers.

PROF. RAMAN'S MAGNIFICENT RESEARCH

EXPLANATION OF DOUBLE REFRACTION IN LIQUIDS

Calcutta, Sept. 23.

The celebrated Cambridge Physicist Clerk Maxwell many years ago discovered that Canada Balsam which is a Viscous liquid when vigorously stirred exhibits so long as it is in motion, the optical phenomenon or double refraction which is usually observed only in crystals or in solids under strain. The phenomenon has since been observed in many other liquids but remained without adequate explanation.

Prof. Raman with his research associate Mr. Krishnan has just succeeded in discovering the true explanation of the effect and has developed a theory by which its magnitude can be calculated in advance for any specified liquid, yielding results in brilliant agreement with the observed values.

Prof. Raman's theory shows that the double refraction in flowing liquids arises from the elongated or unsymmetrical shape of the molecules. When the liquid is set in motion, the professor explains, the molecules do not bend, as has been imagined, to set themselves with the direction of their greatest length along the line of flow but rather with their greatest length at an angle of forty-five degrees to the line of flow which is also the line of maximum tension within the fluid. The result of such orientation is, it is stated, that the fluid tends to expand along the line of tension and contract along the perpendicular direction which is the line of pressure; thereby these expansions and contractions of the fluid under the action of the viscous forces furnish the motive power required for maintaining the molecules in their altered positions in spite of the vigorous thermal agitation within the liquid tending to throw them into disarray. The orientative tendency of the molecules which depends primarily on their shape thus comes into play to an extent determined by the viscous force within the liquid.

Taking this orientation of the molecules into account and also from a knowledge of the optical properties, it is possible, professor Raman says, to calculate the strength of the double refraction produced by the flow. It is interesting to note, he says, that many common oils have very elongated molecules and therefore exhibit the Maxwell effect to a notable extent. Cinnamon oil and its derivatives are specially conspicuous in this respect.—A. P.

20TH SEPT., 1946

“ATOM BOMB — A WASTE OF HUMAN EFFORT”

SIR C.V. RAMAN'S VIEW

COLOMBO, September 18: A strong condemnation of the atom bomb and “atom diplomacy” was voiced by the famous Indian scientist, Sir C. V. Raman, who arrived at Colombo this evening by air from India to attend the second annual session tomorrow of the Ceylon Association of Science.

“Scientists should have refused to collaborate with warmongers and should have refused help in the production of atom bomb, which after all, is a very wicked thing,” he said. He added that the greatest tragedy was the waste of human effort and money in perfecting the weapon and referred to the United States Bikini atom bomb tests as a “stupid, cruel and wicked waste.”

The 30,000,000 dollars spent on the tests could have been better utilised for the benefit of humanity and the world's happiness, he said.

The Physical Institute of Research at Bangalore on which 200,000 dollars had already been spent, needed only 100,000 dollars more to make it the biggest institute in the world and one could well judge what, in terms of human values and benefits, had been lost in the tests. India had scientific talent in the atomic field, he said, citing Dr K. S. Krishnan as an authority on atomic fission — A.P.I.

Thoughts Round Soap Bubbles

— —
MR. KRISHNAN'S LECTURE
— —

Last Thursday Mr. K. S. Krishnan delivered an interesting popular lecture on "Soap Films and their Structure" in the Physics Lecture Theatre of the University. The lecture was illustrated by several lantern experiments. Mr. Krishnan described how from a very early period the soap bubble had been a source of inspiration to the physicist. The brilliant colours which glitter on a soap bubble—the colours were projected on the screen—were first studied by Newton with a minuteness and care almost unparalleled in the whole range of optical investigations. The explanation of these colours taxed the ingenuity of several succeeding generations of physicists until in the hands of Young it formed a strong support for the wave theory of light. Similarly the study of the mechanical forces which operate in the formation of a soap-bubble has claimed the attention of several able mathematicians. In particular physics owes to the famous blind physicist Plateau a wonderful series of investigations on surface forces which have since become classical. Again the investigations by Willard Gibbs on the stability of soap films have led to very important developments in physical chemistry. The fascinating work of Sir James Dewar on the longevity of soap bubbles was also referred to.

The lecturer then gave a detailed account of the extremely interesting observations by the French physicist Perrin and later by Wells on the stratification of soap films, how their thickness instead of varying continuously mounts up by steps of equal thickness, as though they were built up by superposing layer after layer, of the same thickness. A remarkable photograph of a stratified film in natural colours was shown on the screen. The speaker also demonstrated how the thickness of such thin films can be accurately measured. The thickness of the unit layer of soap film referred to comes out as a little over four times a millionth part of a millimetre. On the basis of this value for its thickness of oil films on water, the following simple structure was suggested for the fundamental unit film of soap: it is nothing more than a double layer of obic and molecules, formed by the hydrolysis of soap, these molecules all standing on end perpendicular to the layer, being linked together by their active carboxyl ends which meet in the centre.

Such a regularity in the arrangement and orientation of the molecules as was suggested, scientists are accustomed to regard as a characteristic of a crystalline substance. Does a stratified soap film then behave like a crystal? The interference pattern of a soap bubble placed between crossed Nicols was projected by the lecturer on the screen; its strong resemblance to the pattern obtained with a crystalline plate was remarkable.

— —

in handsome terms Mr. Ranganathan said in the course of his speech:

A university should, above everything else, be a centre of study of the highest teaching and all its members, whether teachers or students, should be animated by a spirit of singleminded devotion to knowledge and even more than that, a university, if it is to be worthy of the name, should not only concern itself with existing knowledge but should endeavour by investigation and research to add to the sum-total of the world's knowledge, and it is here that Sir Venkata Raman's presence and his words will be a source of great inspiration to us. I am aware that our University, still very young, is not equipped on the scientific side for advanced teaching and research as yet, but I am sure that before long adequate facilities will be provided for advanced work both in physics and in chemistry (Cheers).

SIR C. V. RAMAN'S ADDRESS

Sir C. V. Raman said:—

"It was just two years ago that I had the pleasure of visiting Chidambaram and this Institution and addressing the staff and students of the then Sri Minakshi College. I ventured to express the hope that the Institution would at no distant date develop into a centre of culture and learning in Southern India. What was then a mere expression of hope has now developed into a practical proposition, mainly through the generous idealism of your Pro-Chancellor and the sympathetic interest of the Government of this Province.

You will not be surprised when I say that a considerable part of to-day was not spent by me in the Physical Laboratory but in the College of Music listening and speaking to the students, staff and Principal of that Institute. Music is necessarily a vital part of our national culture and the fact that your Pro-Chancellor has thought it fit to found such an Institution shows that he clearly realises what lies at the foundation of the development of our culture. These two years have also witnessed many changes and developments in the educational atmosphere of this country.

