of the data warrant. We feel confident that some of the data at 30° must be in error.

It is of interest to note that in Krapivin's data at 0.01 *N* the addition of 0.01 *N* sodium bromide, iodide or nitrate produced identical effects, as did the further addition of 0.01 *N* bromo-acetate, *i. e.*, *k* increased from 0.455 to 0.502–0.505. This is in agreement with the principle of specific interaction, (see ref. 7b). On the other hand, addition of 0.01 *N* sodium thiosulfate gave a value of $k = 0.504$, while 0.01 *N* sodium sulfate increased *k* to 0.516, even though the ionic strength is the same as in the presence of sodium thiosulfate.

Our experiments are being continued from the standpoint of specific salt effects and the effect of the relative position of the charge and the bromine atom upon the velocity.

The assistance given by Mr. R. W. Fessenden is gratefully acknowledged.

Summary and Conclusions

The velocity data of the reaction $BrCH_2COO^- + S_2O_3^{--} \longrightarrow S_2O_3CH_2COO^{--} + Br^-$ studied by Krapivin for the sodium salts at moderate dilutions have been extended from 0.01 *N* to 0.0005 *N*. The data strongly support Brönsted's theory of reaction velocity. In the presence of sodium ions the limiting slope predicted from the Debye theory holds from 0.001 *N* (0.0025μ) down to the lowest concentration studied. At higher concentrations the slope falls off, reaching a value of one-fourth the theoretical value at 0.35μ. The experiments are being continued.

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NOTES

A Simple Laboratory Vacuum Regulator.—Among various methods of maintaining a constant temperature in the range from room temperature to nearly red heat, the vapor-bath with boiling liquid under constant, automatically controlled, reduced pressure is perhaps the most convenient and satisfactory. The device described in this note for controlling the degree of vacuum and thus the temperature is not new in principle, but its simplicity and utility make it available to any chemical laboratory. A device based upon similar principles has recently been described.[1] The chief difference between the two devices consists in the use of a glass stopcock in the present instance instead of the combination of a rubber stopper and capillary tube to control the ingress of air.

The essential features of the apparatus are shown in Fig. 1. The mercury in the manometer AA′ is adjusted by means of the leveling bottle F to such a position that when contact is broken with the platinum wire sealed into the closed arm A, the height h corresponds to the degree of

[1] S. P. Miller and P. V. McKinney, *Ind. Eng. Chem.*, **20**, 552 (1928).

vacuum desired. Upon closing the electrical switch S, current flows from a 6-volt storage battery through the magnet coils of an ordinary doorbell buzzer, the terminals of which are connected directly to the binding posts so that the vibrator operates like the armature of a relay. The extended armature is attached at right angles to an extension of the stopcock handle in such a way that magnetization of the coils closes the stopcock C, allowing gas to be withdrawn from the condenser E and boiling tube G by means of the service vacuum or any other suitable source of suction. When the pressure in the system falls below the height h, the electrical circuit is broken, the armature is released and the stopcock opens by spring action of the relay. The influx of the air then increases the pressure until the electrical circuit is again closed, when the cycle is repeated. The manometer AA′ is constructed of two wide tubes connected by a narrow tube to minimize surges.

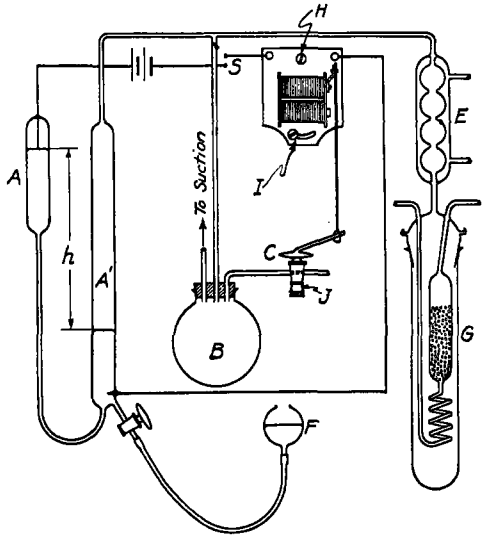

Fig. 1.

An essential feature of the automatically operated stopcock is the attachment of a short glass tube J to the small end of the stopcock barrel with de Khotinsky cement. This tube is slightly tapered and is fitted with a small cork which presses against the end of the stopcock plug to prevent the latter from settling tightly into the barrel. The stopcock is lubricated thoroughly with vaseline or a light stopcock grease. The stopcock handle may easily be extended by sealing a piece of 3-mm. diameter glass rod or tubing to it with de Khotinsky cement. A 3- or 4-liter flask B in the system serves as capacity to minimize surges. The pressure as observed on an open manometer attached to the system was constant to within less than 1 mm. of mercury at all pressures ranging from slightly less than atmospheric down to 1 cm. of mercury.

A slight adjustment of the degree of opening of the stopcock C is required for different pressures. This is accomplished by moving the relay about the screw H until the proper position with respect to the stopcock is found and then securing it in position by means of the screw I. The bore of the stopcock should be small, 1 mm. or less, so that only a slight movement entirely opens or closes it.

This device has been used continuously day and night for several months, interrupting the operation only over week ends, with only a very occasional failure, which has invariably been due to the battery running down. This device may readily be adapted to the control of vacuum distillations and other work in which a constant vacuum is desired.

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Automatic Cut-off Device for a Gas Fired Laboratory Mercury Still.—The distillation of mercury is an operation that is usually carried out in connection with other work and the still should therefore be so designed as to require the minimum of attention. The type of glass still described by Dennis,[1] with a ring type gas burner, gives excellent results but has the disadvantage that if care is not exercised to shut off the flame when the mercury gets low in the boiler, destruction of the still results. The sketch shows diagrammatically an automatic cut-off device which enables the operator to start the still and, except for an occasional filling, then go about other business and forget that it is going.

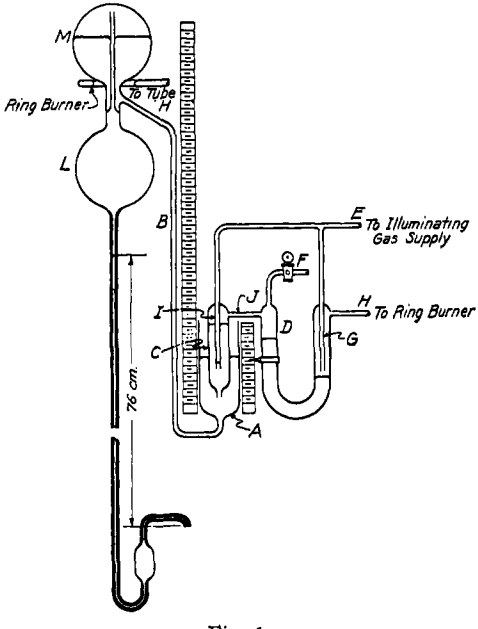

Fig. 1.

The still itself is the usual vacuum type, consisting of a boiling vessel M and condenser L with a 2-mm. bore capillary tube outlet of slightly greater length than the barometric column. Drops of mercury falling from the condenser into the capillary tube capture threads of gas ahead of them and thus maintain the high vacuum in the still by Sprengel pump action.[2] The mercury to be distilled is poured into the open tube A and flows through B into the still-head M. The flow stops when the difference between the

[1] Dennis, "Gas Analysis," The Macmillan Company, New York, 1913, pp. 119–120.
[2] J. Wetzel, *Chem.-Ztg.*, **32**, 1228 (1908).