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SALINITY OF THE WATER OF CHESAPEAKE BAY

BY

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SALINITY OF THE WATER OF CHESAPEAKE BAY

By ROGER C. WELLS, REGINALD K. BAILEY, and EDWARD P. HENDERSON

INTRODUCTION

It is well known that the water of Chesapeake Bay is more or less salty. This characteristic has a bearing on navigation, engineering, the fish and oyster industries, sanitation, sedimentation, and many other matters. The saltiness, or salinity, of the water is far from uniform throughout the bay, however, and the data presented in this contribution show the distribution, range, and variation of the salinity in so far as about 2,500 determinations made at intervals during 1920, 1921, and 1922 could reveal the nature of the phenomena involved. The results show that definite physical factors are at work which, in spite of occasional seasonal fluctuations, tend to reproduce definite conditions from year to year. Briefly, it may be said that the salinity of the water increases from the head of the bay to its mouth in a fairly regular way at any given time and that the salinity also generally increases with depth at any given location. The final adjustments reached are the result of a complex interplay of several different factors, whose separate influences are in this paper considered in connection with the individual determinations.

Determinations of the salinity of the water of Chesapeake Bay were made in the chemical laboratory of the United States Geological Survey at the request of the United States Bureau of Fisheries, cooperating in a general biologic survey of the bay made under the direction of Dr. R. P. Cowles, of Johns Hopkins University. The results are published by the Geological Survey on account of the bearing they have on problems of geology, especially sedimentation, in Coastal Plain areas, the relation to biologic and other questions being left for consideration elsewhere. Doctor Cowles has kindly consented to release for publication the data on the temperature, depth, location, and other features of the samples collected under his direction, which are essential to establish the records of the samples.

The samples were collected from the Bureau of Fisheries boat *Fish Hawk*, by means of the usual water bottle and with the precautions generally observed in collecting samples of sea water. They were preserved in "magnesium citrate" bottles. At the end of the cruise one set of samples was shipped to Washington for determination of the salinity. The thermometers used to determine the temperature of the

water at the different depths at the time of collection were standardized by the Bureau of Standards.

The word "salinity" as used in this report, means the total number of parts, by weight, of chemical compounds of the same composition as those found in sea water, dissolved in 1,000 parts, by weight, of the sample. More specifically, the salinity, S , is defined, according to Knudsen,¹ as a definite function of the chloride content, Cl , thus:

$$S = 0.030 + 1.8050Cl$$

PREVIOUS WORK

A considerable number of determinations of the salinity of the water of Chesapeake Bay were published in 1916 by the United States Public Health Service in connection with a study of the pollution of the tidal waters of Maryland and Virginia.² Most of these, however, were made on samples from rivers and inlets along the borders of the bay. Some further determinations were published in 1917 by Sale and Skinner,³ but the localities are too scattering to establish any general relations concerning the distribution of the salinity over the bay as a whole.

The determinations in these two papers fit in very well with those found in the present investigation. Some of the salinities found by Cumming in 1914 in the sounds along the eastern shore of the bay are higher than those found by the writers at corresponding stations in the bay—a fact, however, which may be in harmony with the tendency outlined on page 109.

METHOD OF DETERMINATION

The salinity of each sample was calculated from the chlorine content, as determined by titration by silver nitrate, potassium chromate being used as indicator. Titrations on Bureau of Fisheries samples Nos. 8707 to 8737 were made by R. C. Wells, on Nos. 8738 to 8769 by R. K. Bailey, and on Nos. 8770 to 9019 by E. P. Henderson. Mr. Wells supervised the methods used. Each author calculated the densities of the samples he analyzed from the data in Knudsen's tables.⁴

¹ Knudsen, Martin, *Hydrographische Tabellen*, p. iii, Copenhagen, 1901.

² Cumming, H. S., *Investigation of the pollution of the tidal waters of Maryland and Virginia with special reference to shellfish-bearing areas*: Public Health Bull. 74, 199 pp., with maps, 1916.

³ Sale, J. W., and Skinner, W. W., *The vertical distribution of dissolved oxygen and the precipitation by salt water in certain tidal areas*: Franklin Inst. Jour., December, 1917, pp. 837-848.

⁴ Knudsen, Martin, *op. cit.*

The titrations were made essentially as recommended by the Conseil permanent international de la mer, except that an ordinary 50 cubic centimeter burette and a 15 cubic centimeter pipette were used. The silver nitrate solution was of such strength that about 41 cubic centimeters was required for a 15 cubic centimeter portion of normal sea water. This procedure necessitates a little more calculation to reduce the results to standard form, but is believed to be fully as accurate as that with the special apparatus and silver nitrate solution. The usual precautions to maintain a uniform temperature and clean apparatus were observed.

The silver nitrate solution was standardized with a sample of sea water sent out from Copenhagen, marked "Cl=19.379 ‰," which was checked and found to be correct on the basis of weighings in air and counting the bromine as an equivalent amount of chlorine. A pipette full of standard sea water is titrated against the silver nitrate solution after the addition of 5 drops of 10 per cent potassium chromate solution, until a definite pink color persists for about three minutes while the solution is stirred vigorously with a stirring rod. Suppose it is found that 42.58 cubic centimeters of silver nitrate is required. Knudsen's table on page 19 shows that sea water having 19.38 parts of chlorine per thousand has a salinity of 35.01 parts per thousand and a density at 0° of 1.02814. Knudsen's table on page 41 shows that the density of this water at 20° would be 1.02463—that is, 1 liter at 20° would weigh 1,024.6 grams—and 1,024.6 grams of the water would contain 35.87 grams of salts, as 1,000 grams contain 35.01 grams of salts by definition of the word salinity.

If now an unknown sample is titrated and requires b cubic centimeters, of silver nitrate the salt content in grams per liter at 20° C. will be $\frac{b}{42.58} \times 35.87$.

The fraction $\frac{35.87}{42.58}$ will be a constant factor, and the product indicated gives the salt content in grams per liter at 20° for each sample titrated. The results are reduced to salinity, or parts per thousand, by means of the accompanying Table 1. It is not necessary that the titration should be made at exactly 20°, but it is essential that the silver solution and the sample being titrated should be at approximately the same temperature. It is obvious that the factor used (for example, $\frac{35.87}{42.58}$) should refer to the same temperature as the table of corrections (Table 1), and that this factor must be determined for each lot of silver nitrate solution made up. A large quantity of silver nitrate solution prepared at one time saves repeated standardizations, but has the disadvantage of changing in temperature more slowly than the small bottles of sea water being titrated. When many titrations

are to be made it is convenient to have the silver nitrate solution kept in a dark bottle placed on a shelf above the burette but connected by a siphon so that the burette may be quickly filled merely by opening a pinchcock.

TABLE 1.—Correction for reducing salt content expressed as grams per liter at 20° C. to salinity, or parts per thousand

Grams per liter at 20° C.	Correction	Grams per liter at 20° C.	Correction
10	−0.06	26	−0.44
11	−.07	27	−.48
12	−.09	28	−.52
13	−.11	29	−.56
14	−.13	30	−.60
15	−.15	31	−.64
16	−.17	32	−.68
17	−.19	33	−.72
18	−.21	34	−.77
19	−.23	35	−.82
20	−.26	36	−.87
21	−.29	37	−.92
22	−.32	38	−.97
23	−.35	39	−1.03
24	−.38	40	−1.09
25	−.41		

The density at 0° is read from the salinity by means of Knudsen's tables, pages 1–22, and the density at the temperature the sample had when collected is calculated by means of the tables on pages 39–42.

It is believed by the writers that the salinities and densities calculated as described above are but slightly if at all inaccurate, even for the more dilute waters, as can be readily shown. The tables are based on the assumption that sea water is diluted with practically pure water, whereas in Chesapeake Bay it is actually diluted with river water of somewhat different composition from sea water. For example, Susquehanna River water, according to Dole,⁵ has the following mean composition, in parts per million of dissolved matter: SiO₂, 8.7; Fe, 0.09; Ca, 21; Mg, 4.6; Na+K, 8.9; HCO₃, 54; SO₄, 31; NO₃, 3.4; Cl, 8.1; total, 112. Here the ratio of total dissolved matter to chlorine is 13.8, whereas in sea water it is 1.806. But sea water is so much more salty than Susquehanna River water that the admixture of river water in such quantities as occur in Chesapeake Bay does not alter the ratio between the chlorine and total salts appreciably.

As an illustration it is calculated that a mixture of 6 kilograms of Susquehanna River water with 1 kilogram of sea water would have a chlorine content of 2.62 grams per kilogram, from which the calculated salinity, according to Knudsen's table, would be 4.76 and the density at 0° C. 1.00377. The true salinity of this mixture, determined by analysis, would be 4.81, and its density at 0° approximately 1.00382. The difference is of the order of the experimental error.

⁵ Dole, R. B., U. S. Geol. Survey Water-Supply Paper 236, p. 104, 1909.

Slight variations in composition of the salts doubtless occur with the season, but it would be impossible to make a complete analysis of every sample.⁶ It has not seemed worth the time required to make any correction on this account. The method used has permitted a large number of determinations to be made, giving results which permit comparisons of the different waters on a common basis, and so far as known no comparisons will have any significant error on account of the slight departure of the waters from average ocean water.

LOCATION OF STATIONS

In accordance with the custom of the Bureau of Fisheries each station where samples were collected was designated by a consecutive number, and consequently the same stations, or points as near as the navigator of the *Fish Hawk* could get to them, appear repeatedly with new numbers. For the sake of simplicity these stations have been reduced to a single series of numbers, 1 to 34, and stations differing by only very short distances are grouped together, provided the differences in location are not essential. The location of these stations by chart bearings and by latitude and longitude is given in Table 2. (See also pl. 13.)

TABLE 2.—Location of stations in Chesapeake Bay

Station No.	Bureau of Fisheries Nos.	Bearings, latitude, and longitude
1	8738 8928 8799 8959 8800 8960 8866 9019 8867 9078	7 Foot Knoll Light W. by N. $\frac{1}{4}$ N.; Craig Channel Light NW. Lat. $39^{\circ} 08' 49''$ N. Long. $76^{\circ} 19' 42''$ W.
2	8739	Sandy Point Light SW.; Baltimore Light W. Lat. $39^{\circ} 03' 52''$ N. Long. $76^{\circ} 20' 04''$ W.
3	8736 8926 8740 8957 8797 8962 8802 9017 8864 9076 8869	Off Sandy Point. Sandy Point Light SW. by S. $\frac{1}{2}$ S.; Baltimore Light NW. $\frac{3}{4}$ N. Lat. $39^{\circ} 02' 16''$ N. Long. $76^{\circ} 22' 27''$ W.
4	8737 8927 8798 8958 8801 8961 8865 9018 8868 9077	Love Point. Sandy Point Light SW. by W. $\frac{1}{2}$ W.; Baltimore Light NW. by W. $\frac{3}{4}$ W. Lat. $39^{\circ} 02' 23''$ N. Long. $76^{\circ} 20' 30''$ W.
5	8741 8954 8796 8963 8803 9014 8861 9045 8872 9073 8925	Thomas Point Light N. by E. $\frac{1}{2}$ E.; Bloody Point Light E. $\frac{7}{8}$ S Lat. $38^{\circ} 50' 10''$ N. Long. $76^{\circ} 27' 02''$ N.
6	8735 8955 8742 8964 8804 9015 8862 9046 8871 9074 8924	Bloody Point Light E. by S. about $1\frac{3}{4}$ miles. Lat. $38^{\circ} 50' 09''$ N. Long. $76^{\circ} 25' 44''$ W.

TABLE 2.—Location of stations in Chesapeake Bay—Continued

Station No.	Bureau of Fisheries Nos.	Bearings, latitude, and longitude
7	8734 8923 8743 8956 8795 8965 8805 9016 8863 9047 8870 9075	Bloody Point Light E. $\frac{1}{2}$ N. about $\frac{1}{2}$ mile. Lat. $38^{\circ} 49' 55''$ N. Long. $76^{\circ} 24' 08''$ W.
8	8732 8952 8745 8967 8793 9013 8807 9044 8859 9072 8873	Governor's Run Wharf W. $\frac{1}{4}$ S. $\frac{7}{8}$ mile; Spar buoy S 2 B N. $\frac{3}{4}$ W. Lat. $38^{\circ} 30' 13''$ N. Long. $76^{\circ} 28' 52''$ W.
9	8733 8922 8744 8953 8794 8966 8806 9012 8860 9043 8874 9071	James Island. North end of James Island E. $\frac{1}{2}$ N.; bell buoy 18 A N. $\frac{1}{4}$ E. Lat. $38^{\circ} 31' 07''$ N. Long. $76^{\circ} 25' 09''$ W.
10	8731 8921 8746 8951 8792 8968 8808 9011 8858 9042 8875 9070	Cove Point. Cove Point Light N. $\frac{7}{8}$ W.; buoy 21 NE. by E. $\frac{3}{4}$ E. Lat. $38^{\circ} 21' 04''$ N. Long. $76^{\circ} 22' 11''$ W.
11	8730 8920 8747 8950 8791 8969 8809 9010 8857 9041 8876 9069	Barren Island. Barren Island Buoy, 16 D, NE. by N. 200 yards. Lat. $38^{\circ} 20' 20''$ N. Long. $76^{\circ} 18' 09''$ W.
12	8729 8748 8969	Hooper Island. Hooper Island Light SE.; Cedar Point Light NW. by W. $\frac{5}{8}$ W.; Point No Point S. $\frac{7}{8}$ W. Lat. $38^{\circ} 16' 22''$ N. Long. $76^{\circ} 16' 36''$ W.
13	8726 8917 8751 8947 8788 8971 8812 9007 8854 9038 8879 9066	Point No Point. Point No Point Light NW. by N. $\frac{1}{4}$ W.; Point Lookout Light SW. by S. $\frac{1}{2}$ S. Lat. $38^{\circ} 07' 11''$ N. Long. $76^{\circ} 16' 48''$ W.
14	8727 8918 8750 8948 8789 8970 8811 9008 8855 9039 8877 9067	Point No Point. Point No Point Light W. by N. $\frac{1}{2}$ N.; Point Lookout Light SW. $\frac{3}{8}$ W. Lat. $38^{\circ} 07' 09''$ N. Long. $76^{\circ} 13' 32''$ W.
15	8728 8919 8749 8949 8790 9009 8810 9040 8856 9068 8878	Holland Island. Point No Point Light W. $\frac{7}{8}$ N.; Holland Bar Light SE. $\frac{1}{2}$ S. Lat. $38^{\circ} 07' 20''$ N. Long. $76^{\circ} 09' 44''$ W.
16	8723 8914 8752 8944 8785 8974 8813 9004 8851 9035 8880 9063	Mouth of Potomac. Point Lookout Light NE. by E. $\frac{1}{4}$ E.; bell buoy 5 NW. $\frac{1}{2}$ N. Lat. $37^{\circ} 59' 56''$ N. Long. $76^{\circ} 23' 19''$ W.
17	8724 8915 8753 8945 8786 8973 8814 9005 8852 9036 8881 9064	Mouth of Potomac. Point Lookout Light NE. by E. $\frac{5}{8}$ E.; Point Lookout buoy, N 2, E. $\frac{1}{4}$ S. Lat. $38^{\circ} 01' 21''$ N. Long. $76^{\circ} 21' 14''$ W.
18	8725 8916 8754 8946 8787 8972 8815 9006 8853 9037 8882 9065	Mouth of Potomac. Point Lookout Light E. by S. $\frac{1}{4}$ S.; Point Lookout buoy, N 2, SE. $\frac{1}{2}$ S. Lat. $38^{\circ} 02' 28''$ N. Long. $76^{\circ} 20' 43''$ W.

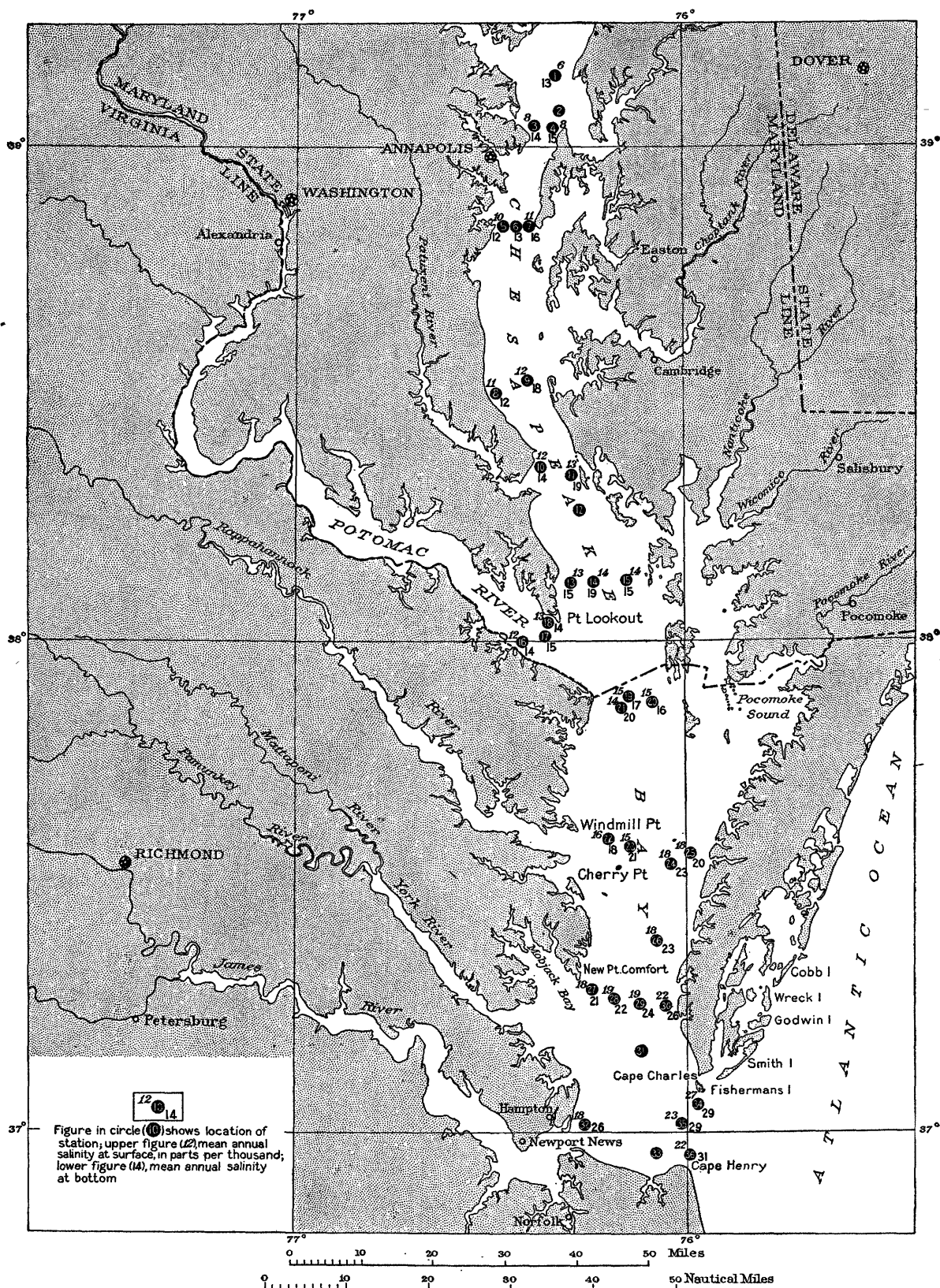
⁶ For slight differences between Mediterranean water and average sea water see Bertrand, Freundler, and Ménager, Compt. Rend., vol. 174, p. 1251, 1922.

