INSTITUTE OF CURRENT WORLD AFFAIRS

CHGO-27
Science in India I:
V.I.P. For a Week

27 Lugard Road,
The Peak,
Hong Kong.

May 21, 1964.

Mr. R.H. Nolte,
Institute of Current World Affairs,
366 Madison Avenue,
New York 17, N.Y..

Dear Mr. Nolte,

On the flight from Kathmandu to Benares I re-read a little book by the noted Indian historian, politician and diplomat, K.M. Panniker, called Common Sense about India. On the third page I came across the following paragraph which will serve as an introduction for my letters on Indian science:

"The most important development in India in the post-independence period is the determination which she has shown in catching up with the scientific advances of the West, and in utilizing the new scientific knowledge to the solution of her own problems. She has realized from the beginning that no permanent progress can be achieved by a country on the basis of borrowed or second-hand science, that unless a country is capable of independent research in basic scientific problems, and further, possesses a considerable body of scientific personnel capable of utilizing the latest knowledge for productive purposes, she will always lag behind others in the race for progress. This approach to modern science is what places India in a category by herself among the newly independent states of Asia."

I spent a month in India and believe that when this paragraph was written in 1960 it painted a grossly optimistic picture of the state of Indian science and its applications for development. Now, in May 1964, a major change is taking place. For the first time, Indians are seriously tackling the problem of how to use science for the benefit of the country. Before, science was encouraged, but it was not applied effectively. Previous five year plans have largely neglected science. This reappraisal mainly stems from the Sino-Indian conflict and the Chinese successes. This had the effect of making Indians in all walks of life take a long close look at what they were doing. In fact the Chinese invasion has had similar repercussions in India as the launching of the first Sputnik had in America.

In subsequent letters on Indian science I shall explore the validity of Panniker's statement as of 1964. But first I want to give some impression of how the Indians reacted to my study and tell you about the trip I made to research laboratories in South India.

Shortly after arriving in Delhi I telephoned one of the senior men at the Council of Scientific and Industrial Research (CSIR)

whom I had met previously at a conference in Hong Kong. We arranged to meet and I told him about my project. The facilities of CSIR were immediately put at my disposal. I was offered a staff car; a list was prepared of Indians best qualified to help me in my study and interviews arranged. I was invited to give a lecture at CSIR; to lead a discussion group on science planning, also at CSIR; to lead another on science and the fourth Five Year Plan, with the scientific staff at the Planning Commission; and to give a talk (about Chinese science) to the Parliamentary Science Committee. I accepted the first three and declined the fourth, although I did attend one of the Committee's meetings.

CSIR then offered to arrange a trip for me to visit research laboratories in South India. "Tell us how long you can spend," they said, "And we'll arrange your itinerary." I decided on eight days, but was a little concerned about feeling compromised if I accepted all their generosity. I therefore accepted the hospitality but suggested that ICWA pay for the air fares. This was agreed upon and on April 30 I left Delhi for Hyderabad. The following eight days were some of the most crowded of my life. My diary for the first two days reads as follows:

April 30: 4.00 a.m. Got up and packed.

5.00 a.m. Left the Austin's (of ICWA) for the airport.

6.15 a.m. Indian Airlines Viscount left for Hyderabad. Excellent flight. Read garbled report of my talk to CSIR of the previous day in Delhi newspaper, Hindustan Times.

9.30 a.m. Met in Hyderabad by representative from Regional Research Laboratories who presented me with a schedule for the forthcoming two days. "We would like you to give us a lecture tomorrow afternoon -- perhaps you could tell me the title now so we can distribute the notices." I told him I would speak on science in South East Asia. We drove to the Research Laboratory with the Director, Dr. Sidhu, who had travelled down on the same plane.

10.15 a.m. Arrived at the Institute, was taken to guest room which adjoined the Director's office. It was tastefully decorated, and mercifully airconditioned (the temperature outside was about 105°F.) Was given 25 minutes to wash and rest.

10.40 a.m. Taken into Director's room. Dr. Sidhu is a pleasant and affable Sikh who has been Director for two years. His predecessor, Dr. Zaheer, who is now Director General of CSIR, had designed all the furniture in the Director's office, guest room, and V.I.P. lounge.
Dr. Sidhu called in all his assistant directors, about eight in all. For the next two hours I asked questions about the Institute. How and where are policies formulated? Who initiates research projects? Who decides when to stop a project? How does the Institute function? What are relations with industry, universities, etc.? These were fully and sympathetically answered. Each question was shunted to the man most qualified to answer. There appeared to be good relations among the senior staff.

