INDUSTRIAL CHEMISTRY.

On the Gases Occluded in Cast Steel.

A review of recent work upon this subject, showing the present state of knowledge in regard to the relation between the composition of steel and the proportion of occluded gas or the occurrence of bubbles in its mass. The occluded gases consist largely of H and CO. The questions of relative affinity of Mn for C and Si at different temperatures and the influence of Mn and Si upon upon the retention of H in steel and the variation of such influence with temperature are discussed. Basic steel, according to Muller, contain mainly H and N, with little CO. The addition of spiegel or ferro manganese causes a reaction which produces CO, and this gas is absorbed by the steel to be set free at the moment of solidification. The discordant views of Muller and Pourcel in regard to the influence of Si in promoting the absorption of H, are reconciled in part by the observation of Brustlen, who finds that Si and Mn increase the permeability of steel for H, and so permit its escape without the production of bubbles. (*Ding. Pol. J.* **251.91**) A. A. B.

On the Properties of Certain Salts of Iron and Aluminum with Reference to their Use in Dyeing. L. Liechti and W. Suida.

A determination of the facility with which these salts were dissociated with liberation of acid and deposition of insoluble basic compounds under the influence of heat, dilution or the attraction of vegetable fibres. The salts used were sulphates, acetates, "sulpho-acetates" (obtained by partial decomposition of a sulphate in solution by lead acetate), nitrates, chlorides, and sulphocyanates of aluminum and (ferric) iron. Starting with normal salts e. g. $R_2\,3\,SO_4$, a series of basic salts, $R_2\,2\,SO_4\,(HO)_2$; $R_2SO_4\,(HO)_4$, etc., were obtained by action of alkaline carbonates. These definite salts, in solutions of known strength, were then submitted to the action of heat, dilution, etc., and the degree of temperature or dilution at which a precipitate appeared was noted, as well as the proportionate increase of base in such precipitate under higher temperatures, etc. Similarly, the solutions were submitted to the

action of textile fibres under varying conditions of temperature and dilution, and the proportionate deposition of oxide was determined subsequently in the ash of the fibre. The bearing of such experiments upon the operations of the dye-house will be readily seen.

The results, in general, show an increased tendency to dissociation with increase of basicity. With the degree of basicity constant, the salts of the same base with different acids, or of the same acid with different bases differ widely in their behavior under like physical conditions. (*Ding. Pol. J.* **251.** 285.) A. A. B.

On the Nitrogenous Constituents of Barley and Malt. C. LINTNER.

An investigation made to determine the relation of the proportion of nitrogen to the strength of the diastatic function in the above materials. Specimens of barley were carefully cleansed and malted, 25 grammes of the ground malt was digested for 6 hours, in each case at common temperatures, and the diastatic power of the filtered solution was determined. The malt in all cases was dried at 40°C. and the results, strictly speaking, relate only to malt made under these conditions or to green malt. Soluble nitrogen $\times 6.25$ expresses the diastase very closely. The mean proportion of diastase found in dry malt was 2 per cent. One part of diastase converts 400 of starch and the percentage of starch in a given amylaceous substance multiplied by 0.2075 gives the weight of green malt to be used. These results accord well with practice. (*Ding. Pol. J.* **251.** 225).

A. A. B.

Method for the Preparation of Sodium Bicarbonate.—H. GASKELL and F. HURTER.

A patented method (D. R. P. Kl. 75.24490) in which anhydrous monocarbonate in revolving cylinders is submitted to the simultaneous action of steam and carbon dioxide. The gas and steam are mixed previously in a coke tower in such manner that CO^2 saturated with water at 82° C. shall enter the cylinder. The proportion of steam is reduced towards the close of the operation. The reaction proceeds rapidly and develops much heat; at its close dry bicarbonate ready for packing is withdrawn from the cylinder. Dilute CO^2, as in furnace gases, may be used, the gases

then being passed through a series of cylinders to induce complete absorption. (*Ding. Pol. J.* **251**. 229.) A.A.B.

On the Influence of the Ammonia Soda Process on the Value of Hydrochloric Acid and Chlorine. M. Scheurer Kestner.

Note relating to M. Weldon's paper on the ammonia soda process. (Soc. Ch. Ind. 1883. 434.) Leblanc's process affords both chlorine and sodium compounds, while the ammonia process affords only the sodium compounds.

The diminution in yield of HCl consequent upon the abandonment of the Leblanc process for the ammonia process has been, in part, at least, replaced by the spread of the manufacture of caustic soda, in which HCl is a by-product. The Weldon regenerative process affords only one-third of the chlorine in hydrochloric acid in the state of chlorine. It is desirable that some process should be discovered by which all the chlorine could be made available in the elementary form. (*Bul. Soc. Chim.*, XLI., 383.) E. W.

Notes on the Soda Industry. M. Scheurer Kestrier.

M. Reidemeister has completed his researches on the sodio-calcic compound formed in crude soda liquors from the Leblanc process. Two varieties were found, viz.: $Na_2 CO_3 . Ca CO_3 . 5 H_2 O$, and $2 (Na_2 CO_3 . Ca CO_3) . 5 H_2 O$. (*Bul. Soc. Chim.*, XLI., 335.)

E. W.

On the Decomposition of Cements by Water. H. LeChatelier.

Hydrated cements treated with a large excess of water, give up not only the lime present as hydrate, but also in time and after treatment with fresh quantities of water, they surrender nearly all of the lime in combination. Slow-setting cements contain much calcium hydrate; quick-setting cements very little.

The following lime compounds were recognized as existing in cements; the figures at the right giving the number of grammes per litre of calcium hydrate which will prevent the decomposition of these compounds (surrender of the lime).

$Ca(HO)_2$	1.3	gms.
Fe_2O_3. 4 CaO, 12 H_2O	0.6	"
Al_2O_3. 4 CaO, 12 H_2O	0.2	"
CaO. SiO_2, 3 H_2O	0.05	"

(*Bul. Soc. Chim.*, XLI., 377.) E. W.

On a Method of Obtaining Benzol from Coal-gas. J. A. KENDALL.

Coal gas passed over hot coal or coke in an iron retort yields an increase of benzol at the expense of luminosity. The best results were obtained when the gas was passed at the rate of 230 cbm. per hour through a bench of nine retorts, each three metres long and 203 mm. wide. The rate at which benzol was produced was measured in an experimental apparatus by passing a portion of the gas from the retorts through a mixture of one part strong HNO_3, and 5 parts conc. H_2SO_4, from which the resulting nitrobenzol was precipitated and weighed. (*Ding. Pol. J.* **251**, 83.) A. A B.

Falsification of Tartar-emetic.

The possibility of replacing this salt in many cases in the fixation of tannin (in dyeing) by zinc sulphate or acetate, has brought into the market so-called "substitutes" for it which contain 33–59% zinc sulphate. The cost per cent. of antimony oxide in these substitutes is to that in the pure salt as 12.24 to 7.00. (*Ding. Pol. J.* **251**, 288.) A. A. B.