TABLE 2.—Location of stations in Chesapeake Bay—Continued

Station No.	Bureau of Fisheries Nos.	Bearings, latitude, and longitude
19	8722 8913 8756 8943 8782 8975 8817 9002 8850 9033 8884 9061	Smith Point Light W. $\frac{1}{2}$ N.; Great Wicomico Light SW. by W. $\frac{1}{2}$ W. Lat. $37^{\circ} 52' 35''$ N. Long. $76^{\circ} 09' 05''$ W.
20	8755 8942 8783 8976 8816 9003 8849 9034 8883 9062 8912	Smith Point Light W. $\frac{3}{4}$ N.; Tangier Light SE. $\frac{3}{8}$ S. Lat. $37^{\circ} 52' 34''$ N. Long. $76^{\circ} 05' 33''$ W.
21	8721 8911 8757 8941 8784 8977 8818 9001 8848 9032 8885 9060	Smith Point Light NW. by N.; buoy NNW.; Great Wicomico Light SW. by W. $\frac{1}{2}$ W. Lat. $37^{\circ} 51' 40''$ N. Long. $76^{\circ} 09' 48''$ W.
22	8720 8910 8758 8940 8781 8978 8819 9000 8847 9031 8886 9059	Off Rappahannock Spit. Windmill Point Light W. $\frac{1}{2}$ N.; bell buoy SW. by W. $\frac{1}{2}$ W. Lat. $37^{\circ} 35' 52''$ N. Long. $76^{\circ} 11' 37''$ W.
23	8719 8909 8759 8939 8781 8979 8819 8999 8846 9030 8887 9058	Off Rappahannock Spit. Windmill Point Light W. by N. $\frac{1}{4}$ N.; bell buoy W. $\frac{3}{8}$ N. Lat. $37^{\circ} 35' 20''$ N. Long. $76^{\circ} 09' 07''$ W.
24	8717 8907 8760 8938 8780 8981 8820 8998 8845 9029 8889 9057	Off Sandy Point. Can buoy 1 E. $\frac{3}{8}$ S. $3\frac{1}{2}$ miles; buoy 10 C N. by E. $\frac{1}{4}$ E. Lat. $37^{\circ} 33' 02''$ N. Long. $76^{\circ} 02' 06''$ W.
25	8718 8937 8779 8980 8821 8997 8844 9028 8888 9056 8908	Sandy Point. Can buoy 1 SE. $\frac{1}{2}$ E. about 1 mile; spar buoy, o. c. c. w, 10 B. SW. by S. $\frac{1}{2}$ S. Lat. $37^{\circ} 33' 51''$ N. Long. $75^{\circ} 59' 36''$ W.
26	8716 8778 8761 8822	New Point Light SW. by W. $\frac{7}{8}$ W.; Wolf Trap Light W. $\frac{1}{2}$ N. Lat. $37^{\circ} 23' 31''$ N. Long. $76^{\circ} 04' 49''$ W.
27	8715 8906 8762 8936 8777 8982 8823 8996 8843 9027 8890 9055	New Point Comfort. Buoy C 9 NW. by N. $\frac{1}{4}$ N.; New Point Comfort Light NW. $\frac{3}{4}$ W.; York Spit Light S. by W. $\frac{1}{2}$ W. Lat. $37^{\circ} 16' 50''$ N. Long. $76^{\circ} 14' 12''$ W.
28	8714 8905 8763 8935 8776 8983 8824 8995 8842 9026 8891 9054	Off New Point Comfort. New Point Comfort Light NW. by W. $\frac{3}{8}$ W.; York Spit Light SW. $\frac{1}{2}$ W.; buoy C 7 W. Lat. $37^{\circ} 15' 58''$ N. Long. $76^{\circ} 11' 00''$ W.
29	8713 8904 8764 8934 8775 8984 8825 8994 8841 9025 8892 9053	Off Cape Charles City. Plantation Light SE. by E.; buoy 10 E. by N. $\frac{3}{4}$ N.; buoy 15 S. by E. $\frac{1}{8}$ E. Lat. $37^{\circ} 15' 50''$ N. Long. $76^{\circ} 07' 44''$ W.

TABLE 2.—Location of stations in Chesapeake Bay—Continued

Station No.	Bureau of Fisheries Nos.	Bearings, latitude, and longitude
30	8712 8903 8765 8933 8774 8985 8826 8993 8840 9024 8893 9052	Cape Charles City. Plantation Light SE. $\frac{3}{8}$ S.; buoy 10 N. $\frac{1}{4}$ E. Lat. $37^{\circ} 15' 18''$ N. Long. $76^{\circ} 34' 54''$ W.
31	8711	South end of 35-foot channel. Buoy S. 4 N. by W. $\frac{3}{8}$ W.; buoy 2 SW. $\frac{1}{8}$ S. Lat. $37^{\circ} 09' 10''$ N. Long. $76^{\circ} 06' 31''$ W.
32	8707 8929 8769 8988 8770 8989 8831 9020 8898 9048	Thimble Shoal. Thimble Shoal Light ENE. $\frac{3}{4}$ E.; can buoy 15 SE. $\frac{1}{8}$ E. Lat. $37^{\circ} 00' 35''$ N. Long. $76^{\circ} 15' 24''$ W.
33	8899	Bell buoy 2 N. by W. $\frac{3}{8}$ W.; bell buoy 3 W. $\frac{1}{4}$ N. Lat. $36^{\circ} 57' 56''$ N. Long. $76^{\circ} 04' 52''$ W.
34	8710 8902 8766 8932 8773 8986 8827 8992 8839 9023 8894 9051	Cape Charles. Cape Charles Light NE.; buoy E. $\frac{1}{2}$ S.; lightship SW. by S. $\frac{3}{4}$ S. Lat. $37^{\circ} 03' 22''$ N. Long. $75^{\circ} 58' 24''$ W.
35	8709 8901 8767 8931 8772 8991 8828 9022 8838 9050 8895	Between the capes. Lightship S. $\frac{3}{8}$ E.; Cape Henry Light S. $\frac{1}{4}$ W. Lat. $37^{\circ} 00' 10''$ N. Long. $76^{\circ} 00' 42''$ W.
36	8708 8900 8768 8930 8771 8987 8829 8990 8837 9021 8896 9049	Cape Henry. Cape Henry Light SW. by S. $\frac{3}{4}$ S.; lightship N. $\frac{3}{4}$ W. Lat. $36^{\circ} 56' 56''$ N. Long. $75^{\circ} 59' 52''$ W.
37	8836	Atlantic Ocean E. $\frac{5}{8}$ S. from whistle buoy off Cape Henry; line of 10 fathoms depth; about 30 miles out. Lat. $36^{\circ} 56' 56''$ N. Long. $75^{\circ} 35' 56''$ W.
38	8835	Similar to 37; line of 20 fathoms depth; about 50 miles out. Lat. $36^{\circ} 56' 56''$ N. Long. $75^{\circ} 11' 56''$ W.
39	8834	Similar to 37; line of 40 fathoms depth; about 70 miles out. Lat. $36^{\circ} 56' 56''$ N. Long. $74^{\circ} 42' 56''$ W.
40	8833	Similar to 37; line of 50 fathoms depth; about 83 miles out. Lat. $36^{\circ} 56' 56''$ N. Long. $74^{\circ} 38' 56''$ W.
41	8832	Similar to 37; line of 100 fathoms depth; about 87 miles out. Lat. $36^{\circ} 56' 56''$ N. Long. $74^{\circ} 35' 56''$ W.



MAP OF CHESAPEAKE BAY, SHOWING LOCATION OF SAMPLING STATIONS AND MEAN ANNUAL SALINITY AT SURFACE AND BOTTOM

VARIATIONS OF SALINITY

VARIATIONS OVER THE BAY AS A WHOLE

The salinity of the water increases from the head of the bay to its mouth at any given time, but not in a wholly regular way. It is approximately 6 in the latitude of Baltimore and about 24 between Cape Charles and Cape Henry; that of average sea water is about 33. There is a tendency toward higher salinities on the east side of the bay than on the west side at the same latitude. Although this condition has been ascribed to the fact that the principal rivers enter the bay on its west side, the rotation of the earth may also be a factor. It is well known that a body moving freely in any direction on the surface in the Northern Hemisphere is deflected to the right, and many instances of the operation of this tendency have been noted in the movement of natural waters. Thus, the Gulf Stream flows across to Europe and the polar currents are deflected toward Greenland and Labrador. Above Patuxent River there is not much difference in the stream flow into Chesapeake Bay on the east and west sides, and most of the water enters the bay from the Susquehanna at its head, yet there is still a slight difference in salinity on the two sides. This is what would be expected if it is assumed that the outflowing lighter water is deflected to the right and passes south along the west side of the bay. The difference in salinity between the east and west sides of all the lower portion of the bay is marked, and the relations in the channel between the capes are also what would be expected from the operation of the principle cited above.

The principal drainage areas furnishing water to Chesapeake Bay are shown in Table 3, together with estimates of their mean rate of contribution.⁷

TABLE 3.—Annual inflow into Chesapeake Bay

	Drainage area (square miles)	Mean rate of contribution (second-feet)
Susquehanna River Basin.....	27, 400	41, 300
West shore of bay between Susquehanna and Potomac Rivers.....	2, 390	3, 230
Potomac River Basin.....	14, 140	14, 850
Rappahannock River Basin above Fredericksburg.....	1, 590	1, 710
Rappahannock River Basin below Fredericksburg and minor streams tributary to the bay between Potomac River and latitude 37° 30'.....	1, 310	1, 440
James River above Cartersville.....	6, 230	7, 540
Appomattox River above Mattoax.....	745	930
Balance of James River Basin, all of York River Basin, and all minor streams tributary directly to the bay between latitude 37° 30' and Cape Henry.....	6, 340	6, 970
East shore of bay between Susquehanna River and Cape Charles.....	3, 980	5, 580
Chesapeake Bay itself.....	64, 125	83, 550
	3, 380	4, 500
Grand total.....	67, 505	88, 050

* Mean annual rainfall on bay about 45 inches; evaporation assumed to be 60 per cent of rainfall. Some later calculations by one of the writers indicate that the annual evaporation is nearer the annual rainfall; if this is correct, the net contribution over the bay itself is negligible.

⁷ From U. S. Geol. Survey Water-Supply Paper 224, p. 52, 1909, and other water-supply papers: summarized for the writers by J. C. Hoyt, of the Geological Survey.

From the data in Table 3 and the known cross section of Chesapeake Bay it is calculated that the average outward current is about 0.3 nautical mile an hour. The rate naturally varies with the cross section of the bay. This rate, however, appears sufficiently large to warrant a consideration of the effect of the earth's rotation on the direction of the currents. The tides convert the net outflow into a series of impulses, first one way and then the other, and these do not occur in the same direction simultaneously over the whole area of the bay. Any given phase of the tidal impulse occurs about nine hours later in the latitude of Baltimore than at Cape Henry. Winds and seasonal flows also cause large variations in the currents in the bay, and the net result of all of these movements is a greatly accelerated mixing of the water of different densities and salinities.

Determinations by Doctor Cowles at station 14 January 25 and 26, 1921, by means of current meters and at different depths, showed rates of flow both above and below the mean rate given above. The highest rate was 1.70 miles an hour at a depth of 30 meters, the lowest 0.14 mile at the surface. Similar determinations at station 1 on January 27 and 28 ranged from 0.14 mile at a depth of 5 meters to 2.07 miles at the surface. Determinations at station 1 on March 26 and 27 ranged from 0.12 to 1.10 miles, both at the surface and with nearly the same direction of the wind, but on March 30 and 31 at the same station the variation was only from 0.02 to 0.46 mile. At station 14 on June 1 and 2 the rate ranged from 0.04 to 0.83 mile; at station 1 on the two following days the range at the surface was from 0.03 to 1.43 miles and at depth from 0.07 to 0.96 mile. The surface velocities of the ebb tides are about 0.1 mile greater at their maximum than those of the flood tides in the latitude of Point Lookout, whereas at Cape Henry Light the difference is about 0.5 mile, other conditions being similar.

The salinity of Chesapeake Bay water generally increases with depth. In other words, there must be a slow movement of the denser water from the ocean up the bay in the deepest channels, while the lighter water flows out over the heavier. For the reason mentioned above, however, this current also bears slightly toward the right—that is, in general toward the east side of the bay. Between Cape Henry and Cape Charles the net movement is of course outward, but there is also a slight under current of salt water moving inward at depth, chiefly on the Cape Charles side, which maintains the salinity of the bay.

Table 4 gives in a condensed form the average salinities observed at the surface and at the bottom at each station on the dates for which observations are available. The results are also shown graphically by curves in Figures 11, 12, and 13. In preparing these curves all observations for each station were averaged to a single figure for each period during which samples

were collected. From the curves figures were then taken for each of the 12 months and averaged to obtain the annual mean for that station at the surface

twelfth, and no more, in the annual mean. It is realized that the data are not as extended as might be desirable for calculating either monthly or annual averages,

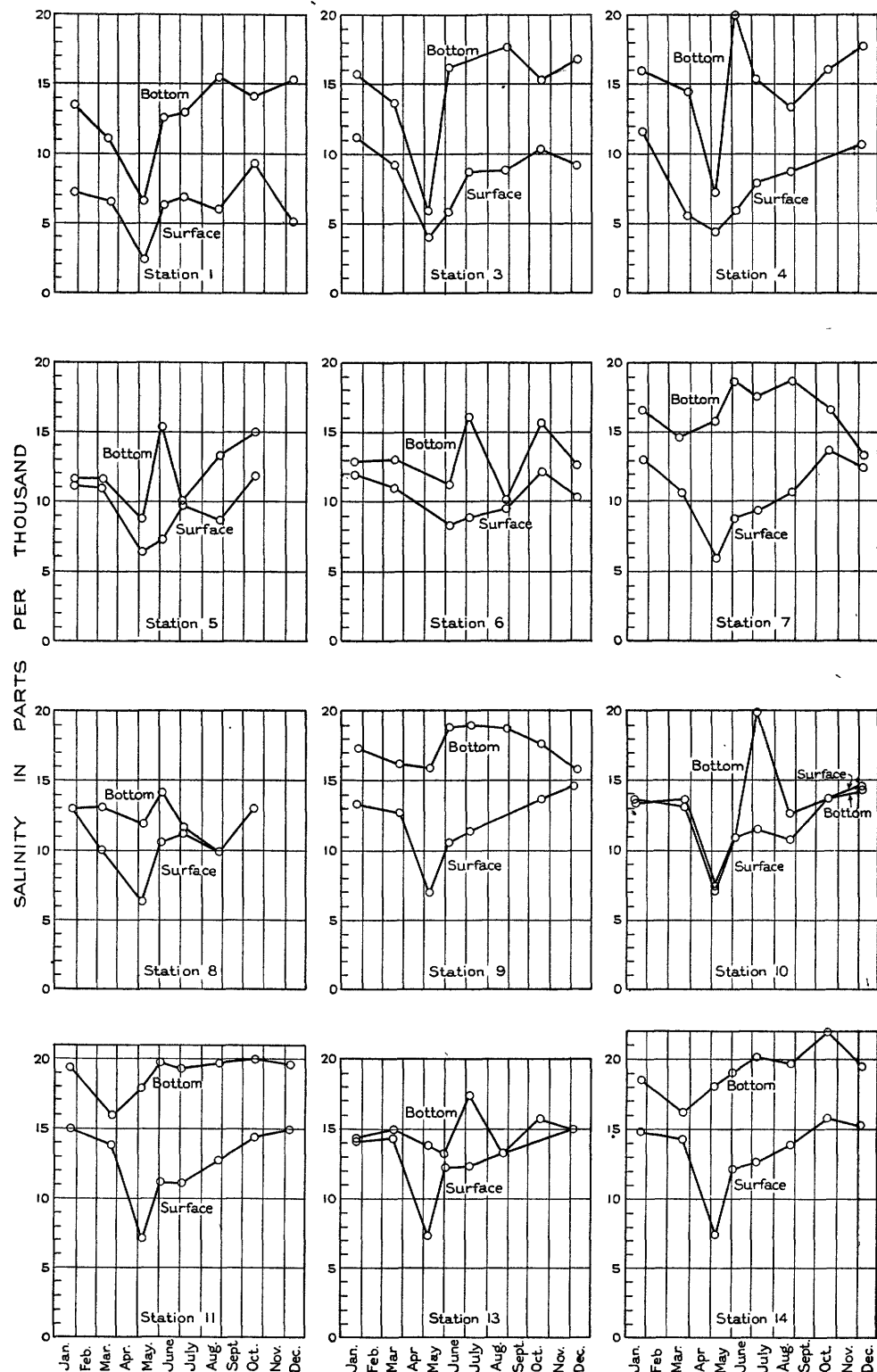


FIGURE 11.—Salinity at stations 1 to 14, Chesapeake Bay, by months

and at the bottom—that is, the annual mean was obtained partly by graphic interpolation and is not exactly the arithmetical mean of the figures in Table 4. As thus calculated each month received a weight of one-

yet the curves and averages give a better idea of the relations than could be obtained from numerical data alone.

It should be borne in mind that like other measurements dependent on such natural conditions as rain-

fall and storms, the salinity is subject to occasional temporary and sometimes large variations from the mean, but it constantly tends to return to a fairly

larly, in the fall, after the evaporation of the summer, the salinity gradually increases to a slightly higher and more steady figure.

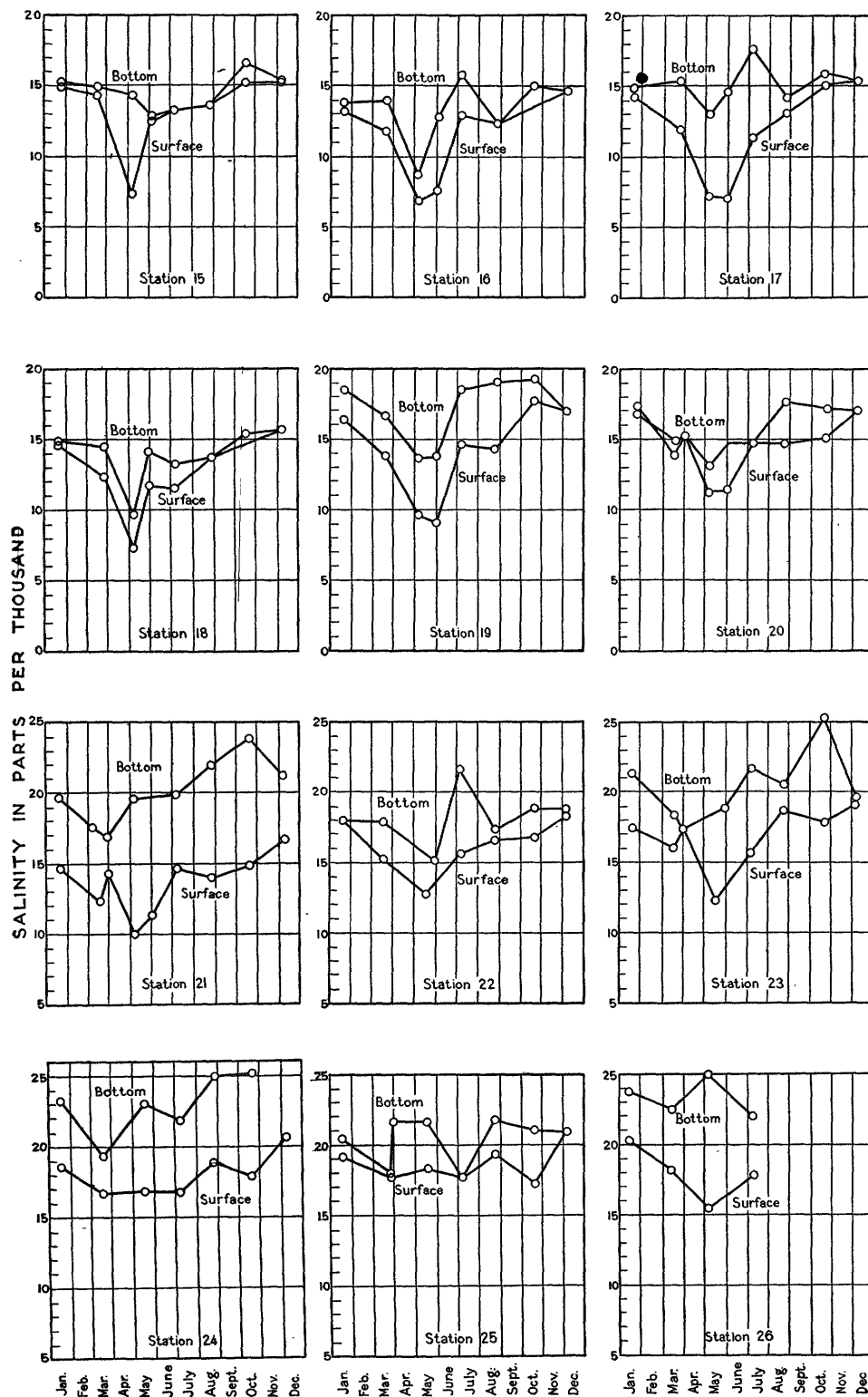


FIGURE 12.—Salinity at stations 15 to 26, Chesapeake Bay, by months

steady and regular figure. As would be expected from the usual spring floods in the Susquehanna River, there is a general tendency toward lower salinities, especially in the upper bay, in the spring. Simi-

VARIATIONS OF SALINITY AT SINGLE STATIONS

The conclusions set forth above are the results of averages and measurements on a large scale. Numerous individual measurements at the different sta-

tions, however, show variations of many kinds, each dependent on a separate factor, as might be expected from the nature of the forces involved. In its simplest terms the process that goes on in Chesapeake Bay is merely one of mixing river water with ocean water—a process in which the winds and the tides take part, the former with occasional large effects, the latter with

conversely, the configuration of the bottom is partly dependent on the currents. The density of the water depends both on its salinity and on its temperature. These separate factors may sometimes assist or sometimes oppose each other, so that the corresponding results occasionally vary widely. Illustrations of these relations may be found in the accompanying

