DARK ground illumination has not only doubled the resolution of the microscope, but also has more than doubled the visibility of small objects. The use of quartz lenses corrected for ultra-violet light involves photographing images, but as no direct method of focusing is satisfactory an indirect method has been devised. An object-glass was made suitable for visual observation with approximately the same focal length as the quartz lens and a perfect method of interchanging the two has been worked out. A slow motion fine adjustment that can be moved a definite amount with certainty to compensate for the small predetermined difference in focus, and capable of moving the lens with an accuracy of $\frac{1}{20}\mu$, is the chief factor in the success of the technique. In concluding, Mr. Beck referred to the high cost of the apparatus necessary and asked whether this type of work should not be carried on in endowed institutions, just as is modern astronomical work.

Boilers for Critical Pressure

A NOTABLE paper was read to the Institution of Electrical Engineers on February 15 by F. Ohlmüller on the Benson boiler and its development for use in power stations. Dr. Mark Benson came to Great Britain some years ago and with the help of the English Electric Co. carried out experiments on a 500 h.p. steam turbine built for the purpose of working with steam evaporating at the critical pressure (3,200 lb. per sq. in.). At this pressure the latent heat of water is zero. The water being heated to the critical temperature (706° F.) turns completely and instantaneously into steam. Unlike ordinary boilers there is no separation of steam from water. In the present design of the boiler, dry steam is produced with certainty in steel tubes. At the outset, many difficulties had to be overcome. The manufacturing rights are now the property of the Siemens-Schuckert Co. of Berlin. They have overcome the trouble experienced with the tubes at Rugby. They now manufacture tubular boilers for use both at the critical and at subcritical pressures. Tests showed that the burning out of the tubes was due to the precipitation of salts contained in the feed water on the parts of the tubes where the water changes into steam. This occurs in the zone where evaporation terminates and superheating begins. The remedy is to change the zone of deposit to a region of lower flue-gas temperature.

HITHERTO the pressure in steam boilers has been regarded as a constant dependent on its construction. The Benson boiler operates with high efficiency not only at the highest possible pressure and at lower pressures, but also with varying pressures, and this seems to open a new field of usefulness. In warships, for example, the fuel consumption must be low at cruising speeds but for temporary maximum speeds, amounting to a multiple of the cruising speed, the quantity of fuel consumed is of minor importance. For cruising purposes, therefore, a relatively low pressure of 300 lb. per sq. in. may be used, and by increasing the pressure, ten times the power output can be obtained. With merchant ships a uniform speed is usually required, but for manœuvring in ports and estuaries a variation of the boiler pressure offers the most economical means of varying the ship's speed. The Benson boiler seems very useful for many purposes. For stationary steam plants with widely variable load (peak load stations) and locomotives, it can be operated at pressures varying with the load. A cheap and simple turbine only is required and an approximately constant thermal efficiency at all loads is obtained. In erecting many generating stations, industrial plants and thermal stations, difficulties often arise owing to the uncertainty about the future load. With this new boiler an increase in the output whenever necessary can be obtained simply by raising the pressure of the steam, as the cost of adapting the turbine and piping to the new conditions is small.

Negro-Indian Crosses in Mexico

SPANISH settlers in Mexico and Central America appear to have taken an interest in the results of racial intermixture from early days. Several series of paintings in oils of seventeenth century date are in existence, of which each picture depicts a family of mixed breed, both parents and children, Spanish-Indian, Spanish-Negro and Indian-Negro, the characters being faithfully presented. The number of pictures in each series is usually five or six. One of the best is, or was, in the possession of the Hulse family, the tradition being that it was part of the dower of Dorothy Woodrow, who married the first baronet towards the end of the seventeenth century. The series was supposed to have been captured from the Spanish in a naval engagement; but some at least of the pictures obviously must be of later date. It is interesting to note that the evidence of cross-breeding as shown in physical characters is still to be observed in the descendants of these early admixtures.

A JOINT Mexican and Italian expedition which is now engaged in observation of the natives of the coast of Guerrero, southern Mexico, reports, according to a communication issued through Science Service, Washington, D.C., that not only do the inhabitants of this area show the traces of their descent from the Negro blood of colonial days in a complexion which is appreciably darker than that of the general run of the Indian population, but also the two communities of Indian and Negro blood hold aloof from one another, and show marked differences in temperament and custom. The natives themselves make use of no less than five terms to distinguish the degree to which the hair of the head shows the Negro character. The tight-kinked African hair is called 'cuculuxtle', an Aztec Indian word; hair tightly curled in ringlets, which shows a slight dilution of Negro blood, is 'chino'; the looser waves produced by a greater proportion of Indian blood is 'crespos'; and the 'pele quebrado', 'broken hair', is Indian hair which is only slightly waved.

Institute of Plant Industry, U.S.S.R.

A LIST of publications of the Institute of Plant Industry, U.S.S.R. from 1908 until 1931, compiled