Those who read the current scientific literature in different subjects and particularly in physics and in chemistry know that India has been taking a continual and rapidly increasing share in the advance of scientific knowledge. At least two or perhaps I should say three of the most fundamental developments in physics during the last decade made in any part of the world have been contributed by Indian physicists and to an increasing extent the work done in India has not only been recognised abroad but has also been a moving power and has influenced the course of scientific work and thought throughout the world. That is surely a very remarkable phenomenon even more remarkable than the development of the national spirit in other perhaps less prominent directions. This phenomenon has impressed scientific visitors to India and has been given expression to in no uncertain lan-

guage by such an eminent man of science as Professor Arnold Sommerfeld who, as you know, recently visited several of the Universities in this country. As part of this remarkable development and I think in close connection with it has also been this flowering outlook of new University centres.

I believe that this development of new Universities is not only a sign of the times, but is also a most powerful and potent method for the development of real intellectual life in our country. It is only by the development of such Universities that we can hope to see the fullest opportunities given to the younger generation to prove its real merit and to strengthen the feeling already voiced in no uncertain language that India has a real contribution to make in all departments of knowledge.

SOUTH INDIANS' CONTRIBUTION TO WORLD SCIENCE

"To some of you perhaps it may be news to know that Chidambaram has already made significant contributions to physics. I miss amongst you to-day—and I am not surprised—a familiar face and that is Mr. Ramachandra Rao (applause) who, as you know, was the chief of the department of physics in this college before it formed a part of this University. Mr. Ramachandra Rao has spent two summer vacations at Calcutta in my laboratory. Subsequently I induced him to try and see if even in the unfavourable circumstances of a college not equipped for higher study and research, whether it would not be possible for him to continue those investigations. He borrowed a certain amount of equipment and carried on investigations which were published in a series of papers in the Indian Journal of Physics. About a month ago I received from a dis-

tributing the results of his work. And I could see from it that he had risen to the full height of the opportunities provided for him in the laboratory of the King's College, London and he was familiarising himself and taking part in the development of one of the most important branches of modern physics. I am sure when he comes back he will prove himself to be not merely an active and helpful teacher of physics, but also one who can communicate to others real enthusiasm for higher study and research. (Cheers.)

MR. VAIDYANATHAN'S RESEARCH WORK IN MAGNETISM

"If I have the pleasure of mentioning the contribution to physics of one who is already a member of the staff of this college, it gives me also great pleasure to refer to one, who, I believe, if it is not already a known fact to you, is to become a member of the physics staff of this university. I think in two days time, Mr. V. I. Vaidyanathan, M. A. who is shortly to join you as Reader in Physics, has been one of the most active and indefatigable workers in my laboratory during the past four years. Mr. Vaidyanathan can rightly be claimed as a pioneer not only in India but perhaps throughout the world in a particular aspect of physical research, namely, the exact study of the magnetic properties

of organic vapours generally. He showed during the time he worked there extraordinary experimental skill and perseverance in overcoming the difficulties of that research and he has published numerous papers in the Philosophical Magazine, in the Physical Review and in the Indian Journal of Physics on the subject of the magnetic behaviour of gases, vapours, liquids and solids, and "Nature" in its research columns took special note of his contribution and pointed out the importance. Just about a month ago he was led to a result which I believe is of fundamental significance in the theory of magnetism, namely, that the magnetic behaviour of certain solid vapours, liquids and solids, depends on the state of sub-division of the solid to the particle state. That is a most unexpected and interesting result and I believe, it will influence the development of our ideas in the science of magnetism. So impressed am I with the importance of this contribution that in order to prevent the continuity of that research being broken I intend to make a loan for such period as is necessary for the research, with which Mr. Vaidyanathan is working for the present in his laboratory (cries of hear, hear.) I am sure your Vice-Chancellor will sooner or later find the funds for equipping and carrying on this work. But that is not the point. The point is that I desire that that work should continue without any break whatsoever and it is for that reason that I deny to myself the pleasure of seeing that work continued in my laboratory and desire to see the Chidambaram University taking part in the exploitation of that fundamental work. (Cheers.)

IN THE FIELD OF X-RAYS

"It is very interesting also to note that besides familiarising himself with magnetic investigations in a thoroughly practical manner Mr. Vaidyanathan also found time to take part in another branch of modern physics, namely, the study of X-Ray scattering and diffraction. X-Rays form a most important and significant part of modern physical research. He has published already two memoirs on X-Ray diffraction in liquids and a third paper written by him has been lying on my table for the past three months unattended to, so great is the flood of new papers for me to examine that I cannot deal with them as promptly as I can desire. I hope that the memoir will also soon be published. It is my earnest hope that when he comes here he will find it possible to introduce the practical study, both on magnetism and on X-Ray work as an integral part of the ordinary work of advanced science students—even the B.A. students in this laboratory." "I have mentioned only those workers from my laboratory who are connected or about to be connected with this university but the feeling of optimism which I mentioned to you in the ability of Indians generally and of South Indians in particular to contribute to scientific advance of the world is based not merely on these two instances. They say that one swallow does not make a summer. But surely not merely one, but with 20 or 30 swallows, one might reasonably anticipate the coming of the summer. I should like to take this opportunity of mentioning a few other South Indians who have not only made distinguished contributions to physics but are also actively engaged in the same beneficent task. My object in mentioning them is not, so to say, to advertise myself or my laboratory or my pupils.

carried on in Calcutta and Rangoon, but still he has shown by his work at Poona that we can, within a reasonable distance of time hope that he will secure recognition as one of the world's authorities on Meteorology of the upper air. Already his work in this field has attracted the attention of leading authorities and I feel sure that the fact that he occupies a highly salaried post in the Government will not in any way diminish his zeal for the promotion of knowledge. (Cheers.)

"Mr. K. S. Krishnan, who till recently was associated with me occupies a very interesting position, namely, as a Reader in the Dacca University. I mention him not only for the reason that he has been one of the most active and distinguished of the younger generation in physicists, but I mention it also for the reason that his career in many respects is an inspiration to the younger generation. Mr. Krishnan first came to my laboratory 5 years ago. During this period he showed such great ability and he did such good work that I thought I should take the opportunity of securing for him some excellent appointment in Government service or elsewhere. But he would not listen to it at all. Later I felt that he had been in my Laboratory quite long enough for this reason that it was rapidly becoming a question of some importance whether he or I was the better physicist (laughter), and for this reason I felt it was high time that he moved to another place where people would be quicker to realise that Mr. Krishnan was a physicist in himself and not for the reason of his association with me. It is a very remarkable phenomenon, I think almost without a precedent in the history of university appointments, that though Mr. Krishnan was only a Master of Science of perhaps six or seven months' standing, he was selected for the post by a strong selection committee in preference to other candidates in a fairly large field which included I think no fewer than five Doctors of Science, both of British and Indian universities. That surely was a significant tribute to his work and I do wish and hope that other universities in Indian will, in selecting men for their appointments, ask not what degrees has this or that man got, but what work has he done (hear, hear). I realise when saying this, I do not for a single moment wish to run down the value of a degree. I think the day

is coming and has come when we have in India a sufficient body of academic opinion who can judge of work and accomplishment quite apart from the defunctious age of alphabetical academic honour.