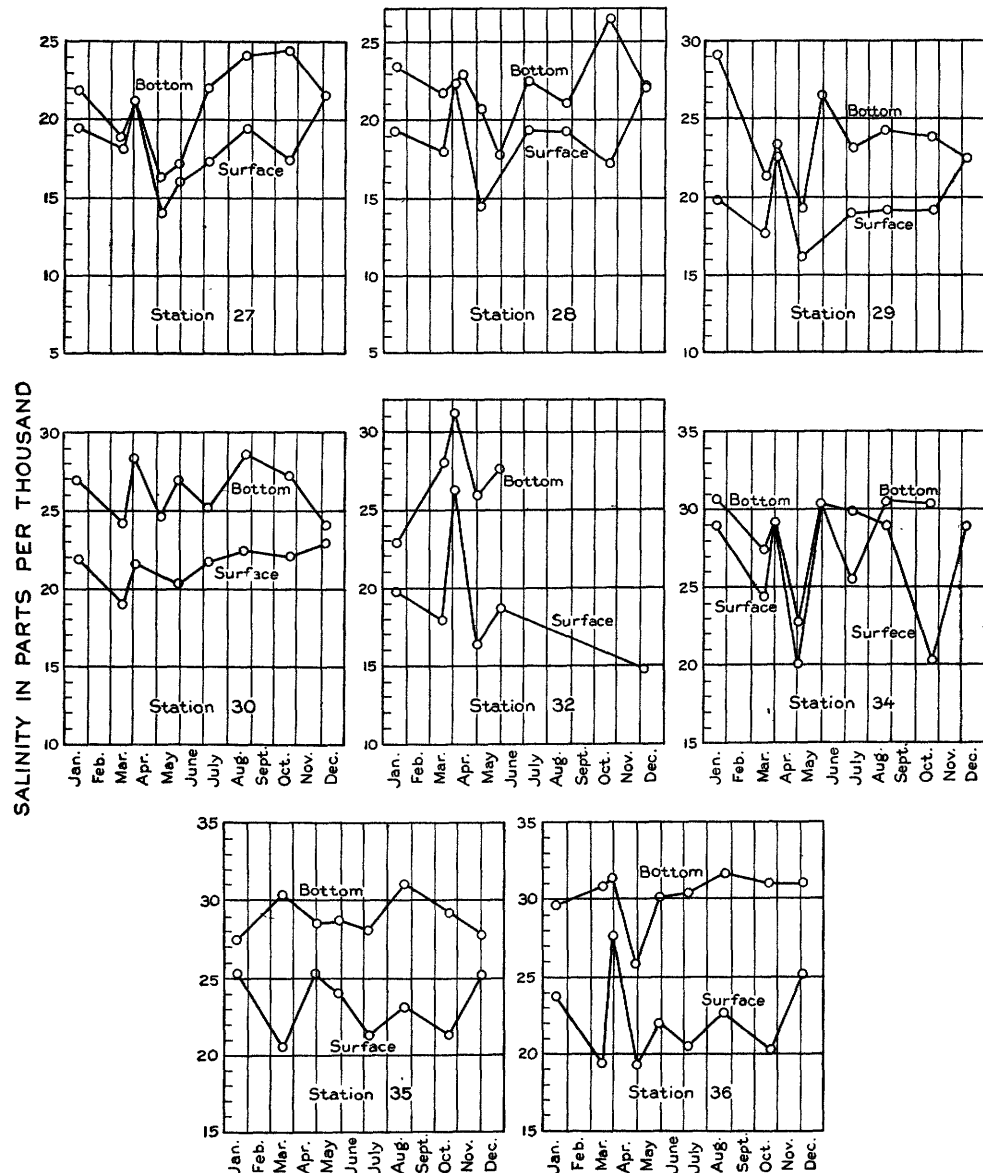


FIGURE 13.—Salinity at stations 27 to 36, Chesapeake Bay, by months

unceasing regularity, and increasing in effect with the nearness to the ocean. Some of the other factors are rainfall, evaporation, and changes in temperature of the water. The adjustments reached are obviously the resultant of a complex interplay of forces, each varying in its own particular way. The discharge of the rivers, the rainfall, and the evaporation vary with the season of the year. The currents in the water are determined not only by the tides, but also by the winds, by the small normal discharge to the ocean, and partly by the configuration of the bottom, although,

data, such as different salinities at the same station in different years, months, days, or even hours of the day, or, on the other hand, occasionally very slight variations over long intervals. Thus the salinities found in May, 1920, were uniformly low over the whole bay.

When it is noted that the average salinity changes a unit in 3 miles at some localities on the bay and that the tides sweep the water back and forth for greater distances than this in many places it is clear that considerable occasional variations are to be ex-

pected at individual stations. Similarly, at many localities the salinity changes on the average as much as a unit in a depth of 5 meters. Greater differences due to incomplete mixing are common.

Continuous records over 24-hour periods at different dates are shown in Table 5 for stations 1 and 14, and two such records are plotted in Figure 15 for four depths at station 14, about the middle of the bay east of Point No Point. These curves show that the surface water and bottom water vary less in salinity than the intermediate waters. The constancy in the bottom water is probably due in part to the lag in its motion caused by friction between the water and the bottom; that of the surface water may be caused by the more thorough mixing brought about by the winds and the waves.

The greatest movement seems to be shown in intermediate waters. In some of these the variations are irregular, as if the sampling bottle had penetrated first one layer then another. In others the variations are clearly due to the tides—that is, flood tides bring denser water, ebb tides lighter water. The differences in density due to differences in temperature are shown in the tables, but most of them are far smaller than those due to differences in salinity, so that only the salinity has been plotted in Figure 15.

The salinity of the water in the deep “holes” of the bay is somewhat more constant, with regard to both depth and the season, than it is in many shallow parts of the bay, as might be expected from analogy with well-known relations in oceanic circulation. The relatively denser water in the “holes” would be expected to be more or less stagnant. In channels this might not be so, however, but sufficient observations have not been made to establish any definite correlations between the density of the water and the flow in the channels.

TABLE 4.—*Salinity of the water at stations in Chesapeake Bay*

[For location of the stations see pl. 13. The figures in parentheses indicate the number of observations averaged to obtain the salinity given]

Station 1 (bottom depth 11 meters)		
Date	Salinity	
	Surface	Bottom
Jan. 27, 1921.....	7.2 (11)	13.5 (9)
Mar. 6, 1920.....	10.3 (11)	12.0 (10)
Mar. 26, 1921.....	3.7 (15)	
Mar. 30, 1922.....	5.6 (5)	10.3 (15)
May 8, 1920.....	2.3	6.5
June 3, 1921.....	6.2 (16)	12.5 (16)
July 3, 1920.....	6.8 (16)	12.8 (15)
Aug. 26, 1920.....	6.0 (16)	15.5 (16)
Oct. 15, 1920.....	9.4 (16)	14.2 (16)
Dec. 10, 1920.....	5.1 (16)	15.3 (16)
Annual mean.....	6.3	12.9

Station 2 (bottom depth 13.7 meters)		
Mar. 7, 1920.....	11.6	15.1

TABLE 4.—*Salinity of the water at stations in Chesapeake Bay—Continued*

Station 3 (bottom depth 13 meters)		
Date	Salinity	
	Surface	Bottom
Jan. 17, 1920.....	12.0	17.2
Jan. 27, 1921.....	10.4	14.2
Mar. 6, 1920.....	12.4	14.8
Mar. 28, 1921.....	6.0	12.4
May 7, 1920.....	4.0	5.8
June 3, 1921.....	5.8	16.2
July 4, 1920.....	8.6	8.9
Aug. 26, 1920.....	8.8 (2)	17.7 (2)
Oct. 17, 1920.....	10.4	15.3
Dec. 9, 1920.....	9.1	16.8
Annual mean.....	8.3	13.9

Station 4 (bottom depth 21 meters)		
Jan. 17, 1920.....	12.3	17.4
Jan. 27, 1921.....	10.9	14.5
Mar. 28, 1921.....	5.3	13.0
Mar. 29, 1922.....	5.7	15.8
May 7, 1920.....	4.4	7.2
June 3, 1921.....	5.9	20.0
July 4, 1920.....	7.9	15.4
Aug. 26, 1920.....	8.7	13.4
Oct. 17, 1920.....		16.0
Dec. 9, 1920.....	10.6	17.7
Annual mean.....	8.1	14.9

Station 5 (bottom depth 10 meters)		
Jan. 25, 1922.....	11.3	12.1
Jan. 27, 1921.....	11.1	11.1
Mar. 7, 1920.....	13.8	14.1
Mar. 28, 1921.....	8.1	9.2
May 7, 1920.....	6.4	8.8
June 3, 1921.....	7.3	15.4
July 4, 1920.....	9.8	10.1
Aug. 26, 1920.....	8.7	13.4
Oct. 17, 1920.....	11.8	15.0
Annual mean.....	9.9	11.8

Station 6 (bottom depth 13 meters)		
Jan. 17, 1920.....	13.0	14.5
Jan. 25, 1922.....	11.6	
Jan. 27, 1921.....	11.4	11.4
Mar. 7, 1920.....	13.7	14.8
Mar. 28, 1921.....	8.4	11.3
June 3, 1921.....	8.4	11.3
July 5, 1920.....	9.0	16.2
Aug. 26, 1920.....	9.6	10.2
Oct. 17, 1920.....	12.2	15.6
Dec. 9, 1920.....	10.4	12.6
Annual mean.....	10.5	13.1

Station 7 (bottom depth 27 meters)		
Jan. 17, 1920.....	13.6	18.1
Jan. 25, 1922.....	13.3	18.4
Jan. 27, 1921.....	12.1	13.3
Mar. 7, 1920.....	13.8	15.7
Mar. 29, 1921.....	7.4	13.5
May 7, 1920.....	5.8	15.7
June 3, 1921.....	8.4	18.6
July 5, 1920.....	9.4	17.5
Aug. 26, 1920.....	10.6	18.7
Oct. 17, 1920.....	13.7	16.5
Dec. 9, 1920.....	12.4	13.3
Annual mean.....	10.8	15.5

TABLE 4.—*Salinity of the water at stations in Chesapeake Bay—Continued*

Station 8 (bottom depth 10 meters)		
Date	Salinity	
	Surface	Bottom
Jan. 16, 1920		13.5
Jan. 25, 1922	13.0	13.1
Jan. 26, 1921	12.4	12.4
Mar. 8, 1920	15.0	15.0
Mar. 29, 1921		11.5
May 7, 1920	6.3	11.9
June 3, 1921	10.6	14.3
July 5, 1920	11.3	11.7
Aug. 25, 1920	9.9	9.9
Oct. 17, 1920	13.0	13.0
Annual mean	10.9	12.4

Station 9 (bottom depth 22 meters)		
Jan. 16, 1920	14.1	18.6
Jan. 24, 1922	13.2	19.8
Jan. 26, 1921	13.0	13.7
Mar. 8, 1920	15.4	15.6
Mar. 29, 1921	10.9	16.2
Mar. 29, 1922	11.9	16.9
May 7, 1920	6.9	15.9
June 3, 1921	10.6	18.9
July 5, 1920	11.4	19.0
Aug. 25, 1920		18.8
Oct. 17, 1920	13.7	17.4
Dec. 9, 1920	14.7	15.8
Annual mean	12.3	17.5

Station 10 (bottom depth 7 meters)		
Jan. 16, 1920	14.1	
Jan. 24, 1922	13.8	13.8
Jan. 26, 1921	13.1	13.1
Mar. 8, 1920	15.6	15.6
Mar. 28, 1921	11.4	11.8
Mar. 29, 1922	12.3	13.7
May 7, 1920	7.0	7.3
June 2, 1920	11.0	11.0
July 5, 1920	11.5	19.9
Aug. 25, 1920	10.7	12.6
Oct. 18, 1920	13.8	13.8
Dec. 8, 1920	14.6	14.5
Annual mean	12.3	13.5

Station 11 (bottom depth 47 meters)		
Jan. 16, 1920	14.9	20.0
Jan. 25, 1922	15.8	20.6
Jan. 26, 1921	14.4	17.7
Mar. 8, 1920	15.9	16.1
Mar. 28, 1922	11.9	15.9
Mar. 30, 1921	13.7	(6)
May 7, 1920	7.1	17.8
June 2, 1921	11.2	19.8
July 5, 1920	11.1	19.4
Aug. 25, 1920	12.8	19.7
Oct. 18, 1920	14.4	20.0
Dec. 8, 1920	14.9	19.6
Annual mean	13.1	18.9

TABLE 4.—*Salinity of the water at stations in Chesapeake Bay—Continued*

Station 13 (bottom depth 13 meters)		
Date	Salinity	
	Surface	Bottom
Jan. 15, 1920	14.2	14.5
Jan. 23, 1922	15.2	15.4
Jan. 25, 1921	13.3	13.3
Mar. 8, 1920	15.8	15.8
Mar. 31, 1921	13.1	14.1
May 6, 1920	7.3	13.8
June 1, 1921	12.2	13.2
July 7, 1920	12.3	17.3
Aug. 24, 1920	13.3	13.3
Oct. 19, 1920		15.7
Dec. 7, 1920	15.0	15.0
Annual mean	13.2	14.8

Station 14 (bottom depth 37 meters)		
Jan. 15, 1920	14.7	20.3
Jan. 23, 1922	15.4 (15)	19.8 (16)
Jan. 25, 1921	14.3 (16)	15.7 (16)
Mar. 8, 1920	15.9	16.4
Mar. 27, 1922	12.7 (12)	16.8 (15)
Mar. 30, 1921	14.2 (16)	15.3 (16)
May 6, 1920	7.3	18.1
June 1, 1921	12.2 (16)	19.2 (16)
July 6, 1920	12.6 (16)	20.1 (16)
Aug. 24, 1920	13.8 (9)	19.6 (15)
Oct. 18, 1920	15.8 (16)	22.0 (16)
Dec. 7, 1920	15.3 (15)	19.5 (16)
Annual mean	13.6	19.2

Station 15 (bottom depth 8 meters)		
Jan. 15, 1920	15.0	15.1
Jan. 24, 1922	15.1	16.1
Jan. 26, 1921	14.5	14.5
Mar. 8, 1920	16.1	16.2
Mar. 28, 1922	12.7	13.6
May 6, 1920	7.3	9.4
June 2, 1921	12.5	12.8
July 6, 1920	13.3	13.2
Aug. 25, 1920	13.6	13.6
Oct. 19, 1920	15.2	16.6
Dec. 8, 1920	15.2	15.3
Annual mean	13.6	14.7

Station 16 (bottom depth 11 meters)		
Jan. 15, 1920	13.7	14.0
Jan. 23, 1922	13.9	14.3
Jan. 24, 1921	11.9	13.2
Mar. 9, 1920	11.2	15.7
Mar. 27, 1922	11.0	13.2
Mar. 31, 1921	13.3	13.2
May 6, 1920	6.8	8.7
June 1, 1921	7.5	12.8
July 7, 1920	12.9	15.7
Aug. 24, 1920	12.3	12.4
Oct. 19, 1920		15.0
Dec. 7, 1920	14.6	14.7
Annual mean	11.9	13.5

TABLE 4.—*Salinity of the water at stations in Chesapeake Bay—Continued*

Station 17 (bottom depth 22 meters)		
Date	Salinity	
	Surface	Bottom
Jan. 15, 1920	14.6	15.5
Jan. 23, 1922	14.6	14.2
Jan. 24, 1921	13.6	15.9
Mar. 9, 1920	12.1	15.3
Mar. 27, 1922	10.4	14.8
Mar. 31, 1921	13.1	13.0
May 6, 1920	7.2	14.6
June 1, 1921	7.2	17.6
July 7, 1920	11.4	14.3
Aug. 24, 1920	13.2	15.9
Oct. 19, 1920	15.0	15.4
Dec. 7, 1920	15.4	15.4
Annual mean	12.4	15.2

Station 18 (bottom depth 12 meters)		
Jan. 15, 1920	13.9	14.8
Jan. 23, 1922	15.9	15.8
Jan. 25, 1921	14.0	14.0
Mar. 9, 1920	12.6	15.9
Mar. 27, 1922	11.8	13.4
Mar. 31, 1921	12.9	14.6
May 6, 1920	7.2	9.6
June 1, 1921	11.7	14.1
July 7, 1920	11.5	13.3
Aug. 24, 1920	13.6	13.6
Oct. 19, 1920	15.6	15.4
Dec. 7, 1920	15.6	15.6
Annual mean	13.0	14.1

Station 19 (bottom depth 12.8 meters)		
Jan. 14, 1920	16.1	19.4
Jan. 23, 1922	18.2	18.8
Jan. 24, 1921	14.5	17.2
Mar. 9, 1920	14.6	16.6
Mar. 26, 1922	11.6	16.6
Mar. 31, 1921	15.1	16.5
May 6, 1920	9.7	13.6
June 1, 1921	9.1	13.8
July 7, 1920	14.7	18.5
Aug. 23, 1920	14.4	19.1
Oct. 20, 1920	17.7	19.3
Dec. 6, 1920	16.9	16.8
Annual mean	14.5	17.3

Station 20 (bottom depth 12 meters)		
Jan. 23, 1922	18.1	19.2
Jan. 24, 1921	15.5	15.5
Mar. 9, 1920	14.2	15.8
Mar. 26, 1922	15.7	12.1
Apr. 1, 1921	15.2	15.3
May 6, 1920	11.2	13.1
June 1, 1921	11.4	14.7
July 7, 1920	14.7	14.8
Aug. 23, 1920	14.7	17.6
Oct. 20, 1920	15.1	17.1
Dec. 6, 1920	17.0	17.0
Annual mean	14.8	16.0

TABLE 4.—*Salinity of the water at stations in Chesapeake Bay—Continued*

Station 21 (bottom depth 44 meters)		
Date	Salinity	
	Surface	Bottom
Jan. 14, 1920	14.9	21.8
Jan. 23, 1922	16.0	18.3
Jan. 24, 1921	13.1	18.7
Mar. 9, 1920	13.0	17.5
Mar. 26, 1922	11.6	16.8
Apr. 1, 1921	14.3	19.6
May 6, 1920	10.0	11.3
June 1, 1921	11.3	19.8
July 7, 1920	14.6	21.9
Aug. 23, 1920	14.0	23.8
Oct. 20, 1920	14.9	21.1
Dec. 6, 1920	16.6	21.1
Annual mean	13.8	20.3

Station 22 (bottom depth 13 meters)		
Jan. 13, 1920	16.9	22.3
Jan. 22, 1922	22.3	17.0
Jan. 24, 1921	14.7	14.7
Mar. 9, 1920	16.2	17.4
Mar. 26, 1922	14.3	18.2
Apr. 1, 1921	16.5	15.1
May 5, 1920	12.0	21.6
May 31, 1921	13.3	17.3
July 8, 1920	15.6	18.9
Aug. 23, 1920	16.5	18.9
Oct. 20, 1920	16.7	18.9
Dec. 6, 1920	18.3	18.9
Annual mean	16.0	18.1

Station 23 (bottom depth 13 meters)		
Jan. 13, 1920	16.5	23.3
Jan. 22, 1922	18.2	23.0
Jan. 24, 1921	17.7	17.9
Mar. 9, 1920	16.7	17.9
Mar. 26, 1922	15.4	18.9
Apr. 1, 1921	17.1	17.4
May 5, 1920	12.0	13.9
May 31, 1921	12.6	21.6
July 8, 1920	15.6	20.5
Aug. 23, 1920	18.7	25.2
Oct. 20, 1920	17.9	19.7
Dec. 6, 1920	19.2	19.7
Annual mean	15.1	20.6

Station 24 (bottom depth 15 meters)		
Jan. 13, 1920	18.0	23.6
Jan. 22, 1922	21.5	24.5
Jan. 23, 1921	16.2	21.6
Mar. 10, 1920	17.5	19.2
Mar. 26, 1922	15.7	19.4
May 5, 1920	14.7	21.0
May 31, 1921	18.9	25.0
July 8, 1920	16.7	21.8
Aug. 23, 1920	18.9	25.0
Oct. 20, 1920	17.9	25.1
Dec. 6, 1920	20.6	22.9
Annual mean	17.9	22.9

TABLE 4.—*Salinity of the water at stations in Chesapeake Bay—Continued*

Station 25 (bottom depth 8 meters)		
Date	Salinity	
	Surface	Bottom
Jan. 13, 1920	18.8	20.1
Jan. 22, 1922	20.6	22.5
Jan. 23, 1921	18.1	18.6
Mar. 26, 1922	17.6	18.0
Apr. 1, 1921	---	21.6
May 5, 1920	17.7	18.3
May 31, 1921	18.9	24.9
July 8, 1920	17.7	17.7
Aug. 23, 1920	19.4	21.7
Oct. 20, 1920	17.2	21.0
Dec. 6, 1920	21.0	20.9
Annual mean	18.4	20.4

Station 26 (bottom depth 23 meters)		
Jan. 13, 1920	20.3	23.8
Mar. 11, 1920	18.2	22.5
May 5, 1920	15.5	24.9
July 8, 1920	17.7	22.0
Annual mean	18.3	23.1

Station 27 (bottom depth 10 meters)		
Jan. 12, 1920	19.7	21.9
Jan. 22, 1922	20.1	20.5
Jan. 23, 1921	18.7	23.4
Mar. 11, 1920	18.5	19.0
Mar. 26, 1922	17.8	18.8
Apr. 2, 1921	21.1	21.2
May 5, 1920	14.0	16.3
May 31, 1921	16.1	17.1
July 8, 1920	17.3	22.1
Aug. 23, 1920	19.5	24.2
Oct. 20, 1920	17.3	24.5
Dec. 5, 1920	21.5	21.5
Annual mean	18.4	21.3

Station 28 (bottom depth 13 meters)		
Jan. 12, 1920	19.3	22.6
Jan. 22, 1922	19.7	24.0
Jan. 23, 1921	19.0	24.6
Mar. 11, 1920	18.4	19.6
Mar. 26, 1922	17.4	23.7
Apr. 2, 1921	22.3	23.0
May 5, 1920	14.5	20.7
May 31, 1921	---	17.7
July 8, 1920	19.4	22.5
Aug. 22, 1920	19.3	21.0
Oct. 20, 1920	17.1	26.4
Dec. 5, 1920	22.2	22.0
Annual mean	18.7	22.4

