

Comments on Indian Institutes

by S. N. Sen, William A. Blanpied, Olexa-Myron Bilaniuk,
Ravi Dutta Sharma, K. V. Rao, Everett M. Hafner

Writing of "An Institute in North Bengal," in our June issue, Everett M. Hafner described the effort as a "failure." He gave several reasons: inadequate planning, language barrier, visiting-staff ignorance of earlier reports and recommendations, flaws in Indian higher education, frustration and insecurity among the Indian participants. He also made several recommendations for more useful future activities: sympathy, patience, careful selection of sites, staff and participants, recognition of India's cultural heritage. Writers of the several letters that follow are sometimes in agreement, sometimes in violent disagreement with Hafner's view. Hafner replies to his critics in a letter which confirms his opinion.

"A biased, one-sided view"

In his recent article "An Institute in North Bengal" (PHYSICS TODAY, June, page 44) Everett M. Hafner has recorded his views regarding the Summer Institute for College Teachers (Physics) held at our university in June-July 1966 under the auspices of the University Grants Commission and the United States Agency for International Development. At the very outset, he has characterized the outcome of the institute as a failure, on which point I totally disagree. I maintain that the institute achieved the same degree of success as other similar institutes held simultaneously in other universities in India.

Before the 1966 institute, one summer institute for college teachers in physics was held in 1964, and two summer institutes, one for college teachers and another for school teachers, were held in 1965 in this university; the reports submitted by the previous American consultants and also the report submitted by the American consultants for school teachers' institutes in 1966 will bear adequate testimony in support of my opinion.

The reports submitted by the consultants had various common grounds on which they all agreed but on which Hafner has held different views, and these different views have led him to label the 1966 college institute as a failure. Leaving aside the controversy that depends upon the opinion of the individual, it will be my effort to point out some of the statements made by Hafner which are not based on facts.

(a) The institute was held not in any hostel but in the main university building where classrooms, laboratories and the library are housed.

(b) Considering the fact that the university was started only four years ago and the tremendous difficulties we had to face at the very outset due to Chinese aggression in India in 1962, the development of the university has been remarkable as observed by visitors from time to time. The science laboratories are very well equipped, and the central library has a stock of 30 000 volumes besides the seminar libraries in each department. Hafner has particularly taken care to take a picture of the library shelves that are partially filled to show the inadequacy

of the number of books in the library. Before choosing this university as the center for a summer institute in 1964 the University Grants Commission authorities and the American coördinators of AID visited the laboratories and libraries, saw the hostel and guest-house facilities and were very much satisfied with existing arrangements.

(c) There are five primary schools (three with English medium), five higher secondary schools and a first grade college in the town of Siliguri.

(d) That the participants did not get proper medical care is a complete travesty of facts. Whenever any case was reported, the university medical officer attended the case. As there is provision in the budget approved by the University Grants Commission, the participants were provided with funds to purchase medicine in addition to those supplied by the university. No serious ailment was reported during the tenure of the institute and all minor cases of ailment were adequately treated by our medical officer.

(e) The previous American consultants and coördinators spoke highly about our university guest house, particularly with regard to food and other

