products. Fuels, refractory materials, and fluxes are described and their value and application explained. A series of models of furnaces and specimens of furnace material and products are used in illustration. Much use is made of publications and of methods setting forth the present practice of actual plants in operation. *Fall term, full study.* Professor PARR.

Required: Chemistry 8.

15. METALLURGICAL CHEMISTRY AND ASSAYING.—This course includes: (*a*), the analysis of finished metallurgical products; as, commercial lead, spelter, aluminum, copper, etc.; and (*b*), the fire assay of lead, gold, and silver ores. Fluxes, reagents, and charges are studied in connection with various typical ores and practice given in the use of the crucible and muffle furnaces and in the manipulations connected with fire assaying. *Fall term, full study or either division alone, half study.* Professor PARR and Mr. WHITE.

Required: Chemistry 5b.

16. CHEMISTRY FOR ENGINEERS.—This course is arranged particularly for mechanical engineers. It involves the proximate analysis of coals, determination of calorific power, technical analysis of furnace gases, examination of boiler waters, etc. *Winter term, full study.* Professor PARR and Mr. WHITE.

Required: Chemistry 1.

17. INDUSTRIAL CHEMISTRY.—A laboratory course in the preparation of chemical products from raw materials. The manufacture and proving of pure chemicals, fractionation, and other processes of the manufacturing chemist. *Winter term, full study.* Professor PARR.

Required: Chemistry 5b.

18. SPECIAL ADVANCED COURSES. — Special laboratory courses as indicated below may be arranged for those competent to pursue them. From one-fifth to three credits will be allowed in the under-graduate courses for such work.

(*a*) Technical Gas Analysis ½ credit.

(*b*) Urinalysis ½ credit.

(*c*) Toxicology ½ credit to 2 credits.

(*d*) Metallurgical Chemistry, 1 to 3 credits. Professors PALMER and PARR.

19. SEMINARY.—Reports and discussions upon assigned topics from current chemical literature. One session each week during the junior and senior years. Professors PALMER and PARR.