Station 29 (bottom depth 28 meters)		
Jan. 12, 1920	20.3	24.3
Jan. 22, 1922	21.1	28.5
Jan. 23, 1921	18.2	24.5
Mar. 11, 1920	18.5	20.3
Mar. 26, 1922	16.7	22.3
Apr. 2, 1921	22.7	23.4
May 5, 1920	16.1	19.2
May 31, 1921	---	27.0
July 8, 1920	18.9	23.1
Aug. 22, 1920	19.2	24.3
Oct. 21, 1920	19.0	23.9
Dec. 5, 1920	22.4	22.5
Annual mean	19.3	23.9

TABLE 4.—*Salinity of the water at stations in Chesapeake Bay—Continued*

Station 30 (bottom depth 42 meters)		
Date	Salinity	
	Surface	Bottom
Jan. 11, 1920	23.3	29.3
Jan. 22, 1922	24.0	25.9
Jan. 23, 1921	18.4	25.4
Mar. 11, 1920	18.7	22.9
Mar. 25, 1922	19.3	25.4
Apr. 2, 1921	21.6	28.3
May 5, 1920	20.9	24.6
May 31, 1921	20.2	26.9
July 8, 1920	21.7	25.2
Aug. 22, 1920	22.4	28.5
Oct. 21, 1920	22.0	27.1
Dec. 5, 1920	22.8	24.0
Annual mean	21.5	26.2

Station 32 (bottom depth 23 meters)		
Jan. 10, 1920	21.3	23.8
Jan. 21, 1922	20.2	23.8
Jan. 22, 1921	17.8	21.2
Mar. 12, 1920	17.7	28.8
Mar. 25, 1922	18.4	27.2
Apr. 2, 1921	26.3	31.2
May 1, 1920	16.3	25.8
May 31, 1921	18.7	27.6
Dec. 4, 1920	14.8	---
Annual mean	17.7	25.8

Station 34 (bottom depth 18 meters)		
Jan. 11, 1920	29.4	30.9
Jan. 21, 1922	28.9	31.3
Jan. 22, 1921	28.6	30.0
Mar. 12, 1920	24.5	29.8
Mar. 25, 1922	24.2	25.1
Apr. 2, 1921	29.1	29.0
May 1, 1920	20.0	22.6
May 30, 1921	30.4	30.4
July 9, 1920	29.8	25.4
Aug. 22, 1920	28.9	30.6
Oct. 21, 1920	20.2	30.4
Dec. 5, 1920	28.8	---
Annual mean	26.6	29.3

Station 35 (bottom depth 15 meters)		
Jan. 11, 1920	25.6	30.9
Jan. 21, 1922	29.0	24.2
Jan. 22, 1921	21.6	27.4
Mar. 12, 1920	21.7	30.3
Mar. 25, 1922	19.4	30.6
May 1, 1920	25.4	28.6
May 30, 1921	24.1	28.8
July 9, 1920	21.3	28.1
Aug. 22, 1920	23.2	31.1
Oct. 21, 1920	21.3	29.3
Dec. 4, 1920	25.3	27.8
Annual mean	23.1	29.1

Station 36 (bottom depth 24 meters)		
Jan. 11, 1920	28.2	31.1
Jan. 21, 1922	23.9	29.3
Jan. 22, 1921	19.2	28.8
Mar. 12, 1920	20.6	30.7
Mar. 25, 1922	18.4	31.1
Apr. 2, 1921	27.7	31.3
May 1, 1920	19.3	25.8
May 30, 1921	22.0	30.1
July 9, 1920	20.5	30.4
Aug. 22, 1920	22.7	31.7
Oct. 21, 1920	20.3	31.0
Dec. 4, 1920	25.2	31.0
Annual mean	22.0	31.3

The mean annual salinities at the surface and at the bottom for certain stations are also shown in Figure 14, together with the depth and the distance from the mouth of the bay. It is obvious from this diagram that the salinity increases more or less regularly in passing down the bay, that it is greater at depth than at the surface, and that the difference between the surface and bottom salinities tends to be greater at the stations where the water is deeper and less at those where it is shallow.

The mean annual salinities at the surface and bottom at all the stations are shown in their approximate locations on a map of the bay in Plate 13. Table 5 gives

primarily by its density, and this in turn by either its salinity or its temperature. In the water of Chesapeake Bay the salinity is by far the more influential variable, although in a few places listed in Table 5 the position of the water appears to be determined in part by its temperature—that is, in water of approximately the same salinity the colder water is found to lie deeper because of its greater density. Several of the samples appear to indicate unstable conditions, but these are relatively rare or within the limits of experimental errors.

The densities might have been plotted exactly as the salinities were, and the relations shown would be

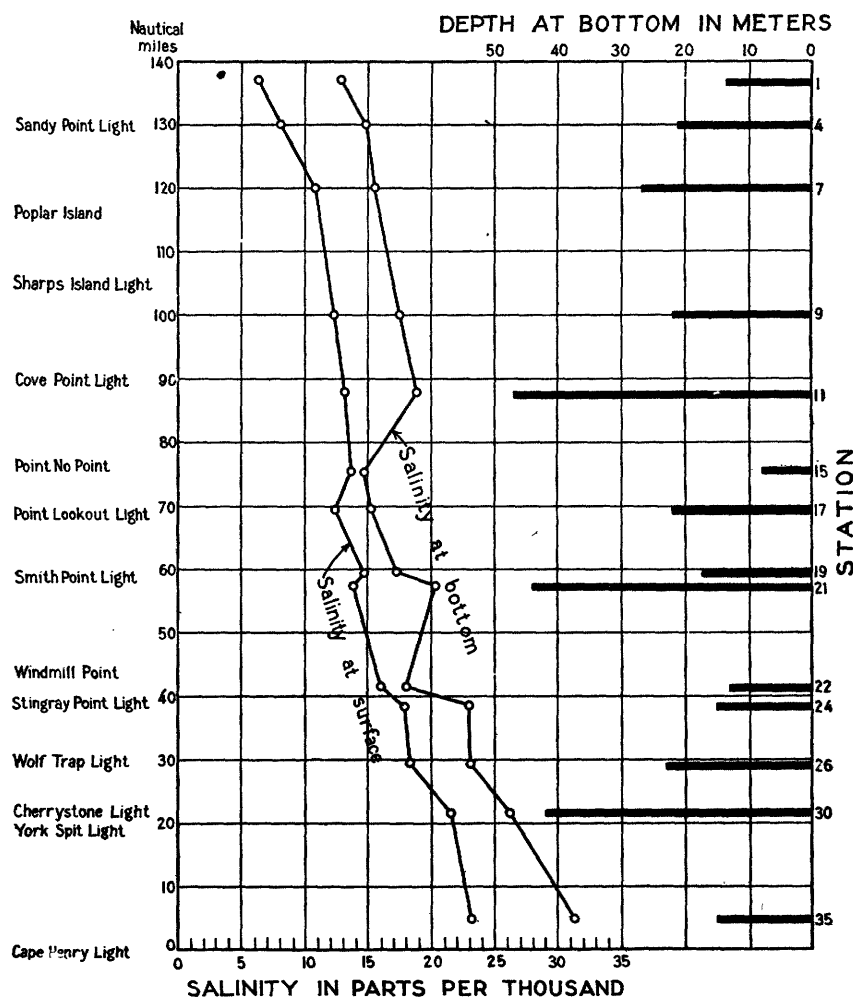


FIGURE 14.—Mean annual salinity and depth at certain stations in Chesapeake Bay

the complete record of all the salinity determinations. The bottom depth was not recorded in all the observations; the largest figure given under "Depth" for a set of observations at the same date and time, if an uneven figure (as 9.1, 25.32), indicates bottom depth.

DENSITY OF THE WATER

In Table 5 is also given the density of each sample of water for its temperature at the time of collection. It is well known that the relative position of any considerable portion of a mass of water is determined

essentially similar, but the salinities were chosen because of their greater weight in determining the density and as being of more general interest. The relations are quantitatively different from those in sea water, as the variations in salinity in water of the open sea are not nearly as great as those observed in Chesapeake Bay. The temperature accordingly assumes greater significance in determining currents of sea water. Moreover, the differences in temperature between surface and bottom sea water are, on account of the greater depths involved, considerably greater than those observed in Chesapeake Bay.

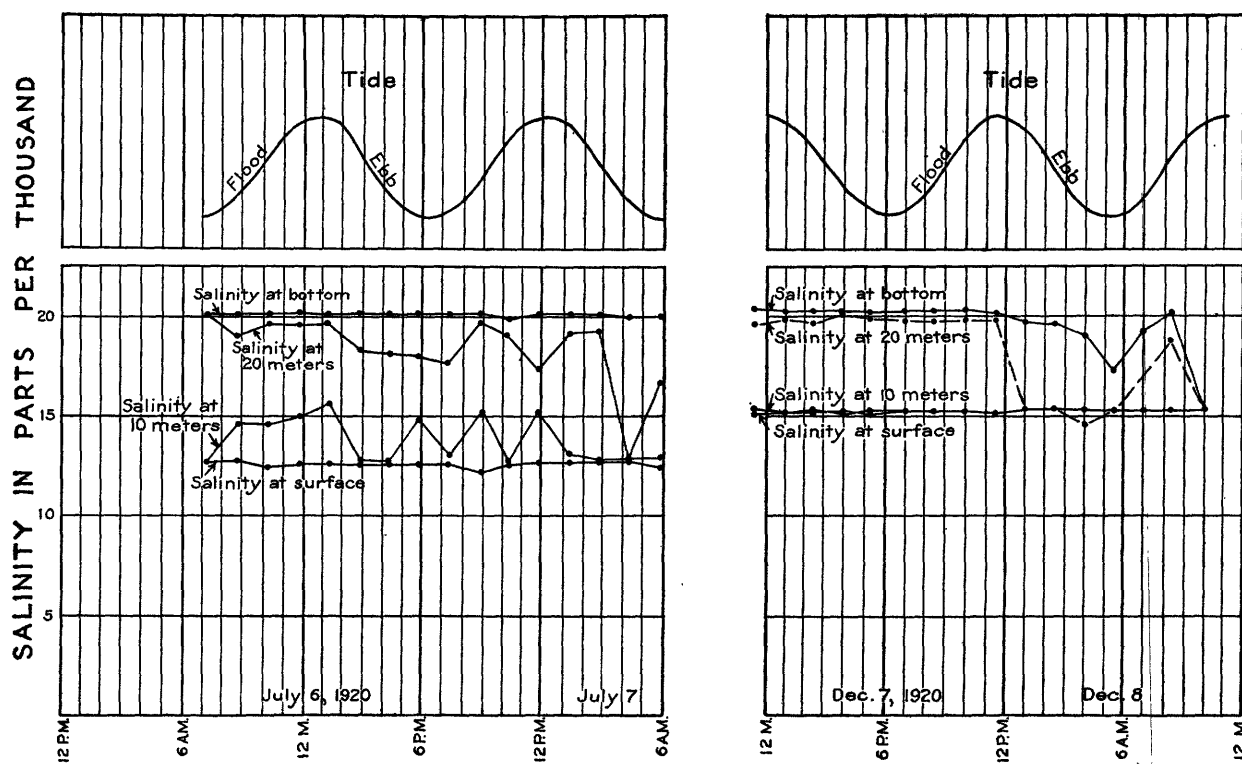


FIGURE 15.—Salinity at station 14, Chesapeake Bay, for 24-hour periods on July 6 and 7 and December 7 and 8, 1920, at surface and at depths of 10 meters, 20 meters, and bottom

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay*

Station 1 (bottom blue-gray mud)

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920						
Mar. 6, 10.15 a. m.	Beginning to ebb	0		0.0	10.46	1.00839
		6.1		-1.3	10.91	1.00870
		9.1		-1.3	11.29	1.00830
11.45 a. m.	½ ebb	0		.0	10.35	1.00830
		3.05		-.3	10.32	1.00826
		6.1		2.8	11.73	1.00942
1.15 p. m.	¾ ebb	9.1		.7	10.86	1.00872
		0		.4	10.05	1.00804
		3.05		.0	10.11	1.00810
2.45 p. m.	Slack	6.1		2.0	10.17	1.00818
		9.1		2.8	10.71	1.00858
		0		.2	9.51	1.00761
		3.05		.0	9.76	1.00782
		6.1		-.3	9.41	1.00750
		9.1		1.7	10.52	1.00843
4.15 p. m.	Slack	0		.0	10.45	1.00837
		3.05		2.7	10.42	1.00834
		6.1		2.8	10.44	1.00838
5.45 p. m.	Beginning flood	9.1		3.7	11.87	1.00949
		0		2.2	10.91	1.00876
		3.05		.7	10.96	1.00878
		6.1		.0	10.91	1.00875
		9.1		.2	10.88	1.00872
		0		.2	10.05	1.00805
7.15 p. m.	½ flood	3.05		-.6	10.07	1.00807
		6.1		.2	10.46	1.00839
		9.1		.6	11.01	1.00882
8.45 p. m.	¾ flood	0		.0	9.72	1.00779
		3.05		-.3	9.96	1.00797
		6.1		1.7	11.33	1.00909
		9.1		-.3	14.23	1.01412
		0		-.3	9.79	1.00783
		3.05		-.6	10.00	1.00801
10.15 p. m.	Beginning ebb	6.1		-.3	9.71	1.00778
		9.1		1.7	15.70	1.01261
		0		.6	10.58	1.00847
11.45 p. m.	½ ebb	3.05		-.3	10.68	1.00855
		6.1			10.66	1.00855
		9.1		-.3	12.54	1.01005
Mar. 7, 1.15 a. m.	¾ ebb	6.1		-1.3	10.92	1.00875
		9.1		1.7	10.72	1.00859
May 8, 6.30 a. m.	Flood	0		12.8	2.26	1.00122
		11.37		12.6	6.54	1.00437
July 3, 2.20 p. m.	¼ ebb	0			6.97	1.00538
		5		24.2	7.15	1.00302
		10		20.5	11.79	1.00710
		12.5		21.0	11.10	1.00547
		0		24.9	6.20	1.00262
		5		24.6	8.60	1.00369
3.50 p. m.	½ ebb	10		24.6	12.78	1.00681
		12.5		24.6	11.54	1.00590
		0		24.8	5.93	1.00163
5.28 p. m.	Full ebb	5		24.9	8.64	1.00365
		10		24.6	9.52	1.00424
		12.5		24.9	13.12	1.00699
6.58 p. m.	Beginning flood	0		24.9	6.32	1.00189
		5		24.9	8.75	1.00371
		10		24.1	13.48	1.00746
		12.5		24.4	13.52	1.00743
		0		24.6	6.36	1.00201
		5		24.6	10.20	1.00487
8.28 p. m.	¼ flood	10		24.1	13.03	1.00712
		12.5		23.9	13.35	1.01048
		0		24.1	6.72	1.00238
9.58 p. m.	½ flood	5		24.2	9.54	1.00449
		10		23.9	11.80	1.00626
		12.5		24.1	12.83	1.00697
11.28 p. m.	¾ flood	0		24.1	6.80	1.00245
		5		23.9	8.49	1.00378
		10		23.9	12.24	1.00660
		12.5		23.9	13.31	1.00740

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 1—Continued

Date and time of collection		Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
				Air	Sample		
1920—Continued							
July 4, 12.58 a. m.	Full flood	0		23.9	6.90	1.00252	
		5		23.6	7.32	1.00289	
		10		23.6	11.05	1.00569	
2.28 a. m.	Beginning flood	12.5		23.9	13.02	1.00691	
		0		23.6	7.14	1.00283	
		5		23.9	9.05	1.00420	
3.58 a. m.	½ ebb	10		23.6	10.87	1.00567	
		12.5		23.6	12.14	1.00660	
		0		23.9	6.91	1.00208	
5.28 a. m.	Full ebb	5		23.6	6.98	1.00273	
		10		23.6	11.08	1.00580	
		12.5		22.9	12.44	1.00699	
6.58 a. m.	Beginning flood	0		23.6	6.76	1.00256	
		5		23.9	7.18	1.00287	
		10		23.4	9.64	1.00487	
8.28 a. m.	¾ flood	12.5		23.6	12.60	1.00721	
		0		23.9	6.74	1.00246	
		5		23.6	7.66	1.00323	
9.58 a. m.	½ flood	10		23.6	11.15	1.00585	
		12.5		23.9	12.79	1.00701	
		0		23.6	7.20	1.00289	
11.28 a. m.	¾ flood	5		23.9	7.55	1.00308	
		10		23.4	11.41	1.00611	
		12.5		23.6	12.46	1.00682	
12.58 p. m.	Full flood	0		23.9	7.45	1.00294	
		5		23.6	8.82	1.00485	
		10		23.4	11.65	1.00629	
Aug. 26, 12 m.		12.5		23.6	12.33	1.00674	
		0		24.6	7.47	1.00293	
		5		23.6	11.40	1.00613	
1.30 p. m.		10		23.6	12.09	1.00656	
		12.5		23.9	12.40	1.00672	
		0		23.6	7.47	1.00309	
3 p. m.		5		23.9	9.06	1.00406	
		10		23.9	10.87	1.00556	
		12.5		23.9			
4.30 p. m.		0		23.5	4.75	1.00107	
		5		24.4	14.21	1.00782	
		Bottom.		24.2	15.21	1.00873	
6 p. m.		0		24.0	4.91	1.00117	
		5		24.4	15.21	1.00867	
		Bottom.		24.4	14.69	1.00829	
7.30 p. m.		0		24.0	5.75	1.00170	
		5		24.1	11.93	1.00630	
		Bottom.		24.2	16.11	1.00940	
9 p. m.		0		23.9	5.86	1.00187	
		5		24.0	12.24	1.00756	
		Bottom.		24.2	15.70	1.00912	
10.30 p. m.		0		23.7	6.05	1.00199	
		5		24.8	10.77	1.00526	
		Bottom.		24.2	16.03	1.00936	
12 p. m.		0		23.6	6.12	1.00207	
		5		24.2	11.86	1.00623	
		Bottom.		24.2	16.20	1.00948	
Aug. 27, 1.30 a. m.		0		23.4	5.69	1.00180	
		5		24.1	13.09	1.00716	
		Bottom.		24.2	15.41	1.00888	
3 a. m.		0		23.8	5.68	1.00169	
		5		23.4	13.86	1.00794	
		Bottom.		24.4	14.79	1.00838	
4.30 a. m.		0		23.5	6.14	1.00216	
		5		23.5	13.79	1.00790	
		Bottom.		24.2	15.80	1.00917	
Aug. 27, 1.30 a. m.		0		23.4	6.05	1.00207	
		5		24.2	14.38	1.00811	
		Bottom.		24.2	16.02	1.00935	
3 a. m.		0		23.4	6.15	1.00214	
		5		23.1	11.70	1.00638	
		Bottom.		24.2	16.11	1.00971	
4.30 a. m.		0		24.3	6.51	1.00219	
		5		24.0	11.78	1.00622	
		Bottom.		24.2	15.94	1.00928	

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 1—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920—Continued						
Aug. 27, 6 a. m.		0		23. 1	7. 04	1. 00290
		5		24. 0	10. 74	1. 00544
		Bottom.		24. 2	15. 69	1. 00910
7.30 a. m.		0		24. 8	7. 22	1. 00259
		5		24. 9	9. 37	1. 00417
		Bottom.		24. 2	14. 11	1. 00792
9 a. m.		0		23. 2	6. 48	1. 00245
		5		24. 0	11. 80	1. 00623
		Bottom.		24. 2	14. 90	1. 00851
10.30 a. m.		0		23. 6	5. 62	1. 00170
		5		24. 1	12. 86	1. 00700
		Bottom.		24. 3	15. 72	1. 00909
Oct. 15, 8.20 p. m.		0		19. 8	9. 25	1. 00534
		5		20. 0	12. 48	1. 00774
		Bottom.		19. 9	13. 51	1. 00855
9.50 p. m.		0		19. 6	9. 81	1. 00580
		5		19. 3	11. 62	1. 00724
		Bottom.		20. 1	13. 97	1. 00884
11.20 p. m.		0		19. 5	8. 43	1. 00478
		5		19. 8	12. 55	1. 00785
		Bottom.		20. 2	13. 96	1. 00881
Oct. 16, 12.50 a. m.		0		18. 7	8. 07	1. 00468
		5		19. 2	10. 77	1. 00662
		Bottom.		20. 0	14. 01	1. 00889
2.20 a. m.		0		19. 7	9. 23	1. 00533
		5		19. 4	9. 67	1. 00576
		Bottom.		20. 1	13. 85	1. 00875
3.50 a. m.		0		19. 4	8. 75	1. 00503
		5		19. 6	12. 84	1. 00808
		Bottom.		20. 1	14. 05	1. 00890
5.20 a. m.		0		19. 3	9. 72	1. 00579
		5		19. 0	10. 18	1. 00621
		Bottom.		19. 9	13. 26	1. 00835
6.50 a. m.		0		19. 5	11. 10	1. 00680
		5		19. 9	13. 43	1. 00847
		Bottom.		20. 4	14. 24	1. 00896
8.20 a. m.		0		18. 9	10. 00	1. 00604
		5		19. 2	10. 77	1. 00662
		Bottom.		23. 9	15. 14	1. 00877
9.50 a. m.		0		19. 5	10. 07	1. 00610
		5		19. 6	12. 42	1. 00777
		Bottom.		20. 4	15. 03	1. 00957
11.20 a. m.		0		19. 8	8. 88	1. 00505
		5		19. 7	11. 27	1. 00688
		Bottom.		20. 3	14. 24	1. 00899
12.50 p. m.		0		20. 1	9. 66	1. 00557
		5		19. 6	10. 39	1. 00614
		Bottom.		20. 2	14. 59	1. 00928
2.20 p. m.		0		20. 1	9. 49	1. 00545
		5		19. 5	11. 80	1. 00732
		Bottom.		20. 0	14. 78	1. 00947
3.50 p. m.		0		19. 9	9. 60	1. 00558
		5		19. 7	12. 38	1. 00772
		Bottom.		20. 2	14. 10	1. 00891
5.20 p. m.		0		20. 3	8. 69	1. 00480
		5		19. 8	11. 89	1. 00734
		Bottom.		20. 1	14. 05	1. 00890
6.50 p. m.		0		20. 3	9. 12	1. 00513
		5		19. 7	10. 86	1. 00658
		Bottom.		20. 5	15. 05	1. 00956
Dec. 10, 7.30 a. m.	Full flood	0		7. 0	9. 13	1. 00716
		5		8. 8	13. 85	1. 01070
		Bottom.		9. 9	17. 23	1. 01320
9 a. m.	¼ ebb	0		6. 4	6. 92	1. 00529
		5		8. 6	13. 06	1. 01010
		Bottom.		9. 9	16. 30	1. 01249
10.30 a. m.	½ ebb	0		5. 6	4. 65	1. 00299
		5		8. 1	12. 50	1. 00971
		Bottom.		10. 4	16. 98	1. 01293
12 m.	¾ ebb	0		5. 4	3. 84	1. 00299
		5		8. 7	12. 21	1. 00943
		Bottom.		10. 2	16. 98	1. 01298

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 1—Continued.