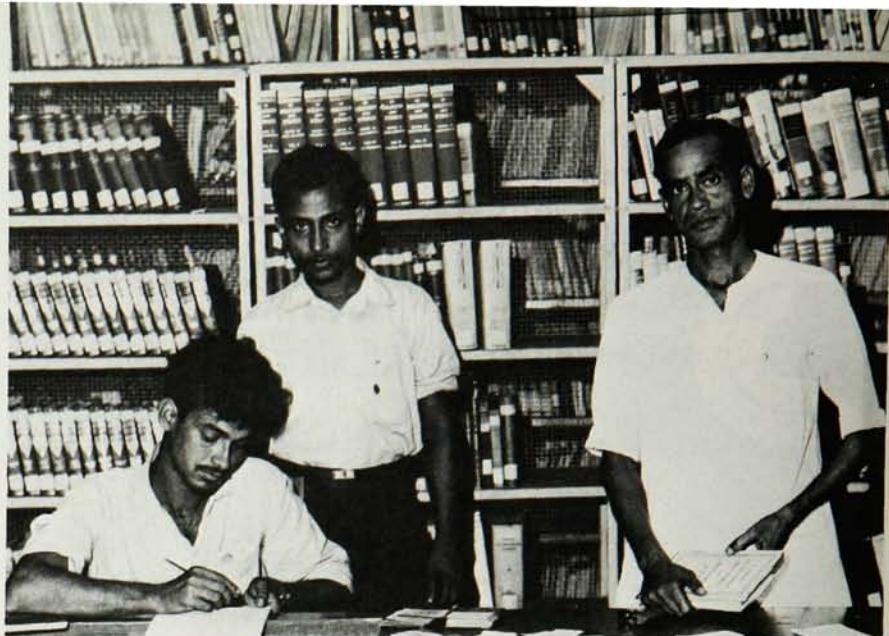
arrangements. As there were four American consultants in 1966 and two air-conditioned rooms, it was decided to house the consultants in other rooms where the arrangements are as perfect as can be. Further, though eight consultants with their families stayed in the university guest house during previous years and the summer-institute coordinators stopped for small halts, none of them expressed any dissatisfaction with the guest-house arrangement. Daniel Detwiler and Richard Hanau, the coordinators in this program, were very much satisfied with all the arrangements made in connection with the summer institute during their first visit to the university before the start of the institute.

Regarding the implementation of the recommendation of the second summer institute held in 1965 in this university, the following steps were taken before the 1966 summer institute was organized:

(1) The number of books in the physics library was increased by about 1000 volumes and some of the missing back issues of important journals in physics were replenished. It has been our experience that so much physics literature is supplied to the participants during the tenure of the institute that they hardly find any time to go to the library at all. Nevertheless the central library was kept open from 10 a.m. to 7 p.m. and the seminar library from 9 a.m. to 8 p.m.

(2) In 1964, there were some difficulties in projecting the PSSC films because the new RCA projector that we purchased went out of order occasionally. William Riley, the American consultant, was able to procure another projector from the US Information Service, Calcutta. In 1966 we purchased a very good projector before the institute started and the arrangements for film showing were excellent.

(3) All the PSSC experiments were arranged as in the previous year, and ten advanced experiments in electronics and nuclear physics were set up, especially to induce the participants to design the experiments themselves. It was found, however, that the majority of the participants could not complete all the PSSC and advanced experiments. The inadequacy of laboratory



LIBRARY SHELVES

experiments as stated by Hafner is therefore a misstatement of fact.

(4) It is admitted that no adequate workshop was attached to the physics department during the 1964 and 1965 institutes, but a workshop was set up in April 1966. To start with we had a lathe, a drilling machine, a shaping machine, a rotating drill, a welding set and a carpentry shop, and since then orders have been placed for other machines. Participants in the 1966 institute had a regular course of workshop practice, which was in their daily schedule throughout the whole tenure of the institute. Hafner did not suffer from any difficulty with regard to workshop facilities, or, even if he did, he did not take care to bring it to my notice.