THE CALL OF SCIENCE

"Having taken up, I would like also, if I might complete my reference to the galaxy of South Indian scientists, to say one or two words more, I do not for one single moment wish the younger generation in front of me to imagine that they are as good as anybody else. I do not wish to produce any notion of swollen-headedness. But none the less, I would like to emphasise the fact that in intellectual endeavour, age is much less important than other qualities as ability, enthusiasm and grit and it is these qualities that characterise a successful man of science; so much so, that it is a thoroughly understood fact that in the scientific world most significant and valuable contributions might come from quite and unknown men. And to-day in science, there is always a welcome to really brilliant contributions coming from one—it does not matter how young or unknown he might be. I will not quote instances of this from the examples of western men of science. That will not, I know, impress you. I will quote examples from India, and amongst South Indians, I want to mention this to indicate to you that you must not imagine that because you are still in the Junior or Senior B.A. that you are precluded from thinking for yourselves and that you need only read your textbooks, conduct the practical tests in such a manner as to secure high marks and please your teachers and come out with a degree. Those of you who feel the impulse to study further than your curricula permit should, not hesitate to obey that impulse. You may keep it a secret until such time as you choose. But, as Napoleon said, it is very desirable that every Brigadier should feel that he has or may have the Field Marshal's baton in his pocket. In the same way, every student of science should feel that an opportunity may some day come to him to make some significant contribution to science. I will only quote two examples, and I will not mention names for fear this might travel to Calcutta or somewhere else and produce an overwhelming pride in the young men to whom I wish to refer.

possibly also potential radiators of the knowledge. The physicist will understand the relation between absorption and radiation of knowledge. Good radiators are good absorbers and vice versa. You cannot be a mere absorber of knowledge unless you are also a potential radiator of knowledge.

A NEW FIELD OF RESEARCH

"I told your Vice-Chancellor this morning that an inaugural address to a science institute should probably in my opinion contain some scientific matter and be cordially agreed. For that reason, I should just like to trespass on your kindness and indicate to you in very general terms a new field of research in physics which owes to a large extent its development to Indian work. As the audience includes a great many who are not physicists, I only wish to give it in the broadest possible outlines and indicate to you the main significance of the result.

"You all know that the sky is blue. (Laughter.) You can see that at any time when the sky is not cloudy. Now this blue colour of the sky, as physicists have shown arises in this way; that when sunlight traverses the upper levels of the earth's atmosphere, the molecules of air, that is to say, the molecules of oxygen, nitrogen and other gases in the atmosphere, they scatter light. Just for example, you observe light coming from that lamp falls on this handkerchief and the handkerchief becomes visible by reason of the light scattered by it. In the same way, molecules, though they are exceedingly small, none the less, each molecule scatters a very small quantity of light. We have an enormous number of molecules and therefore, the scattered light becomes perceptible, and it is this scattered light which becomes visible as the light of the blue sky. In the same way, we have another great natural phenomenon known to everyone who has crossed the ocean in a steamer. The sea shows an intensely blue colour; and some years ago, I showed that the explanation of this intense blue colour is very similar to the blue colour of the sky which I have just mentioned. The sunlight is scattered by the molecules of water and comes back to us after this process of scattering. In the same way, transparent solids as for example the clear ice which you find in glaciers, and in ice-bergs here also the molecules of ice scatter light and I believe this scattering of light is reasonable for the blue colour of very clear ice. This phenomenon has been extensively studied at Calcutta and elsewhere but the impression prevailed that in this process of scattering, there was no real change in the nature of the light. Now, here I wish to make it clear why the sky is blue, if the molecules scatter sunlight. The reason is this:—Sunlight is not of one colour but of many colours, violet, indigo, blue, green, yellow, orange, red and so forth. Now this whole galaxy of colours or spectrum as it is called when the sunlight, composed of all these colours, passes the atmosphere, the molecules scatter the violet, indigo and the blue much more than the other colours. And that is the reason why the light scattered appears to be blue. In reality however sunlight and scattered light are really of the same nature, that is to say, if you examine them through a little spectroscope (a prism of glass) you will see exactly the

same spectra both in the sunlight and the scattered light. In the spring of 1928, a mode of scattering of visible light was discovered by a physicist working with a quite ordinary source of light and quite an ordinary spectroscope and with very familiar chemicals known for at least 50 years ago."

Here the lecturer exhibited a few lantern slides to illustrate the scattering of light and the new lines formed when light is passed through various media, such as benzene, carbon tetrachloride, water, quartz and also the changes consequent on heating the media. He also put on the screen one of the photographs taken by Prof. Wood to show the two-fold nature of light.

The lecturer then concluded:— "I hope that Chidambaram also will have one of the laboratories in which this phenomenon will be studied. I hope that the new university will also try to do something in the study of this phenomenon. It gives me great pleasure to address this audience and I venture to express the hope that the Annamalai University will soon become a great centre of active scientific research." (Applause and cheers.)

After the conclusion of the lecture, Dr. Chakravarti, University Reader in Chemistry, proposed a vote of thanks to the distinguished lecturer of the day.

RP-6

GALAXY OF SOUTH INDIAN SCIENTISTS

SIR C. V. RAMAN'S TRIBUTE

ADDRESS AT ANNAMALAI UNIVERSITY

Annamalai Nagar, July 19.—The inaugural address to the University Science Union was delivered by Sir C. V. Raman at the Annamalai University at 6 p.m. on the 19th instant. There was a very large gathering. The Vice-Chancellor, Mr. S. E. Ranganathan presided.

After introducing Sir C. V. Raman in handsome terms Mr. Ranganathan said in the course of his speech:

A university should, above everything else, be a centre of study of the highest learning and all its members, whether teachers or students, should be animated by a spirit of singleminded devotion to knowledge and even more than that, a university, if it is to be worthy of the name, should not only concern itself with existing knowledge but should endeavour by investigation and research to add to the sum-total of the world's knowledge, and it is here that Sir Venkata Raman's presence and his words will be a source of great inspiration to us. I am aware that our University, still very young, is not equipped on the scientific side for advanced teaching and research as yet, but I am sure that before long adequate facilities will be provided for advanced work both in physics and in chemistry (Cheers).

