

editorial

Aiding physicists in developing countries

To pursue physics research, even theoretical research, in a developing country, is a heartbreaking task. When I returned to Pakistan in 1951 after working at Cambridge and Princeton in particle physics, I could, in a country of 90 million, call on just one physicist who had ever worked with Dirac's equations, for discussion, advice and stimulation. The most recent issues of the *Physical Review* available were dated just before the Second World War of 1939. The dues for The American Physical Society cost nearly one month's salary every year. There were no grants whatsoever for attending symposiums or conferences; the only time I did attend a conference in the United Kingdom I paid a year's savings.

To add to my agony, I felt physics was relevant to my country's needs only indirectly by enhancing me as a teacher.

Today, the situation in Pakistan has vastly improved. For a population of around 70 million there are some 100 research physicists, experimental and theoretical (compare this with the US figure of some three times Pakistan's population with nearly 30 000 members in APS). My Pakistani colleagues still face the same problems regarding journals, publication dues and attendance at conferences. They are still told that all basic science—even the segments necessary for "applicable" physics—is a frightful luxury for a poor country. But compared to Pakistan (and some 20 developing countries like it), the situation in the remaining 60 odd other developing countries that have physics communities is even now as primitive as it was in Pakistan in 1951. First and foremost is the problem of numbers—of the critical sizes. The total number of physicists in many of these countries can be counted on the fingers on two hands.

The creation at Trieste of the International Center for Theoretical Physics in the 1960's resulted when some of us from the developing countries urged agencies of the United Nations, and in particular the International Atomic Energy Agency (IAEA) and the United Nations Educational, Scientific And Cultural Organization (UNESCO), to assist in ameliorating the situation regarding physics research in developing countries. The Center's mandate is two-fold: first to further the work of individual physicists by affording them short respites from their all-absorbing teaching and other duties in their own countries and giving them an opportunity to interact with their peers; second, to hold extended research courses in workshops that contribute to their professional maturity and orientation towards development of their countries. Over its life-span of 14 years, the Center has been privileged to welcome some 3200 research physicists from developing countries and about the same number from developed countries, with around 1000 from Eastern Europe. For those from developing countries there is no

possibility of home-country grants for travel and the *per diem* expenses at the Center. These expenses are, as a rule, borne by the Center from its small budget (now \$1.5 million) half of which comes from the government of Italy and the rest from IAEA, UNESCO and the Swedish International Development Agency (SIDA).

Although in the founding and running of the Center we have depended on the volunteer help of the world's leading physicists, it remains a fact that the physics communities of the developed countries have, by and large, rendered little assistance in an *organized* form to the cause of physics in developing countries, including the Center. I wish to stress the word *organized*, lest I should be failing to pay a heartfelt tribute to the continued work of great individuals who have made real sacrifices in this cause.

There is no question but that the real amelioration of the situation lies within the countries themselves and the role of the Center and any other outside agency can only be to help generate self-reliant communities. But outside help—particularly if it is organized—can make a crucial difference. It could take various forms: for example, the physical societies could help by donating 200–300 copies of their journals to the deserving institutions and individuals and by waiving publication charges (IUPAP has been helping the Center defray postage costs for distribution of old runs of journals donated by generous individuals). The research laboratories and the university departments in developed countries could help by financing visits of their staffs to the institutions in developing countries and reciprocally by creating schemes like the associateship scheme we run at the Center whereby a high-grade physicist working in a developing country becomes part of our staff by being accorded the right to come to us three times in five years, a visit lasting not less than six nor more than 12 weeks each time. The fare and a modest *per diem* is paid, but no salary.

May I be forgiven for thinking in the following terms: That the physics institutions in developed countries may consider contributing in their own ways according to the norms of the well-known United Nations formula whereby most developed countries have pledged to spend 1% of their GNP resources for world development. In the end, it is a moral issue whether the better segments of the physics community should be willing to look after their own deserving but deprived colleagues, helping them not only materially to remain good physicists, but also joining them in their battle to obtain recognition within their own communities as valid professionals who are important to the development of both their country and the world.

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