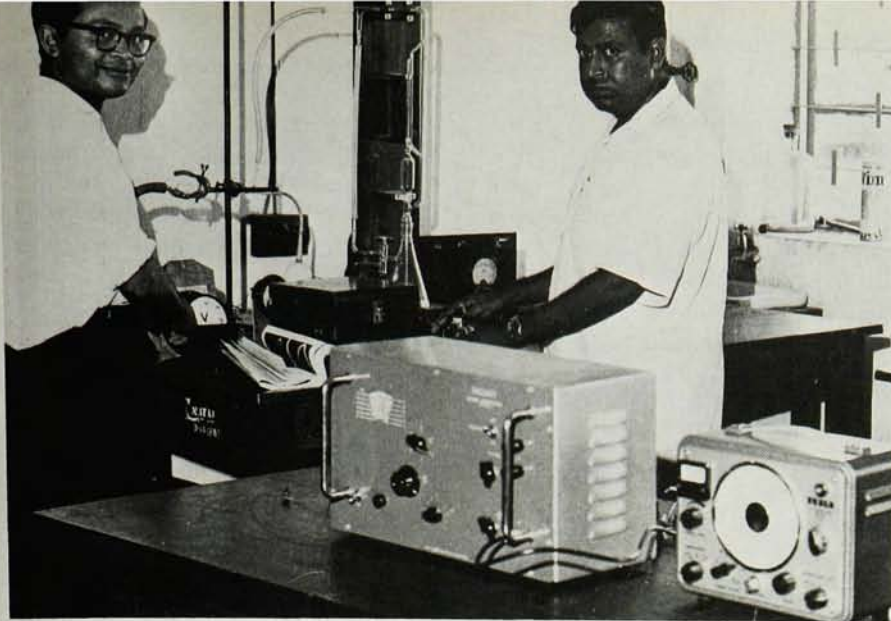
Regarding the planning of the institute, though a broad outline of the daily schedule was made, it was not a rigid one, and I changed the program in consultation with Wayne Hazen and Hafner after their arrival according to their suggestion; I did not want to keep the evenings free because I knew from experience that this time would not be utilized by the participants for study, and this situation actually came to be the case as reported by Hafner in his article. I was therefore in favor of a tight schedule keeping Saturdays and Sundays free.

Regarding the use of the *Feynman Lectures*, it is to be noted that in the 1964 institute we did not follow them, but at the evaluation conference at the end of 1964, the directors and Ameri-

can consultants of other institutes told me that they followed Feynman in their lecture classes. Based on this recommendation, it was decided to follow the *Feynman Lectures*. The program was approved by Hazen and Hafner in our first meeting. In their lectures also both Hazen and Hafner were guided mainly by the presentation provided by Feynman.

The point raised by Hafner regarding the language barrier has been discussed in great detail in the evaluation conferences held at New Delhi in 1964, 1965 and 1966 at the end of the summer institute sessions. It was a point that was common to all the institutes. It was our experience that during the first week there was some difficulty on the side of both participants and consultants to follow each other, but gradually this difficulty resolved itself with the progress of the institute. Indian students going to United States universities for higher degrees also experience the same difficulty initially. Regarding the difficulty in following the dialogue in the films, it was also suggested at the evaluation meetings that the script should be reproduced as a running text at the bottom of the frame so that the entire subject matter might be clear to the audience.

Regarding the examination controversy I agree with Hafner that the participants showed a sense of utter lack of self-reliance and did put up a deliberate spirit of noncooperation with us. In spite of all persuasion



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they refused to sit for any tests at all. Even when a threat was put out to them that their certificate of attendance in the institute would be held up, they remained adamant in their attitude. On a thorough enquiry into the matter I could find that a large section of the teacher participants was willing to take the test, but they were prevented by a few so called "leaders." The point raised by Hafner that the participants were not informed before joining the institute about the holding of tests holds no brief for them. It is not an excuse at all, because the school teachers did undertake the tests even though they were not informed of it beforehand. It is, I understand, a sense of false vanity and lack of self-confidence that prompted the participants to take such an attitude towards the weekly tests. In the discussion classes, however, the participants were very coöperative; they tried to solve the problems that were assigned to them and took active part in the discussions.

At this point it is worthwhile to record that the effort made by D. K. Ghosh of the Saha Institute of Nuclear Physics, Calcutta, to persuade the participants to take the tests has been misunderstood by Hafner. In a meeting attended by the participants and the staff, in which Detwiler, the coördinator of the program, was also present, Ghosh tried his best to explain to the participants the usefulness of the tests, that this item forms a vital part of the whole program, but as in our

case the participants did not respond to his appeal.