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920—Continued						
Dec. 10, 1.30 p. m.	Slack	0		6.0	4.94	1.00392
		5		8.5	13.48	1.01043
3 p. m.	1/3 flood	Bottom.		8.3	11.76	1.00912
		0		5.7	4.09	1.00320
4.30 p. m.	1/2 flood	5		7.3	10.50	1.00822
		Bottom.		10.0	16.26	1.01243
6 p. m.	3/4 flood	0		5.4	3.77	1.00293
		5		8.4	13.95	1.01080
7.30 p. m.	Full flood	Bottom.		10.1	16.93	1.01294
		0		5.8	4.59	1.00358
9 p. m.	Beginning ebb	5		8.9	14.27	1.01102
		Bottom.		10.3	17.38	1.01325
10.30 p. m.	1/3 ebb	0		5.8	6.16	1.00491
		5		8.1	12.67	1.00984
12 p. m.	1/2 ebb	Bottom.		10.0	16.40	1.01254
		0		5.9	5.21	1.00414
Dec. 11, 1.30 a. m.	Slack	5		7.8	12.24	1.00955
		Bottom.		8.7	13.85	1.01069
3 a. m.	Beginning flood	0		5.9	5.93	1.00472
		5		7.3	8.42	1.00659
4.30 a. m.	1/2 flood	Bottom.		9.2	15.42	1.01187
		0		5.8	5.70	1.00452
6 a. m.	3/4 flood	5		5.9	6.02	1.00478
		Bottom.		9.0	14.02	1.01180
Jan. 27, 2.35 p. m.	1/2 ebb; wind NE., force 1	0		5.4	4.30	1.00335
		5	6.6	5.3	4.38	1.00344
4.05 p. m.	3/4 ebb	Bottom.		8.4	13.11	1.01016
		0		5.4	4.35	1.00343
5.35 p. m.	Slack	5		5.4	4.45	1.00350
		Bottom.		8.7	13.25	1.01020
7.05 p. m.	Beginning flood	0		5.4	3.85	1.00300
		5		8.2	13.17	1.01022
8.35 p. m.	1/3 flood	Bottom.		8.8	13.52	1.01044
		0		5.4	3.90	1.00305
10.05 p. m.	3/4 flood	5		6.3	4.74	1.00370
		Bottom.		9.2	14.80	1.01139
1921						
Jan. 27, 2.35 p. m.	1/2 ebb; wind NE., force 1	0				
		5				
4.05 p. m.	3/4 ebb	11.89		1.0	7.08	1.00569
		0		.5	7.24	1.00580
5.35 p. m.	Slack	5		3.7		
		11.89		1.3	6.44	1.00516
7.05 p. m.	Beginning flood	5		1.7	7.51	1.00603
		11.89		1.8	14.17	1.01134
8.35 p. m.	1/3 flood	0		1.3	6.91	1.00553
		5		1.7	9.90	1.00554
10.05 p. m.	3/4 flood	11.89		1.8	14.10	1.01132
		0		.9	7.22	1.00579
11.35 p. m.	Full flood	5		3.6	12.05	1.00967
		11.89		3.7	14.20	1.01134
Jan. 28, 1.05 a. m.	Beginning flood	0		.8	8.49	1.00681
		5		1.9	11.02	1.00886
2.35 a. m.	1/3 ebb	11.89		3.7	14.23	1.01137
		0		.6	8.27	1.00663
4.05 a. m.	3/4 ebb	5		1.3	11.29	1.00907
		11.89		3.7	14.01	1.01125
6.35 a. m.	Slack	0		.8	8.53	1.00684
		5		1.2		
Jan. 28, 1.05 a. m.	Beginning flood	11.89		3.3		
		0		.4	7.64	1.00610
2.35 a. m.	1/3 ebb	5		3.2	13.63	1.01092
		11.89		3.7	13.97	1.01113
4.05 a. m.	3/4 ebb	0		.3	6.92	1.00552
		5		1.5	6.91	1.00554
6.35 a. m.	Slack	11.89		3.5	13.80	1.01104
		0		3.1	6.23	1.00502
Jan. 28, 1.05 a. m.	Beginning flood	5		3.9	13.13	1.01054
		11.89		3.5	13.95	1.01117
2.35 a. m.	1/3 ebb	0		.3	5.99	1.00478
		5		1.6	8.54	1.00684
4.05 a. m.	3/4 ebb	11.89		.9	8.70	1.00700
		0				

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 1—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1921—Continued						
Mar. 26, 7.30 p. m.	$\frac{3}{4}$ flood	0		10.2	2.45	1.00167
		5		9.7	7.06	1.00530
		7		9.4	7.18	1.00542
9 p. m.	Flood	0		10.8	4.02	1.00283
		5		9.3		
		7			6.46	
10.30 p. m.	$\frac{1}{3}$ ebb	0		10.0	5.39	1.00398
		7		9.3	7.69	1.00584
12 p. m.	$\frac{2}{3}$ ebb	0		10.8	3.71	1.00259
		7		9.3	7.49	1.00568
Mar. 27, 1.30 a. m.	Slack	0		12.0	3.10	1.00197
		7		9.4	8.23	1.00627
		0		10.9	3.62	1.00257
3 a. m.	Beginning flood	7		11.0	6.49	1.00473
4.30 a. m.	$\frac{1}{2}$ flood	0		10.7	5.43	1.00394
		7		9.8	7.22	1.00542
6 a. m.	$\frac{3}{4}$ flood	0		11.0	3.70	1.00255
		7		9.4	8.02	1.00607
7.30 a. m.	Full flood	0		11.1	3.10	1.00208
		7		10.4	6.52	1.00481
9 a. m.	Beginning ebb	0		11.7	3.36	1.00221
		7		9.3	7.84	1.00596
10.30 a. m.	$\frac{1}{2}$ ebb	0		12.1	3.60	1.00236
		7		9.4	8.35	1.00633
12 m.	$\frac{3}{4}$ ebb	0		11.9	3.63	1.00251
		7		9.1	9.76	1.00748
1.30 p. m.	Slack	0		13.7	3.71	1.00222
		7		9.9	7.75	1.00582
3 p. m.	Beginning flood	0		12.2	3.35	1.00214
		7		9.9	7.56	1.00567
4.30 p. m.	$\frac{1}{3}$ flood	0		12.7	3.61	1.00227
		7		10.4	5.92	1.00436
6 p. m.	$\frac{3}{4}$ flood	0		13.3		
		7		10.5		
June 3, 5.07 p. m.		0	23.8	21.0	6.13	1.00270
		5		18.0	11.91	1.00773
		10.98		15.7	15.80	1.01116
7.30 p. m.		0		21.0	6.06	1.00265
		5		16.5	14.30	1.00985
		10.98		15.7	15.78	1.01114
8.50 p. m.		0		21.1	5.68	1.00235
		5		19.7	8.09	1.00509
		10.98		16.3	14.46	1.01003
10.30 p. m.		0		20.7	5.45	1.00226
		5		20.7	5.53	1.00234
		10.98		16.6	14.97	1.01033
11.50 p. m.		0		20.6	5.72	1.00240
		5		20.6	6.04	1.00272
		10.98		16.6	13.95	1.00956
June 4, 1.20 a. m.		0		20.5	5.55	1.00238
		5		18.8	7.01	1.00385
		10.98		16.0	9.87	1.00657
3.50 a. m.		0		20.2	6.14	1.00291
		5		19.5	9.87	1.00567
		10.98		15.7	15.92	1.01122
4.20 a. m.		0		20.4	7.15	1.00363
		5		18.0	11.91	1.00773
		10.98		15.5	16.00	1.01137
5.50 a. m.		0		20.5	6.57	1.00316
		5		19.7	9.74	1.00573
		10.98		15.9	14.31	1.00998
7.20 a. m.		0		20.6	6.42	1.00302
		5		19.6	9.32	1.00543
		10.98		15.9	15.07	1.01057
8.50 a. m.		0		20.6	6.56	1.00319
		5		19.3	8.05	1.00455
		10.98		18.4	10.74	1.00676
10.20 a. m.		0		21.1	6.42	1.00391
		5		20.4	7.44	1.00384
		10.98		20.1	12.37	1.00762
11.50 a. m.		0		21.1	5.57	1.00226
		5		21.0	9.15	1.00498
		10.98		19.3	5.66	1.00273

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 1—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1921—Continued						
June 4, 1.20 p. m.		0		21.3		
		5		20.7	6.35	1.00295
		10.98		19.9	8.46	1.00471
2.50 p. m.		0		21.3	6.24	1.00271
		5		20.9	6.36	1.00301
		10.98		19.5	8.54	1.00487
4.20 p. m.		0		21.5	7.29	1.00345
		5		20.3	7.37	1.00379
		10.98		19.3	7.83	1.00436
1922						
Mar. 29, 7 p. m.	¾ flood; sea moderate; wind N., force 2; hazy.	0	10.00	8.6	4.77	1.00362
		5		6.3	7.75	1.00613
		11		4.8	3.80	1.00306
8.30 p. m.		0		9.0	5.22	1.00389
		5		6.4	8.22	1.00650
		11		5.0	10.33	1.00825
10 p. m.		0		8.3	4.86	1.00369
		5		6.4	8.02	1.00638
		11		4.8	11.18	1.00887
11.30 p. m.		0		8.0	4.50	1.00345
		5		6.0	9.58	1.00758
		11		4.9	11.70	1.00933
Mar. 30, 1 a. m.		0			8.89	
		5			6.06	
		11		4.7	11.75	1.00936
2.30 a. m.		0		8.2	3.94	1.00300
		5		8.0	4.66	1.00368
		11		4.9	10.69	1.00852
4 a. m.		0		8.2	11.50	1.00892
		5		8.0	4.09	1.00314
		11		4.8	3.80	1.00306
5.30 a. m.		0		8.0	4.30	1.00330
		5		8.0	4.42	1.00356
		11		5.4	11.69	1.00929
7 a. m.		0		8.1	4.44	1.00340
		5		7.5	11.18	1.00864
		11		5.4	4.85	1.00386
8.30 a. m.		0		7.8	4.89	1.00377
		5		7.7	5.71	1.00442
		11		5.0	12.45	1.00991
10 a. m.		0		8.0	5.20	1.00401
		5		7.0	6.73	1.00528
		11		4.6	8.03	1.00641
11.30 a. m.		0		7.9	5.69	1.00441
		5		7.4	7.68	1.00600
		11		4.5	14.20	1.01132
1 p. m.		0		7.7	5.18	1.00402
		5		6.8	9.13	1.00717
		11		4.6	14.13	1.01125
2.30 p. m.		0		7.9	4.71	1.00360
		5		7.4	7.04	1.00647
		11		5.0	12.48	1.00994
4 p. m.		0		7.8	4.67	1.00361
		5		7.8	5.20	1.00402
		11		4.8	13.90	1.01107

Station 2

1920						
Mar. 6, 9.50 a. m.	Full flood	0		3.9	11.63	1.00932
		5		.0	11.55	1.00926
		10		-.3	12.65	1.01014
		13.7		-.3	15.13	1.01214

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 3

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920						
Jan. 17, 2.30 p. m.-----		0		0.9	12.01	1.00963
		13.7		.9	17.16	1.01378
Mar. 6, 12.44 p. m.-----	¼ ebb-----	0		-3.9	12.43	1.00997
		5.0		1.1	13.00	1.01044
		10.0		-.3	13.26	1.01063
		12.8		-.3	14.78	1.01186
May 7, 4.47 p. m.-----	¾ ebb-----	0		12.8	4.01	1.00266
		13.18		12.8	5.76	1.00393
July 4, 4 p. m.-----	¾ ebb-----	0		23.6	8.58	1.00392
		10		23.6	8.78	1.00408
		Bottom.		23.4	8.89	1.00422
Aug. 26, 9.30 a. m.-----		0		23.2	8.11	1.00366
		Bottom.		24.1	17.69	1.01064
10.05 a. m.-----		0		23.6	9.46	1.00461
		Bottom.		24.1	17.67	1.01061
Oct. 17, 7.40 a. m.-----		0		19.5	10.42	1.00628
		5		19.2	10.61	1.00659
		Bottom.		20.6	15.30	1.00973
Dec. 9, 4.18 p. m.-----	½ flood-----	0		7.2	9.14	1.00715
		Bottom.		10.3	16.78	1.01279
1921						
Jan. 27, 11.05 a. m.-----	Beginning ebb; sea choppy; wind NE., force 3.	0	-1.1	1.3	10.43	1.00837
		12.81		3.7	14.25	1.01142
Mar. 28, 9.50 a. m.-----	Beginning ebb; sea smooth; wind SW., force 2.	0	16.6	11.8	6.00	1.00425
		10		8.4	11.97	1.00929
		15		8.1	12.41	1.00961
June 3, 2.50 p. m.-----	¼ flood; sea smooth; wind S., force 1.	0	23.3	21.3	5.75	1.00235
		12.81		15.6	16.16	1.01146
1922						
Mar. 29, 4.30 p. m.-----	¼ flood; wind N., force 0.	0	14.44	9.1	5.28	1.00399
		12.8		5.3	11.46	1.00908

Station 4

1920						
Jan. 17, 3.17 p. m.		0		-0.1	12.28	1.00984
		20.1		.9	17.37	1.01394
May 7, 6.09 p. m.	Slack ebb	0		12.6	4.35	1.00287
		19.55		12.8	7.16	1.00501
July 4, 2.45 p. m.	½ ebb	0		23.9	7.89	1.00333
		10		23.9	8.70	1.00393
		Bottom.		23.9	15.44	1.00900
Aug. 26, 10.05 a. m.		0		23.5	9.46	1.00461
		Bottom.		24.1	17.67	1.01061
Oct. 17, 6.34 a. m.		0		19.2		
Dec. 9, 5.24 p. m.	½ flood	Bottom.		21.1	16.03	1.01016
		0		7.4	10.64	1.00831
		10		9.6	16.68	1.01280
		Bottom.		10.0	17.65	1.01349
1921						
Jan. 27, 12.30 p. m.	¼ ebb; sea moderate; wind NE., force 2	0	2.7	1.6	10.88	1.00874
		10		2.0	11.97	1.00962
		20.13		3.8	14.46	1.01155
Mar. 28, 7 a. m.	Flood; sea smooth; wind SW., force 2	0	16.1	12.4	5.26	1.00359
		10		8.9	10.21	1.00784
		18		7.7	12.99	1.01015
June 3, 3.37 p. m.	½ flood; sea smooth; wind S., force 1	0	22.7	20.8	5.85	1.00254
		10		18.1	11.91	1.00770
		22.7		14.9	19.66	1.01426
1922						
Mar. 29, 5.27 p. m.	½ flood; sea smooth; wind N., force 1	0		9.2	5.65	1.00426
		10		6.0	10.30	1.00815
		20		5.2	15.79	1.01251

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 5						
Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920						
Mar. 7, 2.46 p. m.-----	½ ebb-----	0-----		0.0-----	13.77-----	1.01105-----
		9.1-----		— .6-----	14.12-----	1.01131-----
May 7, 2.30 p. m.-----	½ ebb-----	0-----		12.8-----	6.42-----	1.00444-----
		9.54-----		12.6-----	8.83-----	1.00613-----
July 4, 6.20 p. m.-----	Beginning flood-----	0-----		23.4-----	9.75-----	1.00484-----
		10-----		23.6-----	10.08-----	1.00506-----
Aug. 26, 5.40 a. m.-----		0-----		23.2-----	8.67-----	1.00408-----
		Bottom.-----		24.2-----	13.41-----	1.00739-----
Oct. 17, 12.05 p. m.-----		0-----		20.0-----	11.81-----	1.00742-----
		Bottom.-----		19.8-----	14.97-----	1.00966-----
Dec. 9, 1.40 p. m.-----	Beginning flood-----	0-----		7.2-----		
		Bottom.-----		7.2-----		
1921						
Jan. 27, 7.10 a. m.-----	½ flood; sea moderate; wind NE., force 2-----	0-----	—2.2-----	1.3-----	11.13-----	1.00894-----
		10.07-----		1.3-----	11.14-----	1.00895-----
Mar. 28, 1.25 p. m.-----	Ebb; sea choppy; wind SW. by S., force 3-----	0-----	18.8-----	14.9-----	8.11-----	1.00557-----
		9-----		15.8-----	9.16-----	1.00607-----
June 3, 10.55 a. m.-----	Full ebb; sea smooth; wind S., force 1-----	0-----	22.7-----	20.4-----	7.29-----	1.00379-----
		10.06-----		16.0-----	15.36-----	1.01077-----
1922						
Jan. 25, 3.15 p. m.-----	¾ flood; wind N. by E., force 2-----	0-----	—1.11-----	.9-----	11.34-----	1.00910-----
		10.06-----		1.3-----	12.06-----	1.00969-----
Mar. 29, 12.28 p. m.-----	¾ ebb; sea smooth; wind NW., force 2-----	0-----	18.33-----	8.5-----	9.75-----	1.00753-----
		9.6-----		7.3-----	10.19-----	1.00797-----

Station 6						
1920						
Jan. 17, 9.57 a. m.-----		0-----		—0.1-----	12.98-----	1.01041-----
		12.8-----		.15-----	14.48-----	1.01162-----
Mar. 7, 10.49 p. m.-----	¾ ebb-----	0-----		— .3-----	13.67-----	1.01096-----
		5-----		— .3-----	13.70-----	1.01100-----
		10-----		1.7-----	14.40-----	1.01157-----
		13-----		— .3-----	14.81-----	1.01188-----
July 5, 6.05 a. m.-----	½ ebb-----	0-----		21.9-----	9.02-----	1.00468-----
		5-----		22.6-----	9.42-----	1.00480-----
		10-----		22.6-----	9.57-----	1.00492-----
		Bottom.-----		22.9-----	16.22-----	1.00988-----
Aug. 26, 6.13 a. m.-----		0-----		23.2-----	9.54-----	1.00475-----
		Bottom.-----		23.6-----	10.17-----	1.00512-----
Oct. 17, 11.20 a. m.-----		0-----		19.9-----	12.22-----	1.00756-----
		Bottom.-----		20.0-----	15.62-----	1.01011-----
Dec. 9, 12.57 p. m.-----	Slack ebb-----	0-----		7.2-----	10.42-----	1.00811-----
		Bottom.-----		7.4-----	12.55-----	1.00981-----
1921						
Jan. 27, 7.53 a. m.-----	¾ flood; sea moderate; wind NE., force 2-----	0-----	—1.6-----	1.8-----	11.38-----	1.00915-----
		12.81-----		1.9-----	11.39-----	1.00916-----
Mar. 28, 3.03 p. m.-----	Flood; sea choppy; wind SW. by S., force 3-----	0-----	21.1-----	10.0-----	8.37-----	1.00631-----
		14-----		9.6-----	11.32-----	1.00869-----
June 3, 11.31 a. m.-----	Beginning flood; sea smooth; wind S., force 1-----	0-----	22.2-----	21.1-----	6.09-----	1.00272-----
		12.81-----		15.8-----	15.86-----	1.01119-----
1922						
Jan. 25, 3.58 p. m.-----	¾ flood; wind N. by E., force 3-----	0-----	—3.33-----	.4-----	11.59-----	1.00931-----
		12.81-----		2.5-----		
Mar. 29, 1.19 p. m.-----	¾ ebb; sea smooth; wind NW., force 2-----	0-----	18.33-----	8.4-----	9.76-----	1.00754-----
		12.00-----		5.8-----	11.09-----	1.00879-----