SIR C. V. RAMAN'S ADDRESS

Sir C. V. Raman said:—

"It was just two years ago that I had the pleasure of visiting Chidambaram and this Institution and addressing the staff and students of the then Sri Minakshi College. I ventured to express the hope that the Institution would at no distant date develop into a centre of culture and learning in Southern India. What was then a mere expression of hope has now developed into a practical proposition, mainly through the generous idealism of your Pro-Chancellor and the sympathetic interest of the Government of this Province.

You will not be surprised when I say that a considerable part of to-day was not spent by me in the Physical Laboratory but in the College of Music listening and speaking to the students, staff and Principal of that Institute. Music is necessarily a vital part of our national culture and the fact that your Pro-Chancellor has thought it fit to found such an Institution shows that he clearly realises what lies at the foundation of the development of our culture. These two years have also witnessed many changes and developments in the educational atmosphere of this country.

Those who read the current scientific literature in different subjects and particularly in physics and in chemistry know that India has been taking a continual and rapidly increasing share in the advance of scientific knowledge. At least two or perhaps I should say three of the most fundamental developments in physics during the last decade made in any part of the world have been contributed by Indian physicists and to an increasing extent the work done in India has not only been recognised abroad but has also been a moving power and has influenced the course of scientific work and thought throughout the world. That is surely a very remarkable phenomenon even more remarkable than the development of the national spirit in other perhaps less prominent directions. This phenomenon has impressed scientific visitors to India and has been given expression to in no uncertain language by such an eminent man of science as Professor Arnold Sommerfeld who, as you know, recently visited several of the Universities in this country. As part of this remarkable development and I think in close connection with it has also been this flowering outlook of new University centres.

I believe that this development of new Universities is not only a sign of the times, but is also a most powerful and potent method for the development of real intellectual life in our country. It is only by the development of such Universities that we can hope to see the fullest opportunities given to the younger generation to prove its real merit and to strengthen the feeling already voiced in no uncertain language that India has a real contribution to make in all departments of knowledge.

SOUTH INDIANS' CONTRIBUTION TO WORLD SCIENCE

"To some of you perhaps it may be news to know that Chidambaram has already made significant contributions to physics. I miss amongst you to-day—

tinguished French Physicist Prof. Cubbon, a good-sized book on the molecular scattering of light. That book gives great prominence to the work of Indian physicists in this special field and indeed it may be said to a large extent it is based on the result of the work done in India and also in France and other countries. Mr. Ramachandra Rao's work is singled out for special praise. Every paper published by him has been quoted, his data exclusively drawn upon and the author goes out of his way to remark that the investigation really represented a beautiful piece of work to quote the language of the author. That surely is significant that the very first contribution made by a member of the staff of this University should find a prominent place in the literature of physics. Though I know Mr. Ramachandra Rao is not to be seen here to-day, I may hope to find that he is, so to say, serving your University in another capacity by working in London and fitting himself for his new task in the changed circumstances of his old college. I was very pleased to notice in the columns of "Nature" a contribution by him describing the results of his work. And I could see from it that he had risen to the full height of the opportunities provided for him in the laboratory of the King's College, London and he was familiarising himself and taking part in the development of one of the most important branches of modern physics. I am sure when he comes back he will prove himself to be not merely an active and helpful teacher of physics, but also one who can communicate to others real enthusiasm for higher study and research. (Cheers.)

MR. VAIDYANATHAN'S RESEARCH WORK IN MAGNETISM

"If I have the pleasure of mentioning the contribution to physics of one who is already a member of the staff of this college, it gives me also great pleasure to refer to one, who, I believe, if it is not already a known fact to you, is to become a member of the physics staff of this university. I think, in two days time, Mr. V. I. Vaidyanathan, M. A. who is shortly to join you as Reader in Physics, has been one of the most active and indefatigable workers in my laboratory during the past four years. Mr. Vaidyanathan can rightly be claimed as a pioneer not only in India but perhaps throughout the world in a particular aspect of physical research, namely, the exact study of the magnetic properties

of organic vapours generally. He showed during the time he worked there extraordinary experimental skill and perseverance in overcoming the difficulties of that research and he has published numerous papers in the Philosophical Magazine, in the Physical Review and in the Indian Journal of Physics on the subject of the magnetic behaviour of gases, vapours, liquids and solids, and "Nature" in its research columns took special notice of his contribution and pointed out their importance. Just about a month ago he was led to a result which I believe is of fundamental significance in the theory of magnetism, namely, that the magnetic behaviour of certain solid, perhaps of many solids, depends on the state of sub-division of the solid to the particle state. That is a most unexpected and interesting result and I believe, it will influence the development of our ideas in the science of magnetism. So impressed am I with the importance of this contribution that in order to prevent the continuity of that research being broken I intend to make a loan for such period as is necessary for the research, with which Mr. Vaidyanathan is working for the present in his laboratory (cries of hear, hear.) I am sure your Vice-Chancellor will sooner or later find the funds for equipping and carrying on this work. But that is not the point. The point is that I desire that that work should continue without any break whatsoever and it is for that reason that I deny to myself the pleasure of seeing that work continued in my laboratory and desire to see the Chidambaram University taking part in the exploitation of that fundamental work. (Cheers.)

IN THE FIELD OF X-RAYS

"It is very interesting also to note that besides familiarising himself with magnetic investigations in a thoroughly practical manner, Mr. Vaidyanathan also found time to take part in another branch of modern physics, namely, the study of X-Ray scattering and diffraction. X-Rays form a most important and significant part of modern physical research. He has published already two memoirs on X-Ray diffraction in liquids and a third paper written by him has been lying on my table for the past three months unattended to, so great is the flood of new papers for me to examine that I cannot deal with them as promptly as I can desire. I hope that the memoir will also soon be published. It is my earnest hope that when he comes here he will find it possible to introduce the practical study, both on magnetism and on X-Ray work as an integral part of the ordinary work of advanced science students—even the B.A. students in this laboratory." "I have mentioned only those workers from my laboratory who are connected or about to be connected with this university but the feeling of optimism which I mentioned to you in the ability of Indians generally and of South Indians in parti-

"The work they are doing is such as need no advertisement, but I desire to refer to them and to their careers in order that their example may prove a source of encouragement to the many that I find here and more especially to such of you as are specially gifted and may reasonably find opportunities and possibilities of achieving greatness. But I do not wish before I proceed further that you should for a single moment entertain the idea that the only workers in my laboratory are South Indians. There are many from Bengal and from Northern India and Western India who have contributed to the work done in my laboratory during the past 10 years. South Indians I have chosen for the special reason which is intelligible to you that I see in front of me a predominance of South Indians."