It is a fact that the recreational and other facilities are not so good in Siliguri, especially on the campus, as in other big cities. The participants were provided with indoor games facilities. In 1964 and 1965, weekend excursion trips were arranged, and one musical and social function was held every week to provide recreation to the participants. As per direction of the University Grants Commission, these expenses were reduced to a minimum during this session and for this state of affairs, certainly the university authorities can not be held responsible.

Regarding the selection of participants to the institute, no definite guidelines were supplied nor did the reports of the previous institutes place any emphasis on this point. When the participants are selected from a large number of colleges situated over the states of West Bengal and Orissa, judged from the entries in their application forms only, it is impossible to know beforehand a candidate's drive, initiative and alertness of mind. This requires a formal interview and an adequate knowledge of the candidate's background; under the circumstances, it is pointless to lay the entire blame on the director of the institute.

I agree with Hafner about some of the suggestions made by him for the improvement of the summer institute program. This subject has been discussed in every evaluation meeting

from various angles. From the experience gained in conducting these institutes, it is hoped that a better and more useful system will ultimately emerge, and the University Grants Commission and AID are, I have understood, working along these lines; but the attitude that Hafner has taken in writing this particular article appears as if he was associated with the institute not as a consultant but as an observer. The article is a biased, one-sided view of the program amplifying the shortcomings and minimizing the laudable points.

The success or failure of the whole program has to be shared by all the members of the staff, Indians as well as Americans. There was no lack of coöperation from our side, but on the other hand we did observe a lack of sympathy and understanding on the part of both the American consultants. A true picture of the summer-institute program (three college institutes and two school institutes held in this university over the period 1964-66) can be obtained by going through all the reports submitted by the directors and American consultants, and one should not form any opinion by reading this report of Hafner which is a prejudiced, parochial and one-sided view of the program.

To make an effective improvement in the Indian educational system especially with regard to science teaching, the first attempt should be in the direction of modifying the existing syllabus. The change should be made starting from the higher secondary stage and extending up to university level. The syllabus should include the latest developments in respective disciplines and in this process the PSSC course should serve as the guideline. A committee consisting of representatives of the Secondary Education Board, the college teachers, the university teachers, the University Grants Commission and AID can be formed, and their comprehensive syllabus should be followed throughout all the schools and colleges of the country. Whatever may be the contrary opinion, the method of teaching is and will always remain syllabus oriented. Having framed the syllabus, our method of teaching can be vastly improved with the help of audiovisual equip-

ment and greater participation of teachers and those taught in the art of teaching. With the introduction of regional languages as the medium of instruction up to the highest level, the writing of suitable textbooks will form an important factor in the general plan of future educational development. The followup program, about which so much has been discussed in the evaluation conferences, should be given a practical shape. The new method of teaching science that has been introduced in the United States definitely should be adopted by us simultaneously with a change of our educational system with regard to syllabus, time of study and mode of examination along the above lines.

S.N. SEN

Professor and Head, Department of Physics, University of North Bengal

"Ours was quite successful"

Having just returned from a two-month trip to India, where I served as American consultant to a summer institute for college physics teachers at Saugar University, I was very much interested in Everett M. Hafner's article (PHYSICS TODAY, June, page 44) regarding his experiences at a similar institute during 1966. I was unhappy to learn that he regarded his institute as a failure; for I feel that ours was quite successful. Therefore I would like to point out a few of the reasons why we seem to have had such different experiences although many of our observations regarding the Indian academic system and the plight of the teachers coincide at least in a qualitative way.

Saugar University is located in Madyha Pradesh in Central India, about 400 miles south of New Delhi. The state is rather backward in education and the region was long neglected by the British as can be judged by the fact that although Saugar is the oldest university in the state, it was founded in 1946. I was the only American advisor to the college institute. An institute for high-school teachers ran concurrently and was advised by Gerald Borer, a first-rate Jesuit teacher from Rockhurst High School in Kansas City. My wife and two-year-old son accompanied me to India. The region was hot (the temperature rose to at least

105°F daily), very dry, and faced an acute shortage of water and grain. Like Hafner, however, we lived in comparative luxury at the university guest house, though we neither had nor desired air conditioning since none of our Indian colleagues had it. With the exception of a semiretired English geologist, a pair of agricultural Peace Corps workers, and two Dutch priests we four were the only westerners in the district. Hence the Indians (townspeople and participants as well as university faculty) immediately invited us to "join the family." We accepted the invitation, and were amply rewarded.