Station 7						
1920						
Jan. 17, 8.47 a. m.-----		0-----		—0.1-----	13.57-----	1.01089-----
		25.0-----		.65-----	18.14-----	1.01457-----
Mar. 7, 4.53 p. m.-----	Slack ebb-----	0-----		— .3-----	13.77-----	1.01104-----
		10-----		— .3-----	14.58-----	1.01169-----
		20-----		1.7-----	15.58-----	1.01250-----
		25-----		.0-----	15.68-----	1.01259-----

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 7—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920—Continued						
May 7, 1.18 p. m.-----	Beginning ebb-----	0-----		12. 5-----	5. 81-----	1. 00400-----
		25. 32-----		12. 3-----	15. 66-----	1. 01164-----
July 5, 7.15 a. m.-----	½ ebb-----	0-----		21. 9-----	9. 40-----	1. 00497-----
		5-----		22. 1-----	11. 22-----	1. 00628-----
		10-----		22. 1-----	14. 10-----	1. 00844-----
		20-----		22. 4-----	16. 89-----	1. 01047-----
		Bottom.-----		22. 1-----	17. 49-----	1. 01100-----
Aug. 26, 7.05 a. m.-----		0-----		23. 7-----	10. 65-----	1. 00545-----
		Bottom.-----		24. 0-----	18. 74-----	1. 01144-----
Oct. 17, 10.05 a. m.-----		0-----		19. 4-----	13. 70-----	1. 00879-----
		10-----		19. 9-----	14. 46-----	1. 00925-----
		20-----			16. 00-----	
		Bottom.-----		20. 2-----	16. 50-----	1. 01074-----
Dec. 9, 11.50 a. m.-----	Full ebb-----	0-----		7. 9-----	12. 42-----	1. 00967-----
		10-----		8. 3-----	12. 68-----	1. 00984-----
		20-----		8. 8-----	12. 84-----	1. 00990-----
		Bottom.-----		8. 1-----	13. 33-----	1. 01036-----
1921						
Jan. 27, 8.50 a. m.-----	¾ flood; sea moderate; wind NE., force 2-----	0-----	-3. 3-----	2. 0-----	12. 14-----	1. 00975-----
		10-----		2. 0-----	12. 33-----	1. 00982-----
		20-----		2. 1-----	12. 36-----	1. 00993-----
		37. 45-----		2. 4-----	13. 27-----	1. 01064-----
Mar. 29, 11.10 a. m.-----	Ebb; sea choppy; wind NNE., force 3-----	0-----	3. 3-----	10. 5-----	7. 43-----	1. 00551-----
		10-----		10. 5-----	8. 29-----	1. 00618-----
		20-----		9. 9-----	10. 38-----	1. 00788-----
		30-----		8. 4-----	13. 53-----	1. 01048-----
June 3, 12.34 p. m.-----	¼ flood; sea smooth; wind S., force 1-----	0-----	22. 2-----	21. 1-----	8. 36-----	1. 00437-----
		10-----		18. 8-----	12. 05-----	1. 00767-----
		20-----		15. 2-----	17. 96-----	1. 01290-----
		27. 45-----		15. 0-----	18. 64-----	1. 01346-----
1922						
Jan. 25, 4.50 p. m.-----	Full flood; wind N. by E., force 2-----	0-----	-4. 44-----	0. 8-----	13. 26-----	1. 01064-----
		10-----		1. 9-----	15. 97-----	1. 01281-----
		20-----		3. 2-----	18. 95-----	1. 01514-----
		27. 90-----		2. 5-----	18. 36-----	1. 01471-----
Mar. 29, 2.13 p. m.-----	Full ebb; sea moderate; wind N., force 2; partly cloudy.	0-----	14. 44-----	8. 2-----	9. 84-----	1. 00761-----
		10-----		7. 2-----	11. 00-----	1. 00862-----
		20-----		4. 5-----	15. 26-----	1. 01216-----
		26. 5-----		4. 0-----	16. 79-----	1. 01340-----

Station 8

1920						
Jan. 16, 1.49 p. m.		0		0.2		
		10.1		.1	13.51	1.01085
Mar. 8, 8.49 a. m.	Slack	0		-1.3	14.98	1.01201
		10		-1.1	15.03	1.01205
May 7, 9.10 a. m.	¾ flood	0		12.8	6.29	1.00434
		9.54		12.6	11.88	1.00868
July 5, 2 p. m.	Beginning ebb	0		24.6	11.30	1.00570
		5		24.3	11.36	1.00583
		Bottom.		24.4	11.69	1.00605
Aug. 25, 6.15 p. m.		0		24.1	9.86	1.00475
		Bottom.		24.0	9.87	1.00475
Oct. 17, 3.20 p. m.		0		19.4	12.99	1.00814
		Bottom.		19.4	13.03	1.00816
1921						
Jan. 26, 4.50 p. m.	½ flood; sea moderate; wind NNE., force 2	0	1.1	2.3	12.44	1.00999
		9.15		2.3	12.40	1.00997
Mar. 29, 3.50 p. m.	Flood; sea choppy; wind NNE., force 2	0	4.4	10.7		
		10		9.9	11.50	1.00874
June 3, 6.31 a. m.	⅓ ebb; sea smooth; calm	0	15.0	20.6	10.63	1.00620
		9.15		16.7	14.28	1.00981
1922						
Jan. 25, 12.05 p. m.	½ flood; sea moderate; wind N. by E., force 3.	0	1.11	0.7	13.03	1.01045
		9.15		0.8	13.14	1.01056
Mar. 29, 9.10 a. m.	¼ ebb; sea smooth; wind NW., force 2	0	12.22	6.4	11.91	1.00938
		9.14		5.6	13.23	1.01049

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 9

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920						
Jan. 16, 2.45 p. m. -----		0 -----		0. 15 -----	14. 13 -----	1. 01134 -----
		22. 8 -----		. 65 -----	18. 59 -----	1. 01493 -----
Mar. 8, 6.36 a. m. -----	½ flood -----	0 -----		— . 8 -----	15. 37 -----	1. 01234 -----
		10 -----		— . 3 -----	15. 57 -----	1. 01249 -----
		20 -----		1. 1 -----	15. 80 -----	1. 01269 -----
		22 -----		— . 3 -----	15. 58 -----	1. 01250 -----
May 7, 10.12 a. m. -----	Flood -----	0 -----		12. 8 -----	6. 85 -----	1. 00477 -----
		22. 72 -----		12. 6 -----	15. 91 -----	1. 01178 -----
July 5, 12.18 p. m. -----	¼ flood -----	0 -----		23. 8 -----	11. 44 -----	1. 00602 -----
		10 -----		23. 6 -----	11. 62 -----	1. 00618 -----
		20 -----		23. 1 -----	18. 61 -----	1. 01158 -----
		Bottom. -----		23. 6 -----	18. 95 -----	1. 01171 -----
Aug. 25, 6.59 p. m. -----		0 -----		24. 1 -----		
		Bottom. -----		24. 2 -----	18. 79 -----	1. 01142 -----
Oct. 17, 4.15 p. m. -----		0 -----		20. 2 -----	13. 72 -----	1. 00865 -----
		10 -----		19. 4 -----	14. 73 -----	1. 00958 -----
		Bottom. -----		20. 3 -----	17. 44 -----	1. 01141 -----
Dec. 9, 6.54 a. m. -----	¼ ebb -----	0 -----		7. 8 -----	14. 69 -----	1. 01145 -----
		10 -----		7. 9 -----	14. 57 -----	1. 01134 -----
		Bottom. -----		7. 9 -----	15. 80 -----	1. 01233 -----
1921						
Jan. 26, 5.50 p. m. -----	¾ flood; sea moderate; wind NNE., force 2. -----	0 -----	0. 0 -----	2. 7 -----	13. 04 -----	1. 01047 -----
		10 -----		2. 6 -----	12. 95 -----	1. 01040 -----
		22. 42 -----		3. 4 -----	13. 73 -----	1. 01100 -----
Mar. 29, 2 p. m. -----	Ebb; sea choppy; wind NNE., force 2 -----	0 -----	2. 7 -----	10. 8 -----	10. 87 -----	1. 00814 -----
		10 -----		11. 6 -----	11. 13 -----	1. 00823 -----
		19 -----		7. 5 -----	16. 18 -----	1. 01265 -----
June 3, 5.15 a. m. -----	¼ ebb; sea smooth; calm -----	0 -----	14. 4 -----	19. 4 -----	10. 58 -----	1. 00614 -----
		10 -----		19. 3 -----	10. 62 -----	1. 00647 -----
		22. 41 -----		15. 3 -----	18. 93 -----	1. 01362 -----
1922						
Jan. 24, 10.55 a. m. -----	¼ flood; sea choppy; wind N. by E., force 4. -----	0 -----	—1. 11 -----	1. 7 -----	13. 17 -----	1. 01057 -----
		10 -----		1. 6 -----	13. 53 -----	1. 01086 -----
		21. 96 -----		2. 6 -----	19. 76 -----	1. 01573 -----
Mar. 29, 7.58 a. m. -----	Beginning ebb; sea smooth; wind NW., force 1. -----	0 -----	10. 00 -----	7. 3 -----	11. 89 -----	1. 00931 -----
		10 -----		6. 3 -----	12. 87 -----	1. 01016 -----
		22. 00 -----		4. 6 -----	16. 89 -----	1. 01342 -----

Station 10

1920						
Jan. 16, 11.29 a. m.		0		0. 4	14. 10	1. 01132
Mar. 8, 9.29 a. m.	Beginning ebb	0		. 2	15. 56	1. 01249
		7. 3		— . 6	15. 62	1. 01253
May 7, 7 a. m.	¾ flood	0		12. 8	6. 96	1. 00486
		7. 27		12. 6	7. 30	1. 00516
July 5, 4.40 p. m.	Beginning ebb	0		24. 1	11. 46	1. 00520
		Bottom.		23. 9	19. 88	1. 01231
Aug. 25, 4 p. m.		0		24. 0	10. 67	1. 00538
		Bottom.		23. 9	12. 64	1. 00662
Oct. 18, 6 p. m.		0		19. 5	13. 77	1. 00882
		Bottom.		19. 2	13. 77	1. 00884
Dec. 8, 3.58 p. m.	Full flood	0		8. 2	14. 56	1. 01132
		Bottom.		8. 4	14. 52	1. 01126
1921						
Jan. 26, 2.52 p. m.	½ flood; sea moderate; wind N., force 2	0	0. 0	2. 3	13. 11	1. 01051
		7. 32		2. 3	13. 12	1. 01052
Mar. 28, 6 p. m.	Flood; sea smooth; wind NNE., force 1	0	6. 6	10. 6	11. 40	1. 00858
		7		10. 8	11. 84	1. 00889
June 2, 7.45 p. m.	5/8 ebb; sea moderate; wind E., force 2	0	18. 8	20. 8	10. 97	1. 00641
		7. 32		20. 7	11. 02	1. 00648
1922						
Jan. 24, 8.40 p. m.	Slack; choppy; wind N. by E., force 4	0	—3. 88	1. 1	13. 82	1. 01109
		7. 32		. 9	13. 83	1. 01111
Mar. 29, 6.07 a. m.	Full flood; calm; hazy	0	8. 89	7. 3	12. 34	1. 00965
		7. 00		5. 7	13. 71	1. 01016

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 11

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920						
Jan. 16, 9.46 a. m.-----		0		0. 8	14. 87	1. 01192
		40. 3		. 8	20. 00	1. 01606
Mar. 8, 10.23 a. m.-----	Ebb-----	0		. 4	15. 90	1. 01277
		10		. 0	16. 09	1. 01292
		20		. 2	16. 10	1. 01292
		30		. 0	16. 06	1. 01290
		40		. 2	16. 13	1. 01295
		47. 5		— . 3	16. 13	1. 01295
May 7, 5.34 a. m.-----	¾ flood-----	0		12. 6	7. 12	1. 00501
		20		12. 8	7. 13	1. 00498
		47. 27		12. 6	17. 80	1. 01322
July 5, 6.05 p. m.-----	¼ ebb-----	0		24. 1	11. 09	1. 00569
		10		23. 4	15. 44	1. 00913
		20		23. 6	14. 99	1. 00874
		30		23. 4	19. 12	1. 01189
		40		22. 1	19. 37	1. 01242
		Bottom.		22. 4	19. 38	1. 01235
Aug. 25, 2.30 p. m.-----		0		24. 2	12. 83	1. 00695
		Bottom.		23. 9	19. 70	1. 01219
Oct. 18, 6.50 a. m.-----		0		19. 5	14. 36	1. 00927
		10		19. 5	15. 08	1. 00982
		20		20. 1	15. 37	1. 01090
		30		19. 6	17. 08	1. 01130
		40		20. 0	26. 08	1. 01801
		Bottom.		19. 4	20. 04	1. 01359
Dec. 8, 2.33 p. m.-----	¾ flood-----	0		8. 6	14. 93	1. 01155
		10		8. 2	15. 01	1. 01166
		20		9. 5	18. 35	1. 01411
		30		9. 9	19. 68	1. 01509
		40		9. 9	19. 75	1. 01515
		Bottom.		9. 9	19. 85	1. 01522
1921						
Jan. 26, 1.38 p. m.-----	¼ flood; sea moderate; wind N., force 2----	0	0. 5	2. 6	14. 44	1. 01158
		10		3. 3	14. 78	1. 01185
		20		3. 4	14. 59	1. 01168
		30		3. 7	17. 46	1. 01393
		40		3. 8		
		47. 58		3. 9	17. 70	1. 01412
Mar. 30, 8.20 a. m.-----	Ebb; sea choppy; wind SE., force 2-----	0	7. 2	10. 2	13. 94	1. 01059
		20		10. 7	14. 20	1. 01073
		46		10. 2	16. 60	1. 01266
June 2, 6.30 p. m.-----	¾ ebb; sea moderate; wind E., force 3-----	0	21. 6	20. 0	11. 20	1. 00677
		10		20. 0	11. 68	1. 00714
		20		15. 5	19. 42	1. 01397
		30		15. 3	19. 66	1. 01421
		40		15. 3	19. 80	1. 01429
		47. 58		15. 1	19. 78	1. 01431
1922						
Jan. 25, 7.45 a. m.-----	Full ebb; sea choppy; wind N., force 4-----	0	—7. 77	1. 4	15. 81	1. 01262
		10		2. 2	16. 53	1. 01325
		20		2. 7	19. 54	1. 01564
		30		2. 5	19. 86	1. 01590
		40		3. 2	20. 43	1. 01631
		47. 50		2. 9	20. 63	1. 01645
Mar. 28, 5.23 p. m.-----	Tide slack; sea moderate; wind S., force 3; hazy.	0	11. 11	7. 7	11. 88	1. 00926
		10		7. 2	11. 90	1. 00932
		20		4. 9	15. 42	1. 01225
		30		5. 2	11. 81	1. 00937
		40		4. 9	13. 67	1. 01087
		47. 55		4. 6	15. 93	1. 01267

Station 12

1920						
Jan. 16, 7.55 a. m.		0		0.45	15.02	1.01205
		38.5		— .3	20.78	1.01669
Mar. 8, 12 m.	Slack	0		.6	16.11	1.01294
		10		.7	16.14	1.01296
		20		.6	16.14	1.01295
		30		.7	16.16	1.01297
		35		.6	16.22	1.01298

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 13

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920						
Jan. 15, 12.52 p. m.-----		0-----		0. 95-----	14. 18-----	1. 01139-----
		12. 8-----		. 7-----	14. 49-----	1. 01164-----
Mar. 8, 4.35 p. m.-----	¾ ebb-----	0-----		. 3-----	15. 82-----	1. 01271-----
		10-----		. 3-----	15. 79-----	1. 01267-----
		12. 8-----		0-----	15. 77-----	1. 01266-----
May 6, 3.45 p. m.-----	¾ flood-----	0-----		13. 1-----	7. 28-----	1. 00506-----
		10-----		13. 1-----	8. 70-----	1. 00615-----
		12. 72-----		13. 3-----	13. 75-----	1. 01001-----
July 7, 7.49 a. m.-----	Slack ebb-----	0-----		23. 7-----	12. 27-----	1. 00666-----
		Bottom.-----		23. 5-----	17. 27-----	1. 01048-----
Aug. 24, 8.59 a. m.-----		0-----		25. 8-----	13. 35-----	1. 00693-----
		Bottom.-----		25. 6-----	13. 31-----	1. 00696-----
Oct. 19, 12.28 p. m.-----		0-----		20. 0-----		
		Bottom.-----		19. 7-----	15. 71-----	1. 01024-----
Dec. 7, 10.04 a. m.-----	½ flood-----	0-----		8. 7-----	15. 03-----	1. 01163-----
		Bottom.-----		8. 7-----	15. 00-----	1. 01161-----
1921						
Jan. 25, 8.43 a. m.-----	Full ebb; sea choppy; wind NNE., force 4.-----	0-----	3. 3-----	2. 9-----	13. 28-----	1. 01066-----
		12. 81-----		2. 9-----	13. 31-----	1. 01069-----
Mar. 31, 12.55 p. m.-----	Ebb; sea choppy; wind S., force 2.-----	0-----	16. 6-----	11. 1-----	13. 09-----	1. 00982-----
		16. 6-----		10. 8-----	14. 05-----	1. 01061-----
June 1, 1.40 p. m.-----	½ ebb; sea smooth; calm-----	0-----	31. 6-----	22. 5-----	12. 20-----	1. 00693-----
		12. 81-----		19. 1-----	13. 19-----	1. 00848-----
1922						
Jan. 23, 3.22 p. m.-----	¾ ebb; sea moderate; wind NNE., force 3.-----	0-----	1. 11-----	2. 8-----	15. 22-----	1. 01220-----
		12. 81-----		3. 1-----	15. 37-----	1. 01231-----
Mar. 27, 12.06 p. m.-----	⅓ flood; smooth; wind SE., force 1.-----	0-----	12. 22-----	6. 9-----	12. 43-----	1. 00976-----
		12. 0-----		5. 7-----	13. 63-----	1. 01070-----

Station 14

1920						
Jan. 15, 2.09 p. m.		0		0. 7	14. 74	1. 01185
		40. 3		. 7	20. 28	1. 01628
Mar. 8, 3.08 p. m.	½ ebb	0		. 7	15. 87	1. 01274
		10		0	15. 86	1. 01274
		20		. 7	15. 87	1. 01274
		30		0	16. 15	1. 01297
		35. 7		. 4	16. 36	1. 01313
May 6, 5.10 p. m.	Flood	0		13. 1	7. 30	1. 00509
		20		13. 3	13. 28	1. 00964
		38. 18		13. 1	18. 09	1. 01337
July 6, 7.19 a. m.	Full ebb	0		23. 8	12. 75	1. 00701
		10		23. 4	12. 75	1. 00710
		20		23. 2	20. 22	1. 01278
		30		23. 6	19. 70	1. 01227
		36. 60		23. 9	20. 22	1. 01268
8.49 a. m.	Beginning flood	0		22. 8	12. 76	1. 00727
		10		22. 8	14. 68	1. 00871
		20		22. 0	19. 11	1. 01225
		30		22. 0	20. 26	1. 01312
		36. 60		22. 0	20. 22	1. 01307
10.19 a. m.	½ flood	0		23. 0	12. 50	1. 00702
		10		23. 3	14. 66	1. 00846
		20		22. 2	19. 72	1. 01265
		30		22. 1	20. 20	1. 01304
		36. 60		22. 0	20. 22	1. 01307
11.49 a. m.	¾ flood	0		23. 2	12. 56	1. 00704
		10		23. 7	14. 95	1. 00866
		20		22. 1	19. 60	1. 01232
		30		22. 1	20. 04	1. 01292
		36. 60		22. 1	20. 25	1. 01307
1.19 p. m.	Full flood	0		24. 0	12. 57	1. 00782
		10		23. 1	15. 63	1. 00934
		20		22. 0	19. 64	1. 01264
		30		22. 0	19. 98	1. 01291
		36. 60		22. 1	20. 10	1. 01301

