

Mines can be quite separate from the Geological Survey, but this is not true of the Utilisation Branch as it is at present. It is actually a part of the Geological Survey and no adjustment can be made until a properly planned Bureau of Mines or Minerals Research Branch is operated. The geologist may take a back-seat when a mining engineer drives, but the driver will often require guidance and even instructions from the back-seat geologist. The responsibility always lies with the geologist, while praise usually goes to the engineer.

It is of interest to know that the number of geologists on the staff of the Burma Oil Company in Burma was about three times that of the Burma Geological Department. There were reported to be no less than 6,000 geologists in the employ of the Soviet Government in 1937, indeed the number was given to me as roughly 10,000 geologists. On a comparative estimate the Geological Survey of India should have about 600 geologists but even on the basis of one geological officer to every district in India, the number is roughly 300 as against about 60 at present employed, many of whom are on a temporary understanding. It is difficult to convince the Government of India that even 150 official geologists are actually necessary for a thorough search of India for minerals which are now regarded as of economic importance. If, however, sanction was accorded for this number of suitably qualified geologists, it would be practically impossible to procure them in India.

There is already difficulty in recruiting Indian geologists who have experience enough and the requisite qualifications to undertake responsible work. Indeed we have had to resort to the expedient of em-

ploying post-graduate scholars, fresh from various colleges, etc., as Geological Assistants on a nominal salary and give them field training and experience under special officers. The problem of future recruits is so serious that I recommend it should be taken up with the various centres where geology is taught in India in order that some arrangement is made with the advice of the Geological Survey of India for meeting the demand which already exists. As a further measure of prudence, I would advise the employment of at least 12 experienced European geologists, who are in India as evacuees, on the Geological Survey in order that young Indian geologists may work under their guidance. This is because we are so short handed.

In conclusion it may help to an understanding of the position if I show that since 1846 there have been about 120 geologists on the staff of the Geological Survey of India and that the average field service of these men has been about ten years, while the annual work done by each geologist in mapping is roughly 500 square miles. This means that an area of about 600,000 square miles should have been surveyed in fair detail in India and Burma in the past ninety-seven years, or about one-third the total area involved. Although there are extensive areas of alluvium, there are also areas in which the geology is very complex, so that an average of 500 square miles is not to be misunderstood. It is a question therefore whether it is not better to search the country quickly and thoroughly by employing a larger staff or simply going on in our present rather old fashion way.

CALCUTTA,
March 16, 1943.

SCIENTIFIC DISCOVERY

IF there is one fact which stands out more than any other in the history of science, it is the remarkable extent to which great discoveries and youthful genius stand associated together. Scores of instances can be quoted in support of this proposition. The fact of the matter appears to be that, other things being the same, the principal requisite for success in scientific research is not the maturity of knowledge associated with age and experience, but the freshness of

outlook which is the natural attribute of youth. The conservatism which develops with increasing age is thus revealed as a factor which militates against great achievements in the field of science. The principal function of the older generation of scientific men is to discover talent and genius in the younger generation and to provide ample opportunities for its free expression and expansion.—From a broadcast by SIR C. V. RAMAN. (Courtesy of *Indian Listener*.)