Like Hafner I found the preorientation given us by the Agency for International Development completely inadequate and misdirected. When I spoke with several prospective consultants at a meeting in Washington prior to our departure for India I was certain that a good many had no idea what they were getting into. Nor was any serious effort made by the Washington staff to give them a clear picture although there had been three years' experience with institutes in India. Indeed, I judge from Hafner's article that much of his difficulty derived from the failure of AID to brief him properly. Fortunately my wife and I have been interested in India for many years and tried to prepare ourselves by reading, talking with Indians in the US and with Americans who know the country, and also with consultants like Hafner who had been at earlier institutes.

Unlike Hafner I found the participants eager to try to improve their teaching and to try modifying the Indian academic system, and very willing to work at the institute. Their spirit was excellent, and they mixed freely both with us and with the university staff, several often dropping into the guest house to chat on their way back to the hostels. The major reason for the differences between my experience and Hafner's was doubtless due to the difference in organization by the Indians. Professor Bhawalkar, who headed our institute, had run institutes for three previous summers, and both he and the staff profited from their experiences. Rather than try to complete two volumes of Feyn-

man in six weeks we gave lectures on selected topics in physics loosely related to various sections from Halliday and Resnick or the first two volumes of the Berkeley course and also several on current topics in physics. We tried to stress the idea that physics cannot be learned by copying notes from a blackboard, but requires participation. To this end problems on the lecture material were assigned daily and served as the basis for group discussion the following day. These were invariably lively, fruitful sessions. We also encouraged individual efforts by giving each participant adequate time to use the library and to write a short paper on any subject of interest to him based upon his library work. Our laboratory, though not so well equipped in electronics, was well equipped with standard and advanced PSSC kits, and several experiments designed and built at Saugar. Many of the participants had had little experience with laboratory work, but most enjoyed the opportunity to gain same. Saugar also has a well equipped workshop, and each participant spent five afternoons receiving training there which they seemed to enjoy. My experience with testing was quite different from Hafner's. We set aside one and a half hours each Saturday morning for that purpose, presenting the tests in part as an opportunity for staff evaluation, in part as an opportunity for them to learn about different types of tests. Although I do not believe anyone really enjoyed taking the examinations, they were intrigued by the idea that there could be many types of tests and cooperated completely. Again their response was doubtless due in large measure to Bhawalkar's organizing ability; for he had told them there would be testing when he accepted them as participants.

I agree with Hafner's view that the typical syllabus used by Indian universities is hopeless and seriously impedes proper education in physics. As a result many teachers are poorly prepared. Certainly they are paid wretched salaries and often have little to say about educational policy. But I am guardedly optimistic. Bhawalkar's explicit plan is to blanket the state with young teachers who are dissatisfied with the current state of affairs,

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and know better ways to proceed. He hopes thereby to create pressure for change, and this is gradually appearing. Several participants from the larger colleges with institute alumni reported a resultant change in teaching methods, and a consequent improvement in student enthusiasm over the past two years. Nor is there much doubt that the participants sensed the inadequacy of the syllabus. After five weeks of the institute a group of six presented their model syllabus to the others for criticism. It was somewhat too idealistic in its intent but showed that they had grasped and appreciated the things we had tried to teach them. Finally I should report that Bhawalkar has obtained permission from the university authorities to start a dozen students on an experimental three-year syllabus in physics that compares favorably to the approach we use in the better US colleges and universities. He hopes that this will gradually replace the old syllabus both at Saugar and at other universities throughout the state.

