

for use in chlorination appears to give a lower yield of cellulose than the original Cross and Bevan method probably because of the temperature at which chlorination takes place.

Cellulose phthalate; its preparation and properties: H. A. LEVEY.

The effect of impurities on the metallurgy of tungsten: CLARENCE W. BOTKA. A study was made of the effect of such oxides as those of iron, cobalt, calcium, sodium, aluminum, magnesium, thorium and the rare earths on the density of ignited tungsten oxide and of the tungsten metal powder resulting from its reduction in hydrogen. Further observation was made of the effect of these impurities upon the grain size of sintered tungsten ingots. In general it may be said that iron and cobalt render the metal exceedingly hard and difficult to work, and produce an exaggerated grain growth. Such impurities as the oxides of calcium, aluminum, magnesium, etc., tend to block grain growth during sintering and in some instances make it necessary to prolong this operation.

The separation and examination of the isomers of xylene: W. D. TURNER and K. K. KERSHNER. Samples of xylene, obtained through the kindness of the Laclede Gas Light Co. were submitted to a series of fractional sulphonations and crystallizations of various sulphonic salts, according to a scheme suggested by the research department of the Eastman Kodak Co. The processes were first carried out in glassware after which the resulting modifications were tried in small size industrial apparatus. The process as applied consisted essentially of four successive sulphonations, the oil remaining unaffected holding the para-xylene. This was sulphonated with fuming sulphuric acid and converted to the barium salt for recrystallization after which it yielded pure para-xylene by hydrolysis. The ortho- and meta-sulphonic acids were converted to the sodium salts which were separated by fractional crystallization. Subsequent hydrolysis yielded pure ortho- and meta-xylenes.

The preparation of furfural from corn cobs: H. L. DUNLAP and V. K. FISCHLOWITZ. Varying concentrations of sulfuric acid, from 5.8 normal to 1 normal, were used to treat the material in a thirty-five gallon enameled steam jacketed kettle. Three normal sulfuric acid was found to be best. Concentrations beyond this decomposes some of the furfural thus cutting down the yield. When rapid steam distillation was used, the time for refluxing is about two hours. The more rapid the steam distillation the better, as the furfural will be carried over in larger quantities for the distillate

collected. If the distillation is too long drawn out, poorer yields will result owing to decomposition. The liquid in the kettle must not be allowed to concentrate too rapidly in the beginning of the distillation. Sulfuric acid does not serve as well as hydrochloric acid for the condensation of the pentoses, but it permits of the use of condensers other than of glass. Benzene can be used as a solvent in place of the more expensive and more highly volatile ether.

The carbonization of Missouri cannal coals: H. L. DUNLAP and K. K. KERSHNER. Five different cannal coals were subjected to destructive distillation in a gas-fired horizontal retort and the results compared with a bituminous coal coked under the same conditions. Both the oils and gases collected at different stages of the carbonization were examined. Different cannal coals show a wide variation in the yield of distillation products. The decomposition temperature for cannal coals is much lower than that of bituminous coals. The oils from cannal coals have a low specific gravity and consist chiefly of paraffin hydrocarbons. These oils resemble the oils obtained by low-temperature carbonization of bituminous coals. Cannal coals yield a larger quantity of gas than bituminous coals and this gas has a high calorific and illuminating value. Again, this is what is found in the coking bituminous coals at a low temperature. With the removal of the sulfur compounds, cannal coal gas would be a valuable illuminating gas. Cannal coals yield little ammonia due to the low temperature of carbonization. Only two of the coals examined gave a coke of any commercial value. Again, these coals would not be a source for benzene and toluene unless coked at a higher temperature than used in these tests.

(To be continued)

CHARLES L. PARSONS,
Secretary

SCIENCE

A Weekly Journal devoted to the Advancement of Science, publishing the official notices and proceedings of the American Association for the Advancement of Science

Published every Friday by

THE SCIENCE PRESS

LANCASTER, PA.

GARRISON, N. Y.

NEW YORK, N. Y.

Entered in the post-office at Lancaster, Pa., as second class matter