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 14—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920—Continued						
July 6, 2.49 p. m.-----	Beginning ebb-----	0		25.3	12.53	1.00727
		10		23.3	12.82	1.00664
		20		22.6	18.40	1.01156
		30		22.5	20.10	1.01287
		36.60		22.2	20.19	1.01294
4.19 p. m.-----	½ ebb-----	0		24.8	12.60	1.00664
		10		23.3	12.74	1.00712
		20		23.1	18.25	1.01131
		30		22.5	20.00	1.01279
		36.60		22.7	20.16	1.01286
5.49 p. m.-----	Full ebb-----	0		23.5	12.68	1.00701
		10		23.1	14.90	1.00899
		20		24.4	18.01	1.01072
		30		22.6	20.10	1.01284
		36.60		22.2	20.19	1.01301
7.19 p. m.-----	¼ flood-----	0		24.4	12.68	1.00781
		10		23.5	13.01	1.00725
		20		22.8	17.77	1.01104
		30		22.5	20.04	1.01282
		36.60		22.0	20.16	1.01304
8.49 p. m.-----	½ flood-----	0		23.7	12.16	1.00696
		10		23.2	15.12	1.00894
		20		22.0	19.70	1.01270
		30		22.1	20.00	1.01289
		36.60		22.0	20.20	1.01307
10.19 p. m.-----	¾ flood-----	0		23.6	12.58	1.00694
		10		22.8	12.72	1.00724
		20		22.4	19.08	1.01213
		30		22.0	19.68	1.01267
		36.60			19.91	
11.49 p. m.-----	¾ flood-----	0		23.6	12.68	1.00701
		10		22.6	15.20	1.00915
		20		21.9	17.30	1.01092
		30		22.0	19.69	1.01267
		36.60		22.4	20.02	1.01284
July 7, 1.19 a. m.-----	Beginning ebb-----	0		23.8	12.68	1.00696
		10		23.4	13.12	1.00739
		20		22.9	19.18	1.01207
		30		22.0	20.06	1.01297
		36.60		22.0	20.02	1.01294
2.49 a. m.-----	¼ ebb-----	0		23.8	12.73	1.00877
		10		24.8	12.77	1.01050
		20		21.9	19.22	1.01238
		30		22.0	20.02	1.01294
		36.60		21.6	20.08	1.01309
4.19 a. m.-----	½ ebb-----	0		23.8	12.76	1.00701
		10		23.8	12.99	1.00719
		20		22.8	12.95	1.00733
		30		22.0	19.18	1.01231
		36.60		21.9	19.98	1.01304
5.49 a. m.-----	¾ ebb-----	0		23.7	12.40	1.00679
		10		23.8	12.93	1.00814
		20		22.0	16.63	1.01038
		30		22.0	20.01	1.01293
		36.60		21.8	20.00	1.01298
Aug. 24, 10.45 a. m.-----		0		25.5	14.18	1.00760
		10		25.8	14.01	1.00737
		20		24.8	18.70	1.01119
		30		25.0	20.30	1.01233
		Bottom.		24.8	20.49	1.01253
12.15 p. m.-----		0		25.6	13.95	1.00742
		10		25.3	13.89	1.00745
		20		25.5	13.91	1.00741
		30		25.5	15.14	1.00832
		Bottom.		25.0	20.47	1.01245
1.45 p. m.-----		0		25.5	13.69	1.00725
		10		25.7	13.70	1.00719
		20		25.6	13.72	1.00719
		30		25.5	13.73	1.00727
		Bottom.		24.8	20.39	1.01241

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 14—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920—Continued						
Aug. 24, 3.15 p. m.		0		25. 5	13. 62	1. 00719
		10		25. 5	13. 63	1. 00722
		20		25. 2	17. 54	1. 01021
		30		24. 8	20. 08	1. 01222
		Bottom.		24. 8	20. 57	1. 01259
4.45 p. m.		0		25. 5	13. 72	1. 00719
		10		25. 5	13. 72	1. 00719
		20		25. 5	13. 77	1. 00720
		30		25. 0	19. 76	1. 01192
		Bottom.		24. 8	20. 50	1. 01254
6.15 p. m.		0		25. 6	13. 75	1. 00726
		10		25. 5	13. 79	1. 00722
		20		25. 1	17. 97	1. 01055
		30		24. 9	20. 09	1. 01220
		Bottom.		24. 8	20. 56	1. 01255
7.45 p. m.		0		25. 6	13. 67	1. 00719
		10		25. 4	13. 75	1. 00720
		20		25. 3	17. 24	1. 00994
		30		25. 0	19. 16	1. 01147
		Bottom.		24. 8	20. 37	1. 01243
9.15 p. m.		0		25. 5	13. 75	1. 00721
		10		25. 3	14. 25	1. 00771
		20		25. 6	17. 28	1. 00989
		30		25. 4	17. 31	1. 00997
		Bottom.		25. 4	17. 73	1. 01028
10.45 p. m.		0		25. 4	13. 63	1. 00722
		10		25. 2	14. 27	1. 00777
		20		25. 5	16. 61	1. 00942
		30		25. 4	17. 06	1. 00978
		Bottom.		25. 2	18. 83	1. 01116
Aug. 25, 12.15 a. m.		0		25. 5	13. 77	1. 00720
		10		25. 0	14. 27	1. 00769
		20		25. 0	14. 18	1. 00774
		30		25. 3	18. 33	1. 01076
		Bottom.		25. 0	19. 28	1. 01156
1.45 a. m.		0		25. 0	13. 85	1. 00748
		10		25. 0	14. 13	1. 00761
		20		24. 6	14. 36	1. 00788
		30		25. 2	17. 66	1. 01030
		Bottom.		25. 1	19. 21	1. 01151
3.15 a. m.		0		25. 0	13. 76	1. 00743
		10		25. 0	13. 77	1. 00744
		20		24. 6	13. 93	1. 00767
		30		25. 2	16. 50	1. 00943
		Bottom.		25. 1	18. 86	1. 01122
4.45 a. m.		0		24. 8	13. 78	1. 00750
		10		25. 0	13. 78	1. 00745
		20		25. 5	16. 47	1. 00832
		30		25. 2	18. 79	1. 01119
		Bottom.		25. 1	19. 18	1. 01146
6.15 a. m.		0		24. 8	13. 85	1. 00755
		10		25. 0	13. 87	1. 00752
		20		25. 0	16. 37	1. 00938
		30		25. 1	18. 81	1. 01119
		Bottom.		25. 1	18. 99	1. 01130
7.45 a. m.		0		24. 8	13. 93	1. 00762
		10		24. 9	14. 04	1. 00767
		20		25. 2	17. 66	1. 01030
		30		25. 1	19. 05	1. 01137
		Bottom.		25. 1	19. 13	1. 01138
9.15 a. m.		0		24. 8	13. 84	1. 00755
		10		24. 8	14. 06	1. 00771
		20		25. 2	15. 46	1. 00865
		30		25. 2	19. 17	1. 01142
		Bottom.		25. 2		
Oct. 18, 10.30 a. m.		0		19. 7	15. 90	1. 01039
		10		19. 7	16. 75	1. 01103
		20		19. 5	20. 57	1. 01390
		30		19. 3	22. 30	1. 01533
		Bottom.		19. 7	22. 24	1. 01518
12 m.		0		19. 7	15. 89	1. 01038
		10		19. 6	15. 90	1. 01041
		20		19. 5	20. 20	1. 01370
		30		19. 3	22. 24	1. 01528
		Bottom.		19. 7	22. 34	1. 01527

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 14—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920—Continued						
Oct. 18, 1.30 p. m.		0		19. 7	15. 90	1. 01039
		10		19. 6	15. 90	1. 01039
		20		19. 6	16. 04	1. 01052
		30		19. 3	22. 34	1. 01536
		Bottom.		19. 3	22. 32	1. 01534
3 p. m.		0		19. 6	15. 86	1. 01039
		10		19. 6	15. 90	1. 01042
		20		19. 4	21. 24	1. 01450
		30		19. 3	22. 32	1. 01534
		Bottom.		19. 3	22. 42	1. 01542
4.30 p. m.		0		19. 9	15. 95	1. 01039
		10		19. 8	15. 90	1. 01037
		20		19. 7	20. 85	1. 01413
		30		19. 6	22. 22	1. 01520
		Bottom.		19. 7	22. 37	1. 01527
6 p. m.		0		19. 6	15. 98	1. 01048
		10		19. 7	16. 05	1. 01051
		20		19. 6	16. 06	1. 01054
		30		19. 4	21. 35	1. 01458
		Bottom.		19. 6	21. 83	1. 01490
7.30 p. m.		0		19. 6	15. 92	1. 01042
		10		19. 6	15. 91	1. 01042
		20		19. 6	17. 59	1. 01170
		30		19. 4	21. 85	1. 01496
		Bottom.		19. 6	22. 21	1. 01519
9 p. m.		0		19. 6	15. 92	1. 01042
		10		19. 5	15. 90	1. 01042
		20		19. 7	16. 78	1. 01106
		30		19. 8	21. 93	1. 01493
		Bottom.		19. 6	22. 02	1. 01505
10.30 p. m.		0		19. 7	15. 85	1. 01035
		10		19. 6	16. 00	1. 01049
		20		19. 5	20. 68	1. 01404
		30		19. 4	21. 92	1. 01502
		Bottom.		19. 7	22. 03	1. 01503
12 p. m.		0		19. 6	15. 38	1. 01002
		10		19. 9	15. 96	1. 01039
		20		19. 7	20. 93	1. 01419
		30		19. 3	22. 04	1. 01589
		Bottom.		19. 4	22. 14	1. 01595
Oct. 19, 1.30 a. m.		0		19. 8	15. 79	1. 01028
		10		19. 5	15. 80	1. 01034
		20		19. 9	20. 89	1. 01412
		30		19. 3	21. 88	1. 01500
		Bottom.		19. 3	22. 14	1. 01521
3 a. m.		0		19. 9	15. 77	1. 01025
		10		19. 5	15. 80	1. 01026
		20		19. 7	20. 72	1. 01403
		30		19. 3	21. 82	1. 01495
		Bottom.		19. 3	22. 03	1. 01512
4.30 a. m.		0		19. 8	15. 68	1. 01020
		10		19. 4	15. 72	1. 00932
		20		19. 7	20. 48	1. 01385
		30		19. 3	21. 75	1. 01491
		Bottom.		19. 3	22. 05	1. 01513
6 a. m.		0		19. 4	15. 76	1. 01035
		10		19. 9	15. 75	1. 01024
		20		19. 6	20. 85	1. 01416
		30		19. 8	21. 61	1. 01468
		Bottom.		19. 4	21. 86	1. 01497
7.30 a. m.		0		19. 6	15. 71	1. 01027
		10		19. 8	15. 76	1. 01026
		20		20. 1	18. 40	1. 01219
		30		19. 4	21. 99	1. 01506
		Bottom.		19. 5	21. 95	1. 01503
9 a. m.		0		19. 6	15. 81	1. 01034
		10		19. 9	15. 75	1. 01023
		20		19. 9	20. 89	1. 01391
		30		19. 4	21. 87	1. 01498
		Bottom.		19. 5	21. 94	1. 01503
Dec. 7, 11.30 a. m.	¾ flood	0		8. 7	15. 14	1. 01171
		10		8. 7	15. 34	1. 01186
		20		10. 1	19. 51	1. 01493
		30		10. 1	20. 10	1. 01539
		Bottom.		10. 1	20. 28	1. 01553

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 14—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920—Continued						
Dec. 7, 1 p. m. -----	Flood.-----	0		8.8	15.20	1.01175
		10		8.6	15.22	1.01178
		20		10.0	19.85	1.01520
		30		10.0	19.19	1.01470
		Bottom.		10.1	20.21	1.01547
2.30 p. m. -----	$\frac{1}{2}$ ebb.-----	0		8.7	15.33	1.01185
		10		8.6	15.31	1.01183
		20		9.9	19.69	1.01510
		30		10.1	20.20	1.01546
		Bottom.		9.9	20.29	1.01557
4 p. m. -----	$\frac{3}{4}$ ebb.-----	0		8.7	15.03	1.01151
		10		8.6	15.21	1.01178
		20		10.0	20.01	1.01533
		30		10.1	20.13	1.01542
		Bottom.		10.1	20.21	1.01547
5.30 p. m. -----	Slack.-----	0		8.7	15.16	1.01207
		10		8.6	15.24	1.01179
		20		9.9	19.90	1.01588
		30		10.0	15.36	1.01172
		Bottom.		10.1	20.17	1.01530
7 p. m. -----	Beginning flood.-----	0		8.7	15.37	1.01189
		10		8.7	15.37	1.01189
		20		10.0	19.88	1.01531
		30		10.0	20.17	1.01545
		Bottom.		10.1	20.24	1.01549
8.30 p. m. -----	$\frac{1}{3}$ flood.-----	0		8.5	15.24	1.01180
		10		8.6	15.26	1.01182
		20		10.3	19.82	1.01514
		30		10.0	20.08	1.01539
		Bottom.		10.0	20.28	1.01554
10 p. m. -----	$\frac{3}{4}$ flood.-----	0		8.6	15.31	1.01185
		10		8.6	15.31	1.01185
		20		10.0	19.90	1.01525
		30		9.8	20.17	1.01548
		Bottom.		10.0	20.36	1.01560
11.30 p. m. -----	Flood.-----	0		8.5	15.12	1.01172
		10		8.6	15.14	1.01173
		20		10.2	19.62	1.01212
		30		9.9		
		Bottom.		9.8	20.10	1.01544
Dec. 8 1 a. m. -----	Beginning ebb.-----	0		8.5	15.30	1.01186
		10		8.8	15.32	1.01184
		20		8.6	15.40	1.01192
		30		9.8	18.53	1.01424
		Bottom.		10.2	19.78	1.01512
2.30 a. m. -----	$\frac{1}{2}$ ebb.-----	0		8.4		
		10		8.6	15.40	1.01192
		20		8.6	15.42	1.01195
		30		9.0	16.20	1.01250
		Bottom.		9.8	19.65	1.01508
4 a. m. -----	$\frac{3}{4}$ ebb.-----	0		8.4	15.38	1.01192
		10		8.5	15.37	1.01191
		20		8.6	14.63	1.01135
		30		9.1	15.76	1.01214
		Bottom.		9.8	19.08	1.01463
5.30 a. m. -----	Slack.-----	0		8.3	15.33	1.01190
		10		8.4	15.30	1.01187
		20		8.4	15.36	1.01192
		30		8.6	15.42	1.01193
		Bottom.		9.4	16.86	1.01297
7 a. m. -----	$\frac{1}{4}$ flood.-----	0		8.3	15.41	1.01195
		10		8.4	15.42	1.01196
		20		8.4		
		30		8.8	15.43	1.01183
		Bottom.		9.7	19.33	1.01484
8.30 a. m. -----	$\frac{1}{3}$ flood.-----	0		9.5	15.37	1.01180
		10		8.7	15.38	1.01190
		20		9.8	18.92	1.01952
		30		9.9	20.21	1.01550
		Bottom.		9.8	20.19	1.01560
10 a. m. -----	$\frac{1}{2}$ flood.-----	0		8.3	15.44	1.01199
		10		8.4	15.44	1.01198
		20		8.6	15.41	1.01193
		30		9.2	15.44	1.01189
		Bottom.		9.7	15.45	1.01184

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 14—Continued.

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1921						
Jan. 25, 10.30 a. m.-----	Beginning flood; sea rolling; wind NNE., force 4.	0	-4.4	3.1	13.64	1.01094
		10		3.0	13.72	1.01099
		20		3.0	13.80	1.01106
		30		3.7	16.80	1.01342
		33.85		3.8	17.95	1.01432
12 m.-----	½ flood-----	0		3.2	13.64	1.01092
		10		3.0	13.72	1.01099
		20		3.2	14.55	1.01165
		30		3.3	15.34	1.01227
		33.85		3.7	17.18	1.01373
1.30 p. m.-----	¾ flood-----	0		3.0	13.97	1.01120
		10		3.1	14.05	1.01126
		20		3.2	14.97	1.01198
		30		3.5	16.12	1.01287
		33.85		3.9	17.62	1.01408
3 p. m.-----	Full flood-----	0		3.1	14.15	1.01133
		10		3.1	14.23	1.01140
		20		3.1	14.64	1.01171
		30		3.0	14.87	1.01191
		33.85		4.1	18.13	1.01445
4.30 p. m.-----	Beginning ebb-----	0		3.1	14.52	1.01164
		10		3.1	14.75	1.01180
		20		3.0	14.77	1.01182
		30		3.0	14.87	1.01191
		33.85		4.0	18.07	1.01441
6 p. m.-----	⅓ ebb-----	0		3.5	14.65	1.01171
		10		3.9	14.75	1.01180
		20		3.1	14.66	1.01173
		30		3.4	14.63	1.01171
		33.85		3.1	15.13	1.01211
7.35 p. m.-----	¾ ebb-----	0		3.0	14.26	1.01143
		10		3.0	14.26	1.01143
		20		2.9	14.34	1.01150
		30		3.0	14.64	1.01173
		33.85		3.3	14.78	1.01183
9 p. m.-----	Slack-----	0		3.0	14.21	1.01138
		10		3.0	14.25	1.01141
		20		2.9	14.48	1.01161
		30		3.1	15.21	1.01217
		33.85		3.3	15.02	1.01202
10.30 p. m.-----	Beginning flood-----	0		3.0	14.20	1.01138
		10		2.9	14.23	1.01140
		20		3.1	14.34	1.01149
		30		2.9	14.56	1.01167
		33.85		3.1	14.38	1.01150
12 p. m.-----	½ flood-----	0		2.9	14.36	1.01151
		10		2.8	14.34	1.01153
		20		3.3	14.52	1.01162
		30		3.3	15.54	1.01164
		33.85		3.1	14.52	1.01163
Jan. 26, 1.30 a. m.-----	¾ flood-----	0		4.0	14.42	1.01151
		10		2.8	14.46	1.01159
		20		3.9	14.44	1.01154
		30		2.9	14.48	1.01161
		33.85		3.1	14.54	1.01166
3 a. m.-----	Full flood-----	0		3.9	14.59	1.01165
		10		3.7	14.56	1.01167
		20		3.9	14.59	1.01168
		30		3.7	14.59	1.01168
		33.85		3.9	14.61	1.01171
4.30 a. m.-----	¼ ebb-----	0		3.0	14.38	1.01152
		10		3.8	14.36	1.01151
		20		3.0	14.44	1.01156
		30		3.8	14.87	1.01191
		33.85		3.8	15.01	1.01201
6 a. m.-----	½ ebb-----	0		3.8	14.44	1.01159
		10		3.7	14.42	1.01155
		20		3.7	14.39	1.01145
		30		3.9	14.58	1.01168
		33.85		3.1	14.68	1.01175
7.30 a. m.-----	¾ ebb-----	0		3.8	14.48	1.01158
		10		3.9	14.61	1.01167
		20		3.9	14.64	1.01173
		30		3.9	14.53	1.01165
		33.85		3.8	14.68	1.01165

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 14—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1921—Continued						
Jan. 26, 9 a. m.-----	Slack-----	0		3. 8	14. 20	1. 01135
		10		3. 6	14. 26	1. 01140
		20		3. 8	14. 26	1. 01140
		30		3. 9	14. 34	1. 01149
		33. 85		3. 8	14. 62	1. 01172
Mar. 29, 11.40 a. m.-----	Ebbing; sea choppy; wind SE., force 1-----	0	11. 6	11. 4	14. 26	1. 01069
		10		11. 0	14. 46	1. 01090
		24		10. 8	15. 86	1. 01201
		0		11. 4	14. 15	1. 01060
		10		10. 9	14. 49	1. 01092
1.10 p. m.-----		24		10. 8	15. 82	1. 01202
Mar. 30, 2.40 p. m.-----		0		11. 6	14. 13	1. 01057
		10		11. 3	14. 12	1. 01059
		24		10. 7	15. 77	1. 01194
		0		10. 7	14. 15	1. 01071
		10		10. 2	14. 05	1. 01070
4.10 p. m.-----		24		11. 0	14. 65	1. 01104
5.40 p. m.-----		0		11. 6	14. 30	1. 01069
		10		11. 3	14. 40	1. 01081
		24		10. 5	16. 76	1. 01275
		0		10. 9	14. 34	1. 00987
		10		11. 5	14. 41	1. 01079
7.10 p. m.-----		24		10. 9	15. 42	1. 01087
8.40 p. m.-----		0		11. 3	14. 33	1. 01075
		10		11. 2	14. 58	1. 01095
		24		10. 8	15. 16	1. 01153
		0		11. 2	14. 40	1. 01082
		10		11. 1	14. 68	1. 01105
10.10 p. m.-----		24		10. 9	15. 83	1. 01198
		0		11. 3	14. 40	1. 01082
		10		11. 1	14. 66	1. 01106
		24		10. 8	14. 48	1. 01095
		0		11. 3	14. 40	1. 01081
Mar. 31, 1.10 a. m.-----		10		11. 0	14. 35	1. 01081
		24		11. 0	14. 79	1. 01116
		0		11. 1	14. 22	1. 01069
		10		11. 1	14. 35	1. 01079
		24		11. 4	14. 75	1. 01107
3.40 a. m.-----		0		11. 3	13. 71	1. 01029
		10		10. 6	14. 34	1. 01086
		24		11. 1	15. 14	1. 01140
		0		10. 9	13. 64	1. 01028
		10		11. 3	14. 48	1. 01087
4.10 a. m.-----		24		10. 9	14. 15	1. 01078
		0		11. 0	14. 05	1. 01058
		10		11. 3	14. 55	1. 01094
		24		11. 3	14. 91	1. 01121
		0		11. 0	13. 61	1. 01021
5.40 a. m.-----		10		11. 4	14. 44	1. 01084
		24		11. 3	15. 84	1. 01193
		0		11. 4	14. 31	1. 01070
		10		11. 4	14. 65	1. 01098
		24		11. 2	14. 83	1. 01116
June 1, 3.30 p. m.-----	2/3 ebb; sea tide ripples; wind NW., force 1-----	0	32. 2	20. 4	12. 07	1. 00733
		10		17. 6	17. 18	1. 01283
		20		17. 2	18. 77	1. 01312
		30		17. 5	16. 44	1. 01130
		40. 26		17. 2	19. 25	1. 01349
4.50 p. m.-----		0		21. 5	11. 94	1. 00697
		10		19. 0	12. 98	1. 00833
		20		19. 0	19. 20	1. 01304
		30		16. 9	19. 17	1. 01348
		40. 26		16. 9	19. 27	1. 01356
6.20 p. m.-----		0		20. 9	12. 05	1. 00725
		10		18. 4	13. 81	1. 00910
		20		17. 1	19. 18	1. 01346
		30		17. 8	17. 34	1. 01190
		40. 26		17. 3	18. 98	1. 01326
7.50 p. m.-----		0		21. 1	12. 11	1. 00720
		10		18. 8	18. 91	1. 01288
		20		17. 1	13. 36	1. 00903
		30		17. 7	18. 62	1. 01290
		40. 26		17. 1	18. 99	1. 01333