In conclusion I would say that my six weeks' experience at Saugar was among the most satisfying of my career. Indeed, from my point of view the worst part of the institute was the leave taking. I believe the institute program is very worthwhile and should be strengthened. But it appears the success or failure of a particular institute depends very much upon the individual attitudes and degree of preparation of the Americans and Indians involved in it. However it seems clear that AID can and should exert a greater influence toward helping both parties in that preparation. I hope that Hafner's criticisms will lead to a situation in which the majority of future American consultants can report experiences more similar to my own than to his.

WILLIAM A. BLANPIED
Case Western Reserve University

On the whole, fruitful

With due deference to the perspicacity and ken of my good friend Everett M. Hafner, I wish to make a critical comment on his report "An Institute in North Bengal" (PHYSICS TODAY, June, page 44).

His soul-searching account vividly

depicts the crisis that may ensue at an institute if one insists on subjecting the Indian participants, all of whom are college faculty themselves, to the American process of classroom examination. Such exams are not just unpleasant to them; they are thoroughly resented by the participants, as the North Bengal and several other experiences indicate.

I feel that administration of classroom exams in Indian institutes is impolitic, except in the rare cases where such examinations are endorsed by the participants themselves. Insistence on written exams is unnecessary since there are other ways for gauging a student's progress. Take-home problems, term papers and oral presentations on predetermined topics are some of the other valid testing methods. I found that these methods, in marked contrast to the abhorred classroom examinations, were quite acceptable to the participants of the physics institute at Delhi University, where it was my privilege to have lectured last summer under the able directorship of F. C. Auluck. A cordial and constructive atmosphere prevailed throughout, with cheerful coöperation of all parties concerned in all phases of the institute. During the last week of the institute, 20-minute lectures on a series of novel topics were delivered by all participants. All lectures were thoroughly prepared and many showed imagination and originality of approach (such as analysis of the conical pendulum in terms of Coriolis forces, exemplification of laser properties in context of Hindu mythology). To boot, the participants were most eager to deliver their talks. This approach permitted an unobtrusive but very effective evaluation of the participants, in the process of which the teachers were elevated to the rank of lecturer rather than degraded to the status of a student. The institute culminated in a warm ceremony during which prizes were awarded to five outstanding participants in whose selection their own colleagues had had a voice.

Lest Hafner's report leaves an impression to the contrary, I wish to stress that on the whole the institute program in India is most fruitful. Favorable questionnaire response of the participants and reports on the 1965

and 1966 institutes (presented at the St Louis and New Delhi briefing conferences) make the overall success of the program abundantly clear. Sweltering weather and poisonous snakes are facts of Indian life and there is no point quarreling with them. Similarly, it is not likely that much can be done soon about the prohibitively heavy teaching loads imposed on Indian college faculty. What is so gratifying about the Indian institutes is that so much can be done despite these hardships. In view of these difficulties, the Indian University Grants Commission and the US Agency for International Development must be congratulated on their excellent organization of the program. All possible encouragement and support should be accorded to the Indian institutes since the very nature of the program is a long-range one, and many years of its continued operation are needed before its broader impact can be felt.

In conclusion I wish to quote, from Hafner's report, the following thoughts to which I wholeheartedly subscribe: "... an American professor must come to India with two principal qualifications in addition to his professional competence: sympathy and patience. . . . Cultural progress is largely a question of establishing sympathetic and harmonic tonalities upon which common creative impulses can be realized."

OLEXA-MYRON BILANIUK
Swarthmore College

A possibility of success

I read with great interest the article by Professor Hafner in the June issue of PHYSICS TODAY. As a person educated both in India and the United States, I wish to comment on the situation of science and math teaching in India. My first contact with this summer program began when I was an MSc student and instructor at Bombay University in 1962. I attended with great interest and enjoyed the program on science films. The only other educational opportunity for me through films has been this year at Yale through *Messenger Lecture Films* of Richard P. Feynman. In 1962 at Bombay I had the rare opportunity to hear visiting American scientists whose general knowledge in the sci-