I also learnt something of the background of the Institute. Before Indian independence in 1947, Hyderabad was a Princely State ruled by the Nizam of Hyderabad -- reputedly one of the world's richest men. The Nizam had his own currency, his own postage stamps, and even his own scientific research laboratory. After Indian independence Hyderabad decided against joining the Indian Union. The Nizam resisted all pressures to join until finally in 1948 the Indian Army invaded the Princely State of Hyderabad. The war was over in two days and Hyderabad became part of India. At first a military governor was appointed and he listened sympathetically to the requests for assistance from the Central Research Laboratories' Director. As a result the laboratory grew and prospered. But later, when the Civilian Government took over, it was less interested in science and for several years the laboratory floundered. Finally in 1955, the Director, Dr. Zaheer, saw Mr. Nehru, told him of the situation and requested that the Central Government take control. The State Government agreed and in 1956 the Central Research Laboratory became known as the Regional Research Laboratory -- one of 30 national institutes scattered throughout India and controlled by the CSIR in Delhi.

Its function is to do research related to the industrial uses of local raw materials. During our two hour discussion I learned a great deal about this work and the laboratory's achievements and problems. A feature of several of the Indian laboratories is the pilot plant operation which is an integral part of the Institute. It was explained to me that Indian industry does hardly any research of its own and takes a great deal of persuading to use a new technique or introduce a new product. The economic feasibility must be well and truly proven before an industrialist will invest. Thus when a new method or product is discovered in the research laboratory it is tried out in a pilot plant to ascertain complete figures on operation and costs.

At one point in our discussions I asked about the progress which had been made in introducing Hindi as a scientific language. Someone produced a popular science journal which was written in Hindi. I thumbed through it and asked what the articles were about. Everyone crowded round and with considerable difficulty managed to translate the titles for me. But none of them was able to read this elementary scientific journal with any degree of fluency.

12.40 p.m. Began tour of pilot plants. First visited one working on low temperature carbonization of coal, then on to the cotton seed product plant.

1.15 p.m. Lunch in V.I.P. lounge with the Director and about a dozen of the senior scientists. Excellent Indian food. One of the scientists remarked, "Dr. Zaheer was insistant that the laboratory always serve Indian food, and once said, 'We don't want any of that Anglo-Indian mush here!'"

2.00 p.m. Continued survey of the Institute. Head of each division showed me around his laboratory. Saw the paint, cotton seed, and castor oil sections. When we came to the organic chemistry section

Dr. Sidhu was called and he came and personally explained the work of this group. This had been his section before he became Director, and he still continues to do some research, despite the fact that his laboratory has a staff of about 400.

4.00 p.m. Had to stop tour because car arrived to take me to Osmania University where I was to meet geophysicists from the Institute of Geophysics. Professor J. Tuzo Wilson (my Geophysics Professor at the University of Toronto) had come here two years before to advise on the setting up of this Institute, but the Chinese emergency had delayed the construction of new buildings. The group was still housed in temporary quarters at the University. The three most senior geophysicists were away, but I was able to talk with the four remaining scientists. A start had been made on heat flow measurements, with some measurements already obtained in a mine. It is hoped to get permission to use some of the oil company wells in India for further measurements. The paleomagnetic group have completed the instrumentation on an Astatic magnetometer and were beginning to study Indian rock samples of different ages. This work will throw light on possible drifting of the Indian sub-continent through geological time. Another group were carrying out gravity and magnetic studies over different geological features of special interest, and one man had just returned from the field where his party had discovered one of the world's largest magnetic anomalies. A young geophysicist was working on electromagnetic wave propagation problems, and he is to form the nucleus of a theoretical geophysical group.

It is intended to gradually expand the size and activities of this Government laboratory, so that it will become a major center for research in the physics of the earth. (Applied geophysics for mineral exploration is carried out in other Government laboratories.)

6.00 p.m. Had to stop talking geophysics since schedule called for one hour of sightseeing around Hyderabad.

7.00 p.m. Temperature still above 100°F., returned to room. Given 45 minutes to shower and change.

7.45 p.m. Dr. Sidhu drove me to his home for a dinner party given in my honour. There were about ten guests. It was a hot evening and we ate excellent North Indian food buffet style on the lawn.

May 1: 6.30 a.m. Car called to take me to the home of Dr. Verma, geophysicist at present in charge of the Geophysical Institute. Ate breakfast with him and his wife. Dr. Verma had obtained his Ph.D. in geophysics at Harvard with Dr. Francis Birch. We found that we had many mutual geophysicist friends.

