total of one hundred and thirty-two plants, six wilted; while in 1917, out of a total of more than seven thousand plants, on the same land only two wilted.

These data will possibly be of some value, especially to the Southern States, where the peanut promises to become a more important crop in the boll-weevil infested districts, and where *Sclerotium Rolfsii* has already become established as a serious parasite of numerous crops.

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THE BOSTON MEETING OF THE AMERICAN CHEMICAL SOCIETY. VII

Potash recovery from greensand and feldspar and by-products therefrom: H. W. CHARLTON. The process, stated briefly, consists in digesting greensand, feldspar, etc., with the requisite amount of lime and water at elevated temperatures and pressures. The alkali is brought into solution and recovered as a hydrate, and the solid material, which has undergone both chemical and physical change, is filtered off and employed as a binding material in the manufacture of brick, tile, artificial stone and other steam-hardened products. Possessing, as it does, self-cementing properties in addition to those induced by the steam-hardening treatment, it turns out materials which for strength and resistance to climatic conditions are superior to previously known steam-hardened products. Although the reaction may be applied to alkali-carrying silicates in general, it is believed that greensand is economically the most suitable, occurring, as it does, in unlimited quantities, obtainable without blasting or crushing and lying in stratified layers overlaid with a high silica sand. This is particularly fortunate as the overburden may be used with the resulting binding material in making brick, and the cost of mining is materially lessened. In the proportioning of the digestion mixture when using feldspar it is necessary to employ an equal weight or more of lime and eight times its weight of water, and to digest at pressures of from 200–250 pounds for from two to four hours. If the amount of water is reduced below this figure, the alumina in the feldspar appears to cause a reverting action. Fortunately this is not the case with greensand where the alumina is normally replaced by iron, and a double concentration can be employed. If lime is added in excess, there are no bad effects, as it is changed into a plastic sub-hydrate which in itself is a powerful binding material. It is undoubtedly true that the cementing material from a feldspar digestion is superior to that from greensand, but the cementitious properties of both are much superior to those now used in the production of steam-hardened products. Feldspar residue could be used in the manufacture of excellent face brick, whereas greensand residue would probably be better suited for the production of court or common brick, roofing, tile, drain tile, sewer pipe, fire-proofing, etc. Probably the most serious problem in the recovery of potash from feldspar is the separation of the soda. When employing greensand the almost complete absence of soda makes it possible to obtain a very pure caustic with one evaporation. Another objection to feldspar treatment is the almost invariable presence of alkali aluminates in the caustic liquor. It is found that there is not a trace in the greensand liquors. Although caustic alkali or a hydrated carbonate are the usual products of the recovery of the potash, other compounds may be easily formed as an end product. The same is true of the cementing material. Its use is not confined to the manufacture of brick. Other products such as tile, artificial stone, insulating material or stucco, are easily produced, and the choice depends on the market.

Some problems in the metallography of steel: H. M. BOYLSTON. (1) Banded structures in steel; their existence, cause and effect. Banded structure in nickel steel, in high manganese rifle-barrel steel, in shell forgings. Prevention and cure. (2) The hardening of high-speed steel and its relation to composition and performance. The Bellis microscopic test for determining best hardening temperature. Effect of carbon content. Effect of special elements. Streaky carbides. (3) The annealing of carbon steel castings. Results desired. Old methods. Present practise.

The effect of annealing on the electrical resistance of hardened carbon steels: I. P. PARKHURST. The object of the investigation was to anneal quenched steels over definite periods of time at constant temperatures. Five steels were determine the effect on electrical resistance of used varying in carbon content from 0.08 to 0.45 per cent. The temperatures used were 125° C., 175° C. and 250° C. The total periods of annealing varied from 90 to 190 hours. Results were plotted as time against resistance. Micro-photographs were made of the specimens during the

various stages of treatment. It was shown that while considerable variation in resistance could be produced by annealing, this variation was not accompanied by structural changes of a nature that could be easily detected under the microscope.

Thermophysics of zinc and its alloys: J. W. Richards. The author discusses some physical, particularly thermal, data which are lacking with respect to zinc and its chief alloys, brass and bronze, and calls attention to the great need of laboratory work to determine these constants. The data needed, such as vapor tensions at low temperatures, and latent heat of evaporation, are constants of nature, difficult to determine, yet of primary importance to the zinc industry if accurately determined and properly and intelligently used.

Recent developments in connection with the use of sulphur dioxide in hydrometallurgy: Edward R. Weidlein. The process developed by the author is based upon the precipitation of copper by means of sulphur dioxide. In precipitation, the solution is neutralized with lime and treated with sulphur dioxide until it has dissolved a percentage of gas equal to that of the contained copper. The precipitation of metallic copper ensues instantly when the solution is brought to a temperature of 160° C. under a pressure of 100 pounds. The mechanical arrangements are such that the processes of dissolution and precipitation are continuous. The copper assays, when melted, over 99 per cent. pure and contains oxygen as the sole impurity.

The importance of the flotation process in the metallurgy of copper: E. P. Mathewson. *Process revolutionary:* There is more ore handled daily by flotation than by any other non-ferrous metallurgical process. Prior to adoption of process the concentration losses were seldom less than 20 per cent.; now they are seldom over 8 per cent. Savings now so great that the so-called hold-up by owners of patents can not cripple the users of the process. *Process is a rule of thumb development:* The theory is now being worked out, but no wholly satisfactory theory has yet been evolved. Canadian users can afford to take chances on outcome of litigation, as they will only be compelled to pay reasonable royalties.

The theory of froth: Wilder D. Bancroft. Froth is a closely packed mass of bubbles having a cellular or honeycomb structure, the walls of the cells being liquid films. Froths are more stable, the more viscous the films; and the films can be made more viscous by adding solids.

Chemicals used in ore flotation: Oliver C. Ralston and L. D. Yundt. The use of certain chemicals in the flotation concentration of ores has been described and theories of the action of these chemicals have been explained. The use of chemical addition agents in ore-pulps during flotation is only in its infancy, and as the process is better understood operators will make greater use of chemical addition agents which will allow them to obtain the highest economic results. The possibilities of such applications are almost unlimited and it is probably along lines of this kind that some of the great advances in ore flotation will be made.

The selective action of cadmium salts on lead and zinc sulphides in flotation: M. H. Thornberry. The experiments so far completed show that the presence of cadmium salts practically stops lead sulphides from floating. The effect of these salts on zinc sulphides will be carried out in time to give results in the final paper.

Flotation experiments on zinc sulphide tailings, III.: W. A. Whitaker, S. F. Farley and H. P. Evans. (*a*) *The Effect of Certain Mixtures of Oils.*—A previous series of flotation tests carried out in this laboratory on a zinc sulphide tailing showed that the lighter wood distillates and certain vegetable oils displayed good selection for the mineral and yielded rich concentrates, while coal and wood tar mediums did not show such selection between mineral and gangue, but yielded high extractions. A series of tests was made in order to learn the effect of mixing a good "concentrating" medium with a good extracting medium, and of mixing certain lighter oils. (*b*) *The Effect of Organic Solvents.*—Solvents such as benzol, alcohol, kerosene, turpentine and gasoline were used with different oils in order to determine whether this method of emulsification would exert a favorable effect in flotation. The method was carried out under neutral, acid and alkaline conditions on tailings from the Joplin District. (*c*) *A Comparison between the "Mechanically Agitated" and "Pneumatic" Types of Flotation Machines.*—Several tests mentioned under (*a*) and (*b*) were made in machines of both types. The results obtained, as regards richness of concentrate and percentage extraction, were compared and plotted.