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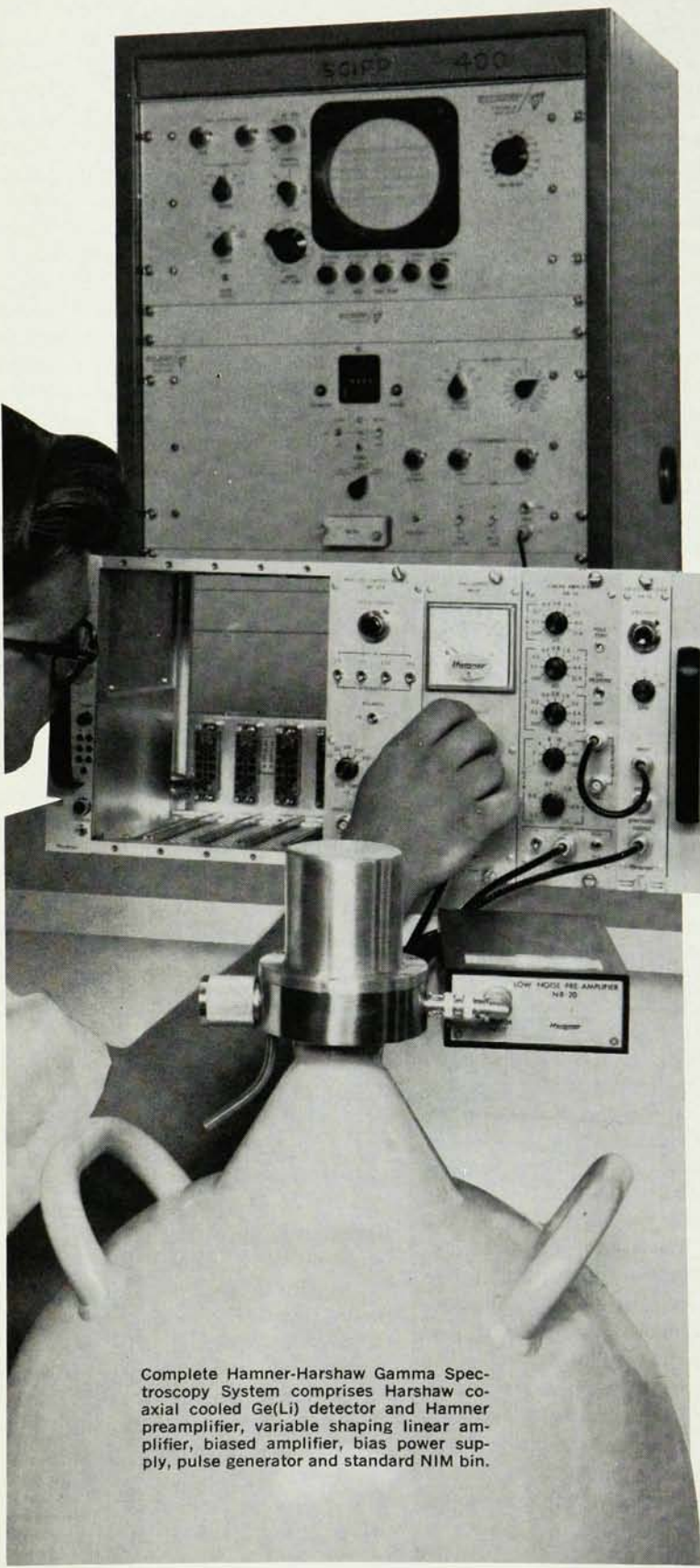
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ences left a definite positive impact upon the teachers. An AID teachers' team left an image of hard working Americans who helped in starting a scheme with great potential for the future, in spite of the difficult working conditions in India. Often they had to carry distilled water for drinking but there was never a complaint. These institutes were so popular that they grew from four to 16 and now to over 50 in successive years. Though I have not followed the accomplishments of these institutes closely except the one at Jaipur (Rajasthan University) they have helped in establishing a closer contact among high-school and college teachers than had ever existed. Every experience indicates that these institutes are beginning to create an atmosphere where a possibility of success exists.