OTHER SOUTH INDIAN SCIENTISTS

"Dr. K. R. Ramanathan being one of the first to come to my laboratory has achieved for himself a solid reputation. He is now engaged in a work somewhat different in character from what he carried on in Calcutta and Rangoon, but still he has shown by his work at Poona that we can, within a reasonable distance of time hope that he will secure recognition as one of the world's authorities on Meteorology of the upper air. Already his work in this field has attracted the attention of leading authorities and I feel sure that the fact that he occupies a highly salaried post in the Government will not in any way diminish his zeal for the promotion of knowledge. (Cheers.)"

"Mr. K. S. Krishnan, who till recently was associated with me occupies a very interesting position, namely, as a Reader in the Dacca University. I mention him not only for the reason that he has been one of the most active and distinguished of the younger generation in physics, but I mention it also for the reason that his career in many respects is an inspiration to the younger generation. Mr. Krishnan first came to my laboratory 5 years ago. During this period he showed such great ability and he did such good work that I thought I should take the opportunity of securing for him some excellent appointment in Government service or elsewhere. But he would not listen to it at all. Later I felt that he had been in my Laboratory quite long enough for this reason that it was rapidly becoming a question of some importance whether he or I was the better physicist (laughter), and for this reason I felt it was high time that he moved to another place where people would be quicker to realise that Mr. Krishnan was a physicist in himself and not for the reason of his association with me. It is a very remarkable phenomenon, I think almost without a precedent in the history of university appointments, that though Mr. Krishnan was only a Master of Science of perhaps six or seven months standing, he was selected for the post by a strong selection committee in preference to other candidates in a fairly large field which included I think no fewer than five Doctors of Science, both of British and Indian universities. That surely was a significant tribute to his work and I do wish and hope that other universities in Indian will, in selecting men for their appointments, ask not what degrees has this or that man got, but what work has he done (hear, hear). I realise when saying this, I do not for a single moment wish to run down the value of a degree. I think the day

is coming and has come when we have in India a sufficient body of academic opinion who can judge of work and accomplishment quite apart from the defunctious age of alphabetical academic honour.

THE CALL OF SCIENCE

"Having taken up, I would like also, if I might complete my reference to the galaxy of South Indian scientists, to say one or two words more. I do not for one single moment wish the younger generation in front of me to imagine that they are as good as anybody else. I do not wish to produce any notion of swollen-headedness. But none the less, I would like to emphasise the fact that in intellectual endeavour, age is much less important than other qualities as ability, enthusiasm and grit and it is these qualities that characterise a successful man of science; so much so, that it is a thoroughly understood fact that in the scientific world most significant and valuable contributions might come from quite and unknown men. And to-day in science, there is always a welcome to really brilliant contributions coming from one—it does not matter how young or unknown he might be. I will not quote instances of this from the examples of western men of science. That will not, I know, impress you. I will quote examples from India, and amongst South Indians, I want to mention this to indicate to you that you must not imagine that because you are still in the Junior or Senior B.A. that you are precluded from thinking for yourselves and that you need only read your textbooks, conduct the practical tests in such a manner as to secure high marks and please your teachers and come out with a degree. Those of you who feel the impulse to study further than your curricula permit should not hesitate to obey

TWO YOUNG ASPIRANTS TO FAME

In the Physical Review for May of this year, there is a paper by an American physicist which occupies a place of honour. At the end of that paper, there is a foot-note and I happened to know that that foot-note was inserted at the last moment when the journal was going to the press. The foot-note says that the results contained in that paper had been independently predicted by so and so of South India in a Mathematical paper. I happened to know that young man and he is 18 years of age and is still in the degree classes in some college in this Presidency.

I will mention another young man who is in my laboratory to-day and who is 19 years of age. He has already published some papers two of which appeared in the Indian Journal of Physics and one will appear shortly in the proceedings of the Royal Society of London. These facts are interesting not only at any rate, so to say, and exhort yourselves to feel that you are here not merely as passive absorbers of knowledge but as possibly also potential radiators of the knowledge. The physicist will understand the relation between absorption and radiation of knowledge. Good radiators are good absorbers and vice versa. You cannot be a mere absorber of knowledge unless you are also a potential radiator of knowledge.

A NEW FIELD OF RESEARCH

"I told your Vice-Chancellor this morning that an inaugural address to a science institute should probably in my opinion contain some scientific matter and he cordially agreed. For that reason, I should just like to trespass on your kindness and indicate to you in very general terms a new field of research in physics which owes to a large extent its development to Indian work. As the audience includes a great many who are not physicists, I only wish to give it in the broadest possible outlines and indicate to you the main significance of the result.

"You all know that the sky is blue. (Laughter.) You can see that at any time when the sky is not cloudy. Now this blue colour of the sky, as physicists have shown arises in this way; that when sunlight traverses the upper levels of the earth's atmosphere, the molecules of air, that is to say, the molecules of oxygen, nitrogen and other gases in the atmosphere, they scatter light. Just for example, you observe light coming from that lamp falls on this handkerchief and the handkerchief becomes visible by reason of the light scattered by it. In the same way, molecules, though they are exceedingly small, none the less, each molecule scatters a very small quantity of light. We have an enormous number of molecules and therefore, the scattered light becomes perceptible, and it is this scattered light which becomes visible as the light of the blue sky. In the same way, we have another great natural phenomenon known to everyone who has crossed the ocean in a steamer. The sea shows an intensely blue colour; and some years ago, I showed that the explanation of this intense blue colour is very similar to the blue colour of the sky which I have just mentioned. The sunlight is scattered by the molecules of water and comes back to us after this process of scattering. In the same way, transparent solids as for example the clear ice which you find in glaciers, and in icebergs here also the molecules of ice scatter light and I believe this scattering of light is reasonable for the blue colour of very clear ice. This phenomenon has been extensively studied at Calcutta and elsewhere but the impression prevailed that in this process of scattering, there was no real change in the nature of the light. Now, here I wish to make it clear why the sky is blue, if the molecules scatter sunlight. The reason is this:—Sunlight is not of one colour but of many colours, violet, indigo, blue, green, yellow, orange, red and so forth. Now this whole galaxy of colours or spectrum as it is called when the sunlight, composed of all these colours, passes the atmosphere, the molecules scatter the violet, indigo and the blue much more than the other colours. And that is the reason why the light scattered appears to be blue. In reality however sunlight and scattered light are really of the same nature, that is to say, if you examine them through a little spectroscope (a prism of glass) you will see exactly the

same spectra both in the sunlight and the scattered light. In the spring of 1928, a mode of scattering of visible light was discovered by a physicist working with a quite ordinary source of light and quite an ordinary spectroscope and with very familiar chemicals known for at least 50 years ago."

Here the lecturer exhibited a few lantern slides to illustrate the scattering of light and the new lines formed when light is passed through various media, such as benzene, carbon tetrachloride, water, quartz and also the changes consequent on heating the media. He also put on the screen one of the photographs taken by Prof. Wood to show the two-fold nature of light. The lecturer then concluded:—

SERVATORY

A Protest Meeting

A public meeting of the residents of Sitabuldi will be held at the Rajaram Library to-day at 5 p. m. to consider the recent police raids on some shops in Sitabuldi and the arrest of alleged Satta gamblers. Dr. K. L. Sonak will preside. The public are invited to attend the meeting.

