emulsin and yield the ordinary known form of α-methylmannoside ($[\alpha]_D$ $+79°$) which is the pyranoside (1,5-ring).

The above biosides are prepared in the same way as the bioses, namely, from cellobial and lactal by the action of perbenzoic acid, but in the presence of methyl alcohol instead of water. The same 4-glucosido-α-methylmannoside has also been obtained from acetobromo-glucosido-mannose.

Had Dr. Hudson tried these experiments it is difficult to see how he could have committed himself to speculations that are at variance with this and with much more chemical evidence which is on record. Moreover, the rotations of these biosides and of the corresponding bioses are widely divergent from those required by his system of classification based on epimeric differences with cellobiosides and lactosides and the free sugars. The "principle of optical superposition" cannot be applied uniformly throughout the sugar group. The results now summarized are in complete agreement with the sugar formulas we have established by methylation studies, lactone formation and degradation, and by a comparison of the reaction velocities of glycosides under hydrolysis, and by other direct chemical methods.

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POSSIBLE USE OF THE POULSEN ARC AS A MEANS OF DETECTING TRACES OF IMPURITIES IN METALS

Sir:

It has been shown by one of us in conjunction with E. Z. Stowell[1] that an atmosphere of hydrogen and usually cathode materials which are elements of even atomic number are necessary to produce radio frequency oscillations in the Poulsen Arc.

In the non-oscillating or ordinary direct current arc in hydrogen, the spectra of copper and sodium were revealed when these elements were used as cathodes. Upon connecting the oscillating circuit, the spectra of copper or sodium were either entirely suppressed, or appeared only faintly. Simultaneously the spectra of elements such as zinc, titanium and aluminum which will support oscillation, and which were present in small amount as impurities in the cathode metal, either appeared or if previously present were greatly accentuated.

The spectrum of H_B showed the presence of more atomic hydrogen in the oscillating than in the non-oscillating arc. Chemical analysis of the electrolytic copper showed titanium and aluminum present as 0.005 and 0.0045%, respectively.

[1] Stowell and Redeker, *Phys. Rev.*, **34**, 978 (1929).

When using an ammonia atmosphere and a tip of gold brazed onto a water-cooled copper cathode, the oscillating arc completely suppressed the spectra of these metals, and intensified the 3361–3372 Å. line of the titanium impurity in the copper. The above phenomena suggested the use of the Poulsen Arc as a means of detecting small traces of impurities of even atomic number in such metals as copper, gold and silver.

A quantitative analytical method involving these phenomena is now being worked out in this Laboratory.

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COAGULATION OF PURE FERRIC HYDROXIDE SOLS

Sir:

In a recent article Judd and Sorum [This Journal, **52**, 2598 (1930)] have stated that with highly purified sols of ferric hydroxide, which are practically free from chloride ions, the amount of univalent coagulating ion decreases as the concentration of the sol increases.

In several publications [*J. Phys. Chem.*, **26**, 701 (1922); **28**, 313 (1924); **29**, 435, 659 (1925); *Kolloid.-Z.*, **34**, 262 (1924); **36**, 129 (1925)] from these Laboratories we have shown that ordinarily purified sols of ferric hydroxide require larger amounts of univalent electrolytes for coagulation when the concentration of the sol is increased. In a recent communication Dhar and Gore [*J. Indian Chem. Soc.*, **6**, 31 (1929)] have shown that even highly purified sols of ferric hydroxide containing a very small amounts of chloride ion follow the general rule that the greater the concentration of the sol, the greater is the amount of electrolyte necessary for coagulation irrespective of the valency of the coagulating ion. It appears, therefore, that the results of Judd and Sorum are not in agreement with previous work and need confirmation.

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A CONTINUOUS (OR BAND) FLUORESCENCE EMISSION SPECTRUM WHICH ACCOMPANIES A CHANGE OF COLOR

Sir:

An interesting phenomenon has been observed in a study of the Raman effect with a number of liquids listed later. A continuous (or band) emission spectrum (Fig. 1) has been found to appear on the plate in each case in which the colorless liquid becomes colored, and not to appear if there