The approach of teachers for these summer institutes should be primarily to create an atmosphere of interest in science rather than to force examinations and *Feynman Lectures* upon the participants. As for the *Feynman Lectures*, since most of the graduate students at a well known university in the United States could not answer questions from them in their 1965 PhD qualifying exams, how could one expect teachers with BSc's from remote areas in India to learn so much in such a short period of time? Many modern schools in the US have abolished exams and this has yielded very promising results. In addition, under the present education administration in India, it would adversely affect the future of the participants.

All observations lead to two important points for discussion: first the comprehension of science in a foreign language and second the methods of education in India. These are interrelated in a way. I personally know the tragic fact that most teachers do not keep up with material outside the syllabus and find an easy excuse by covering the syllabus material through old or outdated notes. The administration of universities and colleges avoids responsibility by administering abstract examinations to the students, only about every two years, that are mostly devoid of estimating past achievements or other knowledge of the students. The rigid definitions of

the topics in a syllabus do not allow the freedom of courses for the teachers. Critical questions are often suppressed. As a result there is a huge gap among various disciplines of science in problem solving and in laboratory training.

The language problem not only affects areas of education but poses more serious challenges to India. But the underlying problem is whether or not students can *think* in English. There exists no sufficient scientific vocabulary in other regional languages. Hence, a standard memorization and presentation of theories has resulted. The language problem exists everywhere in the sense that the most accurate grasp of great scientists' works can be obtained by reading them in the original. I will not go into details of practical and social acceptance of one language in India—one of the most difficult problems concerning the future progress of India; I invite scientists to come up with a feasible solution.

RAVI DUTTA SHARMA
Yale University

New ways for old

I was very interested in the article "An Institute in North Bengal" by Everett M. Hafner, in your June issue on page 44, and wish to make a few comments.

From a role of acceptance to one of objective existence is not easy, in any walk of life, for an individual, not to speak of the country as a whole. This is the real problem of education and the young graduate in India.

In a system of education having an affiliatory system of organization with very little control or communication among the teaching staff in the constituent departments, there has been no useful change in the education mechanism as such, since the country became independent. The governing body of this education system is in the hands of the generation who in their times were educated by a system that fostered nonobjective, law-abiding, job-seeking existence, devoid of all "practical and therefore planning" outlooks. Here lies the cancer in a developing country just free from domination. The young progressive scientists unable to fight this bureaucratic, highly subjective authority, have only been leaving India to main-

tain their nerves as long as possible. Until this problem is attacked at this root cause, by a "hard as a diamond, yet soft as a flower" policy, any empirical approach as the summer school will face the problems mentioned by Hafner. Any contribution in handling this basic difficulty by the foreign scientists will, I am confident, give as much solace in return to their efforts as the Indian music!

K. V. RAO
University of Oxford

Efficacy of controversy

Throughout our collaboration, Sen had my deepest sympathy for the trying conditions under which he was forced to work. Although we differ on many details of the experience, it appears that we agree on some fundamental issues: importance of selection of participants, the effects of language barriers, the need for modification of syllabuses and methods of teaching, and the task of following up a brief summer's experience. I was reluctant to "lay the entire blame on the director" for failure in any of these directions. But the problem of selecting candidates was his alone, and our effort would have enjoyed far greater success if the procedures that are suggested in his letter had in fact been followed.

Blanpied's account of his work in Saugar throws especially strong light on three prerequisites for a successful effort: personal qualifications of American consultants, adequate briefing and careful administration. I am extremely grateful to him, as I am to many other correspondents, for adding depth and perspective to what Sen describes as "a prejudiced, parochial and one-sided view of the program." The correspondence gives me no reason to withdraw from any of my positions; instead, its main effect is to strengthen my conviction that the program is in urgent need of reform. I am left with little doubt that official recognition of some serious shortcomings is long overdue, and my faith in the efficacy of thoughtful controversy suggests to me that the discussion in these pages will stimulate a sequence of new ideas.

EVERETT M. HAFNER
University of Rochester □