Rain Coat Found

Mr R. D. Tiwari staying opposite Tale Bhawan, Dhantoli writes:—"A rain-proof coat was found on the main road by the side of the Patwardhan ground by the son of a peon. The cloak is at present with me. The owner can take it back after satisfying me that the cloak is his and paying, if possible, some reward to the boy who found it".

Improvement Trust

At a meeting of the Rate-payers, Association, Nagpur, held in Itwari on Thursday night Mr Soni, a merchant presiding, speeches were delivered by Messrs Mote, Kate, Phate, Dr. Paranjoe, J. P. Verma, Pannalal and others in support of the resolution to be moved in the Municipal Committee to-morrow by Mr P. M. Naidu and other members urging postponement of the introduction of the Nagpur Improvement Trust Bill and urging public enquiry into the Isolation Hospital case. The meeting was largely attended.

S. R. W. Fulay

Rao Saheb R. W. Fulay, M.L.C., who attended the International Labour Conference at Geneva as Indian Workers' Delegate returned to Nagpur on Friday morning. He was received at the Railway Station by Mr Samiullah Khan President, the Nagpur Municipal Committee and several municipal members and office-bearers of local Trade Unions.

Sapru to Appear?

It is reported that in the case of Daljit Singh Agarwal, who was recently sentenced to transportation for life by the Sessions Judge Saugor and who was released on bail on two securities of Rs. 5000 each, on the application of his Counsel, Mr C. B. Parakh, Tej Bahadur Sapru is likely to be engaged for the accused.

Run Over By Tanga

A guardian writes:—"Yadeo Pravan Kalar, a seven year old student of the Daji Primary School, Nagpur, received serious injuries on one of his legs when a tanga ran over him on the 4th street, while he along with other students was moving about during the interval. This is not the first accident of the kind. But still the authorities do not seem to have taken any notice of the dangerous situation caused on account of the location of the Itwari motor-stand here or is it that the number of accidents has not swollen too high to attract the Municipal authorities to their attention to them? Applications and interviews in this connection seem to have been futile. The proposal for the removal of the motor-stand in the heart of the city has been approved by the D. S. P. and the Municipality and a site also, as is said, has been fixed a few months ago. But the reason why the proposal has not been carried into action is not known. Will the authorities concerned look into the matter and thereby relieve the anxiety of the guardians of the pils of the school.

Admirer's Tribute

A correspondent writes:—"Mr O. N. Wankhede, M. Sc. went to England last year, took the 'T. D.' degree in first class from the Bristol University. He is the first 'T. D.' from his community. He has distinguished himself in the Bristol University as one of the best Indian students. He was welcomed by various educational institutions and got several testimonials 'as a best scholar', from them. He has been appointed as Lecturer of Science in Jubbulpore Spence Training College and will arrive in India at the end of this month."

Isolation Hospital Construction Charge of "Looting Public Funds" Repeated

ENQUIRY SUB-COMMITTEE PROPOSED Member Throws Lime Piece on Floor

NAGPUR, July 18 The Municipal Committee, Nagpur, devoted the whole of the morning in discussing the Report of the Sub-Committee appointed to enquire into the Isolation Hospital case, Mr M. S. Khan presiding.

It will be recalled that following certain complaints of defective construction of the Isolation Hospital (near the Kamptee Road), the President appointed a Sub-Committee consisting of Messrs Durgiah, J. Barry, Pannalal, Bajrang Thekedar and Surju Prasad to enquire into the affair. The Sub-Committee by a majority expressed the view that the matter should be referred to experts, while Mr Pannalal made some serious allegations of "open looting of public funds". The President thereupon referred the matter to the Superintending Engineer, Nagpur, who suggested certain modifications amounting to Rs. 300 from the payment to be made to the contractor. The question was next considered by the Standing Sub-Committee who effected the reductions recommended, while the Municipal Auditor had before passing the final bill for payment had suggested a reduction of Rs. 2,300. The Standing Sub-Committee thus approved of a reduction of Rs. 2,700 or thereabouts in the bill of the Contractor amounting to Rs. 23,000.

In placing the Report of the Sub-Committee before the house, the President briefly traced the history of the case.

Mr Pannalal reiterated his charges and affirmed that the Municipal Funds were being looted. He also gave a demonstration of two lumps of stone and lime, the one being of reinforced concrete and other of *Bairi*. The former piece when thrown on the floor by Mr Pannalal remained in tact while the *Bairi* piece was broken into pieces. Mr Pannalal maintained that the latter type had been used in the foundation while the former should have been used.

Mr Shirpurker, Assit. Engineer, Public Works Department of the Nagpur Municipal Committee, was subjected to a series of questions affecting the details of rates and estimates of the work.

Mr Durgiah said that the piece of cement concrete work was picked up by Mr Pannalal from

Dr. Khare

Dr. N. B. Khare, M. L. A., Nagpur has, it is understood, agreed to become a foundation member of the Civil Liberties Union.

Arrested on Suspicion

Two persons, Gopal alias Abdul Rahman, and Luxmi Shanker alias Vijayashanker were arrested by the Police on Friday Night while hiding in lanes in a suspicious manner in circle Nos. 3 and 18 respectively.

Alleged Satta Dens Raided

Two alleged Satta dens were raided by the Police on Friday night last. The shop of Jagannath Marwari and the pan-shop of Luxman Kunbi, both of Circle No. 2 were raided and 9 persons in all were arrested and bailed out. Marked coins, betting slips, it is alleged, were also recovered.

a piece of land opposite his house, where construction work was proceeding. Mr Durgiah's remark caused much amusement in the house.

Mr Pannalal also complained about the rate paid for tiles but Mr Surju Prasad, himself a contractor, said that the rate paid was approximately the same paid elsewhere. As regards the complaint that Bagra tiles had been used although the estimates were for Mangalore tiles, Mr Surju Prasad said that there was nothing wrong in it. In other estimates, they sometimes used the word "Allahabad Tiles" which were really manufactured at Kamptee. The word Mangalore tiles only meant Mangalore Pattern Tiles. Mr Pannalal said that the word "pattern" was absent from the estimates.

Mr Pannalal ultimately proposed that the whole question should be referred to a Sub-Committee consisting of the Deputy Commissioner, Nagpur, two municipal members and two members from the public, since he felt that the Committee was not prepared to do justice and was keen on shielding the culprit in this case.

He also invited the members to pay a visit to the Hospital at his expense.

Mr Atmaram Pandurang moved an amendment that the decision of the Standing Sub-Committee be upheld.