8.00 a.m. Left Hyderabad to visit a magnificent old fort built on a hill at Golcanda, about six miles away. Temperature over 100°F. still, but we climbed about 500 feet to the top of the fort. It was from near here that the famous Kohinoor diamond is reputed to have been found. Of special interest was the elaborate water irrigation system which had been constructed to provide water for the fort. Also, near the top was a delightfully cool "air conditioned"

room. The architect had designed a funnel shaped conduit which channelled the wind through the funnel into the room, providing a blast of cool air. From the very top of the fort we got an excellent view over the desolate dry plain below. Just outside the imposing granite walls of the fort were row after row of Indian Army tents. Some of the soldiers were drilling, others were having rifle practice and for all the world it felt as though we were besieged in the fort and under attack.
By now the shade temperature was 108°F.

11.00 a.m. Arrived back in Hyderabad. Next item on the agenda was a visit to the Museum. But by this time I was feeling somewhat dazed and begged to be excused so that I might collect my thoughts for the lecture I was due to give in the afternoon. It was with some reluctance that my hosts agreed to interrupt the carefully prepared schedule and I was driven back to my room.

12.00 noon. Out to lunch with geophysicists and one of the scientists from the Research Laboratory. Another good meal, in fact it was so good that it was not until 3.25 p.m. that I got back to the Institute. The information officer was waiting for us at the entrance somewhat concerned, as my lecture was due to begin at 3.30. I rushed up to my room, changed my shirt, and went to the Director's office. Together we went into the main lecture hall where about 150 scientists were seated. Much to my relief the auditorium was airconditioned. My talk was the same as I had given earlier in the week in Delhi. I discussed the reasons why developing countries need to develop their own science, and then summarized the growth of science in South East Asia, stressing those factors which had stimulated and those which had hindered the growth of science in each country which I have visited.

But for me, the most interesting part was the discussion period, which went on for almost an hour. One of the questions asked was: "Do you think superstition and religion are hindering the growth of science in India?" Answer: "I have only been in your country two weeks and am not in a position to judge. But what do you think?" Then began a long debate on the subject. It was clearly a question which is very much on scientists minds in India and both sides spoke passionately but without much factual base. At the conclusion I was still unable to judge whether superstition had deletory effects on Indian science. (However, on this and later occasions I did learn some interesting stories. For example, I was told about one of the most senior scientists in India who consulted an astrologer to determine the most auspicious day for him to take up his appointment as head of a major research organization. The acting head of one research institute I visited explained to me in great detail why it was logical that the Himalayas should be gods. At yet another laboratory I visited, 75% of the scientists did not turn up for work one day because a certain configuration of the planets made it highly inauspicious. And the director of technical education of one of the State Governments explained that there is an auspicious time and an inauspicious time for every day. On this particular day the inauspicious time was from 3.00 - 4.30 p.m.. Perhaps it was no accident that my interview had been arranged for 3.30 p.m.!).

Another question was: "When Gerard Piel, Editor of Scientific American, was in India recently, he gave a talk to the Parliamentary Science Committee in which he said that India should concentrate on fundamental research and leave the applied research and technological development to the more advanced nations. Do you think this is the right approach for India?" I replied that I did not think that this was the right approach. Fundamental research there should be, but it should not, at this stage of India's development, take precedence over applied research to find industrial uses for local raw materials, to improve local agriculture, and to solve local health problems. Experience over the past 15 years has shown that for successful development a country cannot just import technology from abroad. Even if it could, India does not have the foreign exchange to be able to afford to import all the technology she needs.

5.15 p.m. Lecture and discussion over. Continued tour of laboratory paying special attention to the library. This was well-stocked. The journals received in each days mail are displayed on one table, shifted to a second table for the second day, and then put in the racks. Scientists are given every encouragement to keep up to date with the literature.

5.45 p.m. Met Director and went with him to his club to meet a Ford Foundation specialist and talk about his work on small industries development.

6.45 p.m. Returned to Director's home. Left for dinner party given by Dr. Verma and his wife. By now the heat and pace were beginning to have their effect, but it was an agreeable, dazed effect. I have a pleasant recollection of dining on a balcony under the stars in the delightful company of geophysicists and their wives who wore sarees of most wonderful colors.

And so it went on. From Hyderabad I flew to Bangalore where I was the guest of the National Aeronautic Institute. In Mysore I visited the Central Food Technological Research Institute, and in Madras the Central Leather Research Institute. In each place the program was similar and my hosts extremely helpful. I was grateful for the time they devoted to me, and learned a great deal from this experience.

The fact that I was given this tour is, I believe, one illustration of the interest and concern that exists in India today in how best to apply science for economic and social development. The Indians were keen to learn about the experience of other countries in Asia, and glad to demonstrate what they themselves are doing. I left India enthused with many of the things I saw and much more optimistic about the future development of the country than I had ever been before.

Yours sincerely,

C.H.G. Oldham.

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