

VIII.—LEAD AND ZINC.

1. The provision of a quick and reliable method of testing lead before it is put into commercial use, and especially a reliable method for determining the amounts of the various impurities which are at times found in commercial and chemical lead.

2. As to the causes of the corrosion of lead, and the determination as to whether it is (possibly) due to the presence of one or other of the isotopes of lead.

3. The reduction of zinc ores, the development of new methods, and their translation into commercial practice.

4. To find a reliable method of determining minute quantities of fluorine (down to one-hundredth per cent.) in zinc concentrates.

NOTE.—At the present time 0.05 per cent. of fluorine is regarded as too high a percentage of this impurity, and the present method of arriving at the fluorine content is entirely unsatisfactory.

5. As to the effect of using higher temperatures in the reduction of zinc ores in retort furnaces, and the presence of cadmium, iron and other impurities in the resulting spelter.

NOTE.—Mr. H. M. Ridge (of the Ridge Roasting Furnace and Engineering Co., Ltd., and a member of the Advisory Technical Committee on Lead and Zinc) stated that he would be glad to be of assistance to researchers in connection with lead and zinc.

IX.—PETROLEUM, ASPHALT, OIL SHALES AND NATURAL GAS.

1. As to the physical properties of various crude oils.

NOTE.—There are many individual physical properties, each of which would make a valuable subject for research. Some aspects have been partially studied, such as specific gravity, viscosity, colour and absorption, but there are others, such as coefficient of expansion, specific heat, electric conductivity, compressibility, latent heat, refractive index and fluorescence, colour-measurement and the adoption of a standard colour scale to all crude oils, viscosity, with special reference to mobile oils, viscosity and melting point hysteresis, surface tension, emulsibility, heat of absorption with precipitated silica as standard, dielectric strength, and heat of combustion, on which comparatively little work has been done. There still remains a wide field for investigation in regard to the physical properties of crude oils.

2. The chemical composition of various crude oils.

NOTE.—A good deal of work has already been done on this subject by individual Companies, and the Imperial Institute will be pleased to put such Companies in touch with any scientific body embarking on an examination of the chemical composition of various crude oils. The Imperial Institute will ask the Companies interested to supply samples of any particular crude petroleum required.

3. The economic utilisation of spent shale.

NOTE.—A certain amount of work has been carried out but not with any degree of success. It is suggested that the possibility of its use for such purposes as—

- (a) Brickmaking
- (b) Cement making
- (c) Manures

is worthy of consideration.

4. The production from shale of a burning oil possessing the properties of a petroleum kerosene.

NOTE.—A certain amount of work has already been carried out, but there is still a great deal to be done, in connection with cracking, as well as odour and colour.