III. PLAN OF WORK.

As mentioned earlier the difference between chinaclay and fireclay is not very clear (4) and the research technology is virtually the same in both the cases. As such, conventional methods of testing e.g. the ultimate chemical analysis or the proximate analysis, though of some considerable significance, are not enough to distinguish the slight difference between the kaolinite mineral in chinaclay and the "fireclay mineral" in fireclay; in fact, any single method is not capable of examining the fireclays thoroughly. It was, therefore, necessary to adopt a number of modern techniques aimed at a systematic investigation, to determine the physico-chemical characteristics of Indian fireclays with respect to the nature of the mineral or minerals present in them. According to the work of Grim (1), Roberts (8) Warrall (9), Brindley (10, 11 & 13) and others, the predominant mineral present in fireclay, though of the kaolinite type, varies to a certain extent than conventional kaolinite. Newer techniques developed during the last decade have also revealed that this kaolinite in many cases behaves somewhat differently from that present in chinaclays.

To determine the exact nature and constitution of this
mineral present in Indian fireclays, it was considered necessary to adopt chemical analysis to determine the percentage of iron and fluxes in fireclays which is usually higher than in chinacclays. The proximate analysis was also determined to find out the percentage of clay substance, feldspar and quartz in fireclays, the last two of which increase at the cost of clay substance.

Particle size of Indian fireclays was measured by Andreasen Pipette (17) and ultracentrifuge to determine whether in general the size of the particles and their range are different from that in chinacclays. Thermal technique was adopted to examine the endothermic peaks between 120°C and 750°C and exothermic peaks between 350°C and 500°C (Crude) and 950°C and 1000°C which are characteristic of fireclays. Base exchange capacity of the Indian fireclays revealed values higher than chinacclays in conformity with those obtained by Roberts (18) and others (9a, 9b, 23).

The two most important techniques applied were the X-ray diffraction analysis and Infrared absorption method which were really two very helpful tools to identify and distinguish various clay minerals in Indian fireclays. The X-ray helped the investigation to
determine the nature of crystallinity of the fireclay mineral and infra-red to detect the presence of any other mineral e.g. montmorillonite, illite etc., other than kaolinite in Indian fireclays.

Ionic formula of Indian fireclay mineral was determined on the basis of Marshall's method (16) and this was of great help to determine the nature and amount of isomorphous substitution of aluminium by iron or titanium and of silicon by magnesium in the kaolinite crystal present in Indian fireclays.