Mr Pandurang Sao strongly opposed Mr Pannalal's resolution on the ground that the Committee itself should go into the question. It was surprising that a Congressman like Mr Pannalal should seek the help of the Deputy Commissioner in the matter.

Mr P. M. Naidu said that nothing could be more derogatory to Congressmen than the fact that one of them should move a resolution seeking the Deputy Commissioner's intervention.

Mr Durgiah said that no useful purpose would be served by sending the case to the Deputy Commissioner as the Deputy Commissioner was likely to add nothing to the report of the Superintending Engineer.

Mr Yadavrao Deshmukh said that the matter was agitating the mind of the citizens for over a year and public meetings were held more than once at which the charges had been made. It was the duty of the Committee to reply the same publicly and although the majority might attempt to white-wash the affair by upholding the Standing Sub-Committee's decision, it would fail to carry conviction to the tax-payers.

Mr Atmaram said that the appointment of another Committee would tantamount to a lack of confidence in the Standing Sub-Committee. Mr Deshmukh denied that that was the case.

Mr Waghmare at this stage moved for a closure and the motion was carried.

Mr Pannalal in the course of his reply said that he had deliberately included the Deputy Commissioner in the enquiry as under the C. P. Municipali-

Pains All Over His Body

Prevented from Working by Neuritis and Rheumatism

Kruschen Made Him Feel a New Man

Rheumatism is an insidious complaint that strikes without warning. It attacks an arm, or a leg, and frequently the pains spread to all parts of the body, unless something is done to check them. That was the experience of this man, who had rheumatism so badly that at times he was prevented from working.

"About 10 months ago," he writes, "I suffered terribly with rheumatism and neuritis. The pains were all over my body and some days I could not even get up from bed to go to work. A friend visited me and suggested that I should try Kruschen Salts. I did so, the result being that the pains seemed to gradually disappear. I have been going to work ever since without a break, thanks to Kruschen Salts, and I feel a new man. I would gladly recommend them to anyone."—A. R.

Rheumatic conditions are the result of an excess of uric acid in the body. Two of the ingredients of Kruschen Salts have the power of dissolving uric acid crystals. Other ingredients assist Nature to expel these dissolved crystals through the natural channels. And as they go, there's no doubt about those aches and pains going too!

Kruschen Salts is obtainable at all Chemists, Stores and Bazars.

ties Act, the Deputy Commissioner had every right to interfere in the affairs of the Committee. There was nothing wrong in co-operating with the Deputy Commissioner in one's capacity as a municipal member. On the other hand, it was derogatory for Congressmen to send letters of congratulation to H. E. the Governor as was done by Mr P. M. Naidu. He challenged the Committee to prosecute him in case, after enquiry, if it was found that even one of his allegations was not correct.

Mr P. M. Naidu rising to speak on a point of information said that he had not congratulated H. E. the Governor in his capacity as a Congressman but in his individual capacity.

Mr Atmaram's amendment was thereupon put to vote and declared carried. On a poll being demanded 27 members voted for and 10 against it. The meeting was then adjourned.

The following 27 voted in support of the amendment:—

- Messrs T. N. Wazalwar, Ramnath Tiwari, Madhavrao Thakre, D. B. Barse, Ibrahim Khan, B. K. Pagey, Natiq, G. M. Khan, R. T. Vairagade, Eustachius, Atmaram Pandurang, Pandurang Sao, Bajrang Thekedar, P. G. Gandhi, L. S. Sorde, K. C. Durgiah, Abbas Ali, P. M. Naidu, T. R. Joshi, D. K. Kamdin, Miss A. J. Cama, K. S. Siddique Ali Khan, S. S. Dandige, Narayan Gokul, Surju Prasad, P. M. Venkatswamy. (One illegible).

The following ten opposed the amendment:—

- Messrs Bhapker, Deogade, Ganesh Bhola, Lanjiwar, Bholasingh, Y. S. Deshmukh, Gopal Pahalwan, Pannalal Dr. Miss Karani and Mrs Vidya-vati Bai.

Earlier in the day, the President expressed delight at the return of Rao Saheb Fulay, Vice-President, from Geneva and said that he deserved to be congratulated for the work done by him at the Conference on behalf of Indian workers,

Editorial Notice

All letters sent to the Hitavada for publication must contain the name and address of the writer, not necessarily for publication, but as a guarantee of good faith. Anonymous communications will be destroyed at once. Correspondents are requested to write on one side of the paper only. The Editor cannot undertake to return rejected communications unless a stamped and addressed envelope is enclosed for the purpose. He cannot enter into any discussion regarding rejected communications. The copyright in all contributions published in the Hitavada is reserved to the Proprietors of the paper and reproductions without acknowledgment are strictly forbidden.

All Business communications should be addressed and remittances made payable to the Manager. Subscribers must always quote their wrapper number in their communications as this will facilitate immediate attention being paid to them.

The Hitavada

They are slaves who dare not be
In the right with two or three
—J. R. Lowell.

NAGPUR, JULY 19, 1936

PROVIDENTIAL ESCAPE

THE REPORT THAT AN attempt was made on the life of His Majesty the King Emperor when he was going in a procession and that the attempt was foiled by the timely intervention of the police will be received with joy throughout the country. We can think of nothing more dastardly than this attempt on the life of a person who has endeared himself to the peoples of the Empire by his wide and humane sympathies. The assailant, we are told, is a journalist, a Mr McMahon, and the members of the journalistic profession throughout the world will hang their heads in shame for one of their fraternity being responsible for this cowardly and atrocious act. The assailant, according to his confession, made this attempt as a protest against the Home Secretary, an excuse which is so fantastic as to suggest that the man was demented when he threw his revolver at the King. The Empire will be grateful to Providence for having saved the King from assassination. His Majesty deserves well of all the peoples of the Empire, for his heart is with the poor, the down-trodden and the hapless. We wish to offer our congratulations to him on his providential escape. It is hoped that the Home Office would take greater precautions to protect the person of the King. The fact that the revolver was first seen by a woman and then only the attention of the police was drawn to it shows that the protective arrangements were not perfect.

