should expect to find that their absorption spectra should, as in the case of the emission spectra, resolve themselves into well-defined bands when the material is cooled down to liquid air temperatures. That this is actually the case is shown by the spectra reproduced in Fig. 3. They were obtained with a piece of fluorspar exhibiting a bright green colour and which also showed a strong luminescence. The two spectra at the top of the picture record the light of a tungsten filament lamp after transmission through the piece of fluorspar when the latter is held at room temperature. The two lower spectra represent the effect of cooling down the specimen to the temperature of liquid air on the transmission. The appearance of specific absorption bands is very clearly seen in the latter two spectra. The mercury arc spectrum has been recorded in the plate to indicate the positions where the bands appear.

The appearance of weak birefringence patterns in natural fluorite is a feature of great interest calling for an explanation. The present investigation has revealed that this is a field of investigation which is not unrelated to the explanations of the luminescence and of the colours exhibited by natural fluorite. Amongst the facts which indicate such a connection is that a marked difference is noticeable between the appearance of the luminescent and non-luminescent areas in a section-plate of fluorite when it is viewed between crossed polaroids. In several cases, also, it has been noticed that the luminescence resolves itself into a set of parallel laminæ in positions adjacent to or coincident with the lamellæ visible in birefringence. The further unravelling of these relationships can, however, well await the results of a more detailed and elaborate investigation of the whole subject.

MULTIPLE-BEAM KLYSTRON

THE GEC has developed a multiple-beam klystron (MBK) by means of which up to 100 times more microwave superpower energy than is now possible can be generated. A factory-built 10-beam MBK has produced a sustained level of 32 kw. CW *r-f* output at X-band using routine test methods. Operating at 32% efficiency, the MBK was completely stable, had a 46 db gain at 12 kv. input and a beam transmission in excess of 99%.

In a typical 10-beam MBK, a low-level *r-f* signal is fed in to the tube's input cavity, which is in effect a periodic waveguide circuit, physically extended in one direction. In the MBK waveguide circuit, the signal interacts with each of the 10 beams and the entire system is "phase-locked". The sum of the power contributions from each of the individual beams is combined in an extended output cavity and directed to one or more waveguide output windows.

A unique feature of MBK's is the very low harmonic power output. The electrical relationship between the tube's multiple beams is such that an inherent harmonic cancellation can be produced.—(*J. Frank. Inst.*, 1962, 273, 537.)

DR. SYED HUSAIN ZAHEER

WE are glad to note the appointment of Dr. Syed Husain Zaheer as Director-General of the Council of Scientific and Industrial Research. He succeeds Professor M. S. Thacker and took charge of his office on 1 September 1962.

Born on 7 November 1901, Dr. Zaheer had his education at Lucknow, Oxford and Heidelberg. Throughout his career Dr. Zaheer has been closely associated with teaching and research. He served the Lucknow University from 1930 to 1948, first as Reader and then as Professor of Organic Chemistry.

In 1948 he was appointed as the Director of the Central Laboratories for Scientific and Industrial Research, Hyderabad. These laboratories were taken over by the Council of Scientific and Industrial Research in 1956 and constituted as the Regional Research Laboratory, Hyderabad. During the fourteen years of his directorship, he built up the Regional Research Laboratory as an important centre for pilot plant and developmental research in the country.

Dr. Zaheer is the author of several research papers in organic chemistry, coal chemistry and technology, oils and fats, surface coatings, heavy chemicals and fertilizers.

He has been keenly interested in many important industrial development projects in the country.