INDIAN INSTITUTE OF SCIENCE

THE INDIAN INSTITUTE OF Science in Bangalore is shortly to celebrate its Silver Jubilee and there will be rejoicing all over the country that the Institute has completed a quarter of a century of its existence. The rejoicing is likely to be marred by the fact that drastic changes in the policy and direction of the Institute have

been recommended. The Quinquennial Committee under the presidency of Sir James Irvine which was set up to report on the working of the Institute has submitted its report, we understand, to Government, but great secrecy has been observed with regard to the recommendations and the contents of the report. However, Press forecasts of the reports suggest that the Committee has recommended that the object of the Institute should once for all be defined as being mainly to concentrate on scientific research applied to the immediate industrial needs of the country. This is meant to be a corrective to the alleged over-emphasis on physics and mathematics and abstract research which is said to be the policy of the present Director of the Institute, Sir C. V. Raman. The other recommendation deals with the drastic curtailment of the administrative powers of the Director and the appointment of a Government official under the control of Government with co-ordinate powers with regard to matters of general administration. It will be seen, assuming these press reports are true, that the recommendations of the Irvine Committee have been designed specially to meet the situation created by the directorship of Sir C. V. Raman. It is an open secret that the relations of Sir C. V. Raman with his colleagues in Bangalore are none too happy and that when the Irvine Committee surveyed the working of the Institute, it did so in an atmosphere of suspicion, accusation, prejudice and recrimination. Even the most impartial Committee will not pass unaffected by such an unfortunate atmosphere and it will not be too much to say that the Irvine report bears traces of the atmosphere in which the Committee reviewed the working of the Institute. It is this which makes it incumbent on the Viceroy to give the most careful consideration to the matter before taking action on it. He has to use his discretion and sift the recommendations of the Committee and see whether the interests of the Institute and justice are met by the recommendations of the report. Coming to the two principal recommendations of the Committee, we have to observe that the one relating to the need for research in the Institute being connected with the industrial needs of the country, is an unnecessary restriction sought to be imposed on the policy of the Institute. Such a hard and fast rule regarding research should not be laid down. Even the founders of the Institute did not have the distinction in mind which the Irvine Committee has recommended. The object of the Institute has been defined in the regulations as "the promotion of advanced instruction and original investigation in all branches of knowledge and their utilisation for the benefit of India". It will be seen that the founders of the Institute did not scoff at research which at first might seem academic. The point is that often what is called "abstract" research leads one to results which are of great benefit to industry. For example, when the electron was discovered, few dreamt of its practical value. The electro-magnetic theory of light would have been termed, we are sure, at the time of its enunciation, if the Irvine Committee had been asked its opinion on the subject, "abstract research." But those conversant with science know how this theory laid the foundations of modern wireless. We have said enough to show that there is no necessity to jeer

at research which is termed abstract. Everyone is aware that research must have practical value and nobody would object to the Irvine Committee recommending an emphasis on research which might have an immediate practical application, but to relegate "abstract" research to a side line will be as the *Hindu* rightly remarks "an unfortunate development." It is easy to see that behind the recommendation is the mass of accusations against the policy of the Institute. It has been said that the present Director has been neglecting departments other than his own, Physics. We have had personal evidence of students working in the Institute and we have it on their assurance that the charge is not correct. It seems that while there is only one assistant in the Physics Department, there is a larger staff in the Electrical Department, a department supposed to be neglected by the Director. The grant to the Electrical Department has also been increased, we are informed. The Director wanted to appoint a permanent professor for the Organic Chemistry Department, a demand made by the students themselves, and chose an eminent professor from the Continent to occupy the position. But the fractious attitude of some members of the Council resulted in the quashing of the appointment. The Central Workshop meant to manufacture scientific instruments and the course of Chemical Engineering and Technology were started by the present director. It is difficult in the circumstances to accept the view at its face value that the Director has neglected other departments. It is also admitted that since the present Director took charge, the volume of research done in the Institute and the number of original papers submitted have been considerable which prove that his direction has been efficient. We must now pass on to the second recommendation suggesting the appointment of a Registrar with administrative powers co-ordinate to those of the Director and directly under the control of Government. This recommendation seems to have been made with a view to redress the situation created by the alleged high-handedness of the present Director. We strongly object to a Government official being foisted on the Institute. In all likelihood, the official will be an I. C. S. man and the country will be treated to the spectacle, if an I. C. S. man is appointed, of the heaven born service dabbling in all things under the sun from Governorship to scientific research. Government must keep their hands off the Institute's administration and I. C. S. aggression has to be stopped. Whoever is the Director, A or B, he must have effective powers of Direction, otherwise he will be a Director only in name. If a Registrar is appointed having the present administrative powers of the Director, there is no need for a special office like the Director. We object on principle to the Director's powers being curtailed and a co-equal authority being appointed. The latter will lead to constant friction and bickering in the Institute and harmony will be in jeopardy. Further we are opposed to the intensification of Governmental control over the Institute. If this recommendation is meant for the special benefit of Sir C. V. Raman, we are sure, he would himself like to stand out of the way and allow Government to make happier arrangements. The need for efficient direction in the Institute is great. Some departments according to reports from students,

have become what the blunt would call "a drones hive" and research on haphazard lines are being conducted. We have before us the Report of the Past and Present Students Representative Committee submitted to the Quinquennial Committee. The student's report contains details about the slipshod manner in which work is being done in certain departments. A para in the report containing the view of the "minority" describes certain branches of work done in the General Chemistry department which seem to be rather removed from Chemistry. All these point to the need for vigilant direction and this is also another argument against the curtailment of the powers of the Director. Nobody would object to effective powers of appeal against the decisions of the Director for the aggrieved party and other legitimate safeguards against the misuse of the Director's powers being included in the constitution, but to curtail the powers of the Director to nullity is to reduce the office to a farce. Such being the case, we would suggest to the Viceroy to personally visit the Institute and see things for himself. The Institute is a national property and its destinies should not be trifled with by biased recommendations. The present Director has also a great responsibility. His greatness should make him take the initiative in being considerate to his colleagues and to respect their susceptibilities and we also would appeal to his colleagues not to carry on a personal vendetta against him. Sir C. V. Raman is the first Indian Director of the Institute and reckless allegations and sensation-mongering will harm not merely an individual but the prestige of our countrymen. Nothing should be done which would lower India's reputation, and we hope that ere long harmony and smooth-working will be restored in Bangalore.

"PHILOSOPHIC ATTITUDE"

Mr Sastri's Speech

CHIDAMBARAM, July 14
The Rt. hon. V. S. Srinivasa Sastriar, Vice-Chancellor, Annamalai University, presiding, the staff and students of the Philosophy Department of the University were "At home" to Mr R. Ramanujachariar, on the occasion of his appointment as Professor of Philosophy of the University.

The Vice-Chancellor delivered an interesting address on the 'Philosophic Attitude' and expressed the hope that the Annamalai University would develop a strong school of Indian Philosophy. He observed that the function of Philosophic studies was not the acquisition of much technical philosophic information but the creation of a philosophic attitude, an attitude which never takes anything for granted, which is impelled by an insatiable curiosity to ask the why of everything and which sifts evidence. The philosopher is under a special obligation to practice what he professes. In a sense the philosophic attitude is as much intellectual as it is moral.—A. P. I.

BIRTH OF TRIPLETS

FEROZEPUR, July 9
A woman in the city is reported to have given birth to triplets. The babies are all in a healthy state.—A. P. I.