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 14—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1921—Continued						
June 1, 9.20 p. m.-----		0		20. 8	12. 03	1. 00719
		10		17. 6	18. 17	1. 01257
		20		17. 2	19. 07	1. 01335
		30		18. 9	13. 02	1. 00838
		40. 26		17. 4	18. 86	1. 01315
10.50 p. m.-----		0		21. 1	11. 85	1. 00701
		10		18. 8	13. 12	1. 00849
		20		17. 3	18. 88	1. 01317
		30		18. 6		
		40. 26		17. 2	18. 93	1. 01323
June 2, 12.20 a. m.-----		0		20. 3	11. 85	1. 00719
		10		18. 0	14. 03	1. 00934
		20		17. 2	18. 87	1. 01322
		30		17. 9	19. 13	1. 01323
		40. 26		17. 1	19. 41	1. 01363
1.50 a. m.-----		0		19. 6	12. 07	1. 00751
		10		18. 8	13. 11	1. 00848
		20		17. 2	18. 99	1. 01329
		30		17. 0	19. 17	1. 01347
		40. 26		17. 1	19. 22	1. 01349
3.20 a. m.-----		0		19. 8	12. 07	1. 00747
		10		18. 2	14. 99	1. 01004
		20		17. 1	18. 98	1. 01331
		30		17. 2	19. 22	1. 01343
		40. 26		17. 1	19. 27	1. 01353
June 3, 4.30 a. m.-----		0		19. 5	12. 28	1. 00770
		10		19. 4	12. 48	1. 00788
		20		17. 3	18. 99	1. 01328
		30		17. 1	19. 05	1. 01338
		40. 26		17. 1	19. 25	1. 01351
6.20 a. m.-----		0		19. 5	12. 44	1. 00782
		10		19. 2	12. 52	1. 00795
		20		17. 3	18. 73	1. 01306
		30		17. 1	19. 05	1. 01337
		40. 26		17. 2	19. 12	1. 01339
7.50 a. m.-----		0		19. 4	12. 48	1. 00787
		10		19. 1	12. 87	1. 00823
		20		17. 3	18. 94	1. 01325
		30		17. 2	19. 20	1. 01344
		40. 26		17. 1	19. 22	1. 01348
9.20 a. m.-----		0		19. 5	12. 62	1. 00783
		10		19. 3	12. 70	1. 00805
		20		17. 3	18. 58	1. 01244
		30		17. 3	18. 90	1. 01320
		40. 26		17. 1	19. 13	1. 01341
10.50 a. m.-----		0		19. 2	12. 79	1. 00815
		10		19. 2	12. 82	1. 00817
		20		17. 1	18. 34	1. 01319
		30		17. 1	19. 05	1. 01336
		40. 26		17. 1	19. 37	1. 01360
12.20 p. m.-----		0		19. 2	12. 62	1. 00802
		10		19. 3	12. 79	1. 00815
		20		17. 1	18. 92	1. 01327
		30		17. 2	19. 11	1. 01339
		40. 26		17. 2	19. 25	1. 01349
1.50 p. m.-----		0		19. 8	12. 58	1. 00786
		10		19. 5	12. 71	1. 00802
		20		17. 1	19. 26	1. 01352
		30		17. 0	19. 30	1. 01356
		40. 26		16. 6	19. 40	1. 01371
1922						
Jan. 23, 4.50 p. m.-----	Beginning flood; sea moderate; wind NNE., force 4; hazy.	0	1. 11	2. 6	15. 37	1. 01232
		10		2. 6	15. 38	1. 01233
		20		2. 7	18. 22	1. 01459
		30		2. 5	16. 56	1. 01328
		36. 60		2. 7	19. 60	1. 01569
6.20 p. m.-----		0		2. 3	15. 45	1. 01241
		10		2. 4	16. 31	1. 01308
		20		3. 0	18. 94	1. 01514
		30		2. 8	20. 41	1. 01632
		36. 60		2. 8	20. 41	1. 01632

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 14—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1922—Continued						
Jan. 23, 7.50 p. m.-----		0		2.6	15.46	1.01240
		10		2.3	16.40	1.01315
		20		2.4	20.31	1.01626
		30		2.8	20.46	1.01637
		36.60		2.8	20.31	1.01625
9.20 p. m.-----		0		2.4	15.47	1.01242
		10		2.2	15.85	1.01271
		20		3.2	18.64	1.01489
		30		2.8	20.03	1.01602
		36.60		2.8	20.01	1.01600
10.50 p. m.-----		0		2.2	15.46	1.01241
		10		2.2	15.91	1.01277
		20		3.3	19.94	1.01597
		30		2.8	20.12	1.01613
		36.60		2.8	20.15	1.01616
Jan. 24, 12.20 a. m.-----		0		2.7	16.37	1.01307
		10		2.3	15.47	1.01241
		20		2.6	15.42	1.01238
		30		3.1	17.08	1.01336
		36.60		2.8	19.94	1.01596
1.50 a. m.-----		0		2.3	15.39	1.01235
		10		2.2	15.74	1.01262
		20		2.8	16.34	1.01307
		30		2.5	16.20	1.01299
		36.60		3.2	20.47	1.01636
3.20 a. m.-----		0		2.9	15.24	1.01222
		10		2.2	15.40	1.01234
		20		2.5	15.98	1.01280
		30		2.9	16.43	1.01317
		36.60		2.8	18.01	1.01441
4.50 a. m.-----		0		2.5	15.22	1.01220
		10		2.0	15.16	1.01217
		20		2.8	16.43	1.01317
		30		2.0	15.23	1.01223
		36.60		3.0	17.35	1.01389
6.20 a. m.-----		0		2.7	15.14	1.01214
		10		2.2	15.05	1.01207
		20		2.6	16.23	1.01302
		30		3.0	16.48	1.01320
		36.60		2.8	19.79	1.01583
7.50 a. m.-----		0		2.2	15.14	1.01214
		10		3.3	15.15	1.01212
		20		3.3	20.61	1.01650
		30		3.5	20.85	1.01669
		36.60		3.0	20.95	1.01675
9.20 a. m.-----		0		2.2	15.15	1.01215
		10		2.2		
		20		3.2	15.24	1.01220
		30		2.9	20.85	1.01667
		36.60		2.8	21.01	1.01682
10.50 a. m.-----		0		2.5	15.25	1.01222
		10		2.2	15.50	1.01244
		20		2.4	20.61	1.01649
		30		3.0	21.05	1.01979
		36.60		4.3	20.14	1.01602
12.20 p. m.-----		0		2.2	15.30	1.01228
		10		2.2	15.58	1.01250
		20		2.4		
		30		2.5	17.71	1.01419
		36.60		3.2	20.63	1.01651
1.50 p. m.-----		0		2.4	15.16	1.01216
		10		2.3	16.32	1.01308
		20		2.4	17.55	1.01416
		30		2.0	16.39	1.01314
		36.60		2.4	19.81	1.01586
3.20 p. m.-----		0		2.5	15.15	1.01216
		10		2.5	16.14	1.01293
		20		2.6	17.94	1.01436
		30		2.2	16.43	1.01318
		36.60		2.4	17.91	1.01435

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 14—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1922—Continued						
Mar. 27, 1.43 p. m.-----	¼ flood; sea smooth; wind SE., force 1-----	0		6.2	12.22	1.00965
		10		5.6	15.10	1.01196
		20		5.9	13.43	1.01064
		30			16.77	
		40.0		6.8	13.68	1.01075
3.13 p. m.-----		0		7.2	15.54	1.01219
		10		5.6	12.11	1.00961
		20		5.4	13.89	1.01174
		30		5.9	13.14	1.01040
		40.0		6.0	15.67	1.01238
4.43 p. m.-----		0		7.2	12.21	1.00957
		10		5.8	14.54	1.01152
		20		5.7	16.95	1.01342
		30		5.6	17.12	1.01355
		40.0		5.4	17.22	1.01366
6.13 p. m.-----		0		7.2	12.15	1.00953
		10		5.6	14.16	1.01122
		20		5.8	17.06	1.01350
		30		5.7	17.18	1.01359
		40.0		5.5	17.25	1.01366
7.43 p. m.-----		0		7.0	12.08	1.00947
		10		5.5	14.71	1.01168
		20		5.8	16.75	1.01325
		30		5.7	17.10	1.01353
		40.0		5.5	17.18	1.01361
9.13 p. m.-----		0		7.0	12.21	1.00959
		10		5.5	14.31	1.01135
		20		5.7	16.51	1.01306
		30		5.4	17.12	1.01357
		40.0		5.5	17.25	1.01366
10.43 p. m.-----		0		7.1	12.30	1.00965
		10		5.6	13.82	1.01095
		20		5.7	15.95	1.01263
		30		5.6	17.00	1.01346
		40.0		5.3	17.30	1.01372
Mar. 28, 12.13 a. m.-----		0		7.0	12.32	1.00968
		10		6.0	{ 13.52 } { 15.91 }	
		20		5.8	16.83	1.01331
		30		5.6	17.35	1.01374
		40.0		5.4	17.16	1.01359
1.43 a. m.-----		0		7.6	12.30	1.00961
		10		5.6	16.04	1.01269
		20		5.5	17.10	1.01354
		30		5.6	17.18	1.01361
		40.0		5.4	17.34	1.01374
3.13 a. m.-----		0		7.2	14.07	1.01102
		10		5.8	16.17	1.01278
		20		5.6	16.86	1.01335
		30		5.7	16.92	1.01338
		40.0		5.5	17.11	1.01355
4.43 a. m.-----		0		7.3	12.36	1.00968
		10		7.0	13.76	1.01080
		20		5.5	16.81	1.01331
		30		5.8	17.12	1.01354
		40.0		5.6	17.31	1.01371
6.13 a. m.-----		0		7.1	12.30	1.00966
		10		6.6	13.42	1.01056
		20		5.7		
		30		5.5	16.91	1.01338
		40.0		5.6	17.18	1.01360
7.43 a. m.-----		0		7.2	12.28	1.00962
		10		6.0	13.62	1.01076
		20		5.5	16.56	1.01311
		30		5.6	17.05	1.01349
		40.0		5.5		
9.13 a. m.-----		0		7.2	12.26	1.00960
		10		7.1	13.42	1.01052
		20		5.7	16.50	1.01304
		30		5.4	17.93	1.01419
		40.0		5.4	17.18	1.01361

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 14—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1922—Continued						
Mar. 28, 10.43 a. m.		0		7.3	12.17	1.00953
		10		5.9	12.25	1.00970
		20		5.7	16.07	1.01271
		30		5.8	16.97	1.01341
		40.0		5.4	17.08	1.01352
12.13 p. m.		0		7.6	11.18	1.00863
		10				
		20		5.4	17.06	1.01351
		30		5.6	17.15	1.01357
		40.0		5.4	17.20	1.01361

Station 15

1920						
Jan. 15, 3.44 p. m.		0		0.7	15.04	1.01207
		7.3		.7	15.10	1.01213
Mar. 8, 2.10 p. m.	¼ ebb	0		1.4	16.10	1.01292
		7.33		1.1	16.16	1.01297
May 6, 6.24 p. m.	¼ ebb	0		12.8	7.32	1.00514
		7.27		12.6	9.42	1.00675
July 6, 4.55 a. m.	Slack ebb	0		24.4	13.26	1.00723
		Bottom.		23.1	13.24	1.00755
Aug. 25, 11.37 a. m.		0		24.8	13.61	1.00737
		Bottom.		24.7	13.63	1.00741
Oct. 19, 11.25 a. m.		0		19.6	15.15	1.00984
		Bottom.		19.7	16.60	1.01089
Dec. 8, 12.03 p. m.	¾ flood	0		8.5	15.23	1.01182
		Bottom.		8.2	15.34	1.01192
1921						
Jan. 26, 10.50 a. m.	Slack ebb; sea broken; wind NNE., force 2.	0	—3.3	3.5	14.49	1.01162
		7.78		3.6	14.53	1.01165
June 2, 3.55 p. m.	½ ebb; sea moderate; wind E., force 3.	0	26.6	19.9	12.53	1.00779
		8.23		19.5	12.83	1.00810
1922						
Jan. 24, 5.14 p. m.	¾ ebb; choppy; wind NNE., force 4.	0	—3.88	2.5	15.05	1.01207
		9.15		2.3	16.08	1.01289
Mar. 28, 2.15 p. m.	Full flood; wind SSE., force 2.	0	12.22	8.3	12.74	1.00987
		9.15		7.4	13.63	1.01066

Station 16

1920						
Jan. 15, 8.15 a. m.		0		—0.05	13.74	1.01103
		11.9		—0.05	13.96	1.01121
Mar. 9, 6.33 a. m.	Slack	0		.2	11.22	1.00900
		5		.3	12.74	
		10		.7	15.74	1.01263
May 6, 11.28 a. m.	⅛ flood	0		13.8	6.76	1.00456
		10.91		13.6	8.73	1.00610
July 7, 9.58 a. m.	½ flood	0		24.3	12.89	1.00697
		Bottom.		21.8	15.67	1.01171
Aug. 24, 5.50 a. m.		0		25.3	12.27	1.00623
		Bottom.		25.3	12.44	1.00634
Oct. 19, 2.05 p. m.		0		20.9		
		Bottom.		19.7	15.00	1.00972
Dec. 7, 7.05 a. m.	Slack ebb	0		8.8	14.56	1.01117
		Bottom.		8.8	14.65	1.01121
1921						
Jan. 24, 4.24 p. m.	¼ ebb; sea choppy; wind NNW., force 3.	0	5.5	3.5	11.91	1.00954
		11.44		3.4	13.19	1.01054
Mar. 31, 3.55 p. m.	Flood; sea choppy; wind S., force 4.	0	18.3	12.1	13.28	1.00983
		11.89		11.2	13.21	1.00990
June 1, 10.55 a. m.	Beginning ebb; calm; wind force 0; cloudy.	0	31.6	20.5	7.47	1.00383
		10.98		19.0	12.82	1.00820
1922						
Jan. 23, 12.35 p. m.	Beginning ebb; moderate swell; wind NNE., force 4.	0	1.67	2.7	13.90	1.01115
		10.98		3.4	14.26	1.01142
Mar. 27, 8.45 a. m.	Slack; sea smooth; wind SW., force 1.	0		9.0	11.01	1.00846
		12.0		5.8	13.17	1.01044

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 17

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920						
Jan. 15, 9.57 a. m.-----		0		0. 7	14. 63	1. 01176
		10. 5		. 7	14. 71	1. 01182
Mar. 9, 7.25 a. m.-----	Beginning ebb-----	0		. 4	12. 13	1. 00973
		10		. 7	15. 93	1. 01279
		21. 9		. 3	15. 91	
May 6, 12.45 p. m.-----	¼ flood-----	0		13. 8	7. 22	1. 00491
		10		13. 8	12. 21	1. 00885
		21. 81		13. 6	13. 03	1. 00948
July 7, 10.37 a. m.-----	½ flood-----	0		22. 4	11. 38	1. 00629
		10		23. 1	15. 14	1. 00897
		Bottom.		22. 9	17. 62	1. 01090
Aug. 24, 6.33 a. m.-----		0		26. 0	13. 19	1. 00672
		10		25. 5	15. 02	1. 00814
		Bottom.		24. 8	14. 25	1. 00806
Oct. 19, 2.51 p. m.-----		0		20. 4	14. 99	1. 00954
		10		19. 7	15. 32	1. 00995
		Bottom.		19. 7	15. 92	1. 01040
Dec. 7, 8 a. m.-----	Beginning flood-----	0		8. 9	15. 36	1. 01186
		10		8. 9	15. 34	1. 01183
		Bottom.		8. 9	15. 37	1. 01186
1921						
Jan. 24, 5.22 p. m.-----	⅓ ebb; sea choppy; wind NNW., force 3---	0	5. 0	4. 0	13. 60	1. 01087
		10		3. 6	13. 61	1. 01088
		21. 96		3. 6	14. 15	1. 01132
Mar. 31, 3.20 p. m.-----	Flood; sea choppy; wind S., force 4-----	0	18. 3	13. 4	13. 09	1. 00973
		10		10. 9	14. 15	1. 01068
		14. 64		11. 0	14. 81	1. 01116
June 1, 11.47 a. m.-----	⅓ ebb; sea smooth; wind ENE., force 1; cloudy.	0	30. 0	22. 2	7. 17	1. 00326
		10		19. 1	12. 59	1. 00803
		21. 96		19. 6	14. 58	1. 00967
1922						
Jan. 23, 1.20 p. m.-----	¼ ebb; slight sea; wind NNE., force 3-----	0	1. 67	3. 9	14. 62	1. 01169
		10		3. 7	15. 37	1. 01227
		21. 96			15. 48	
Mar. 27, 9.30 a. m.-----	Beginning flood; smooth; wind SE., force 1--	0	11. 11	8. 0	10. 39	1. 00801
		10		6. 7	13. 31	1. 01053
		21. 0		7. 8	15. 32	1. 01194

Station 18

1920						
Jan. 15, 11.13 a. m.		0		0.95	13.88	1.01113
		21		.7	14.76	1.01186
Mar. 9, 8.35 a. m.	¼ ebb	0		.4	12.62	
		5		.3	14.52	
		10.5		.7	15.90	1.01277
May 6, 1.43 p. m.	½ flood	0		13.8	7.22	1.00491
		10		13.1	9.56	1.00668
July 7, 11.40 a. m.	¾ flood	0		24.5	11.47	1.00586
		Bottom.		24.1	13.26	1.00730
Aug. 24, 7.18 a. m.		0		26.0	13.56	1.00701
		Bottom.		25.5	13.60	1.00718
Oct. 19, 3.38 p. m.		0		19.9		
		Bottom.		20.0	15.39	1.00994
Dec. 7, 8.39 a. m.	¼ flood	0		8.9	15.61	1.01205
		Bottom.		8.9	15.61	1.01205
1921						
Jan. 25, 7.10 a. m.	¾ ebb; sea choppy; wind NNE., force 2	0	-3.8	2.9	13.95	1.01119
		10.98		2.9	13.96	1.01120
Mar. 31, 2.12 p. m.	Flood; sea choppy; wind S., force 3	0	17.2	12.5	12.93	1.00951
		12		11.0	14.59	1.01098
June 1, 12.25 p. m.	⅓ ebb; sea smooth; wind ENE., force 1	0	30.0	20.3	11.67	1.00705
		10.5		17.3	14.10	1.00955
1922						
Jan. 23, 1.55 p. m.	½ ebb; sea moderate; wind NNE., force 3	0	1.67	2.7	15.85	1.01271
		10.53		3.1	15.81	1.01264
Mar. 27, 10.18 a. m.	¼ flood; smooth; wind SE., force 1	0	11.11	7.8	11.76	1.00916
		10.0		7.1	13.40	1.01050

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 19

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920						
Jan. 14, 10.30 a. m.-----		0-----		0. 95-----	16. 13-----	1. 01295-----
		12. 8-----		. 95-----	19. 37-----	1. 01555-----
Mar. 9, 11.48 a. m.-----	Slack-----	0-----		1. 0-----	14. 58-----	1. 01169-----
		5-----		. 9-----	13. 80-----	
		10-----		. 9-----	15. 97-----	1. 01282-----
		12. 8-----		. 9-----	16. 55-----	
May 6, 5 a. m.-----	¼ ebb-----	0-----		12. 6-----	9. 71-----	1. 00702-----
		12. 73-----		12. 8-----	13. 62-----	1. 00998-----
July 7, 5.04 p. m.-----	¾ flood-----	0-----		22. 5-----	14. 70-----	1. 00881-----
		Bottom.-----		23. 2-----	18. 47-----	1. 01176-----
Aug. 23, 6.11 p. m.-----		0-----		25. 5-----	14. 40-----	1. 00777-----
		Bottom.-----		25. 2-----	19. 11-----	1. 01138-----
Oct. 20, 7.04 a. m.-----		0-----		19. 6-----	17. 68-----	1. 01176-----
		Bottom.-----		20. 2-----	19. 33-----	1. 01286-----
Dec. 6, 4.18 p. m.-----	¾ ebb-----	0-----		9. 5-----	16. 90-----	1. 01298-----
		Bottom.-----		9. 5-----	16. 76-----	1. 01287-----
1921						
Jan. 24, 1.28 p. m.-----	¾ flood; sea choppy; wind NNW., force 3-----	0-----	6. 6-----	3. 8-----	14. 45-----	1. 01155-----
		11. 90-----		3. 8-----	17. 22-----	1. 01374-----
Mar. 31, 6.30 p. m.-----	Flood; sea choppy; wind S., force 3-----	0-----	16. 1-----	11. 5-----	15. 08-----	1. 01131-----
		12. 81-----		11. 0-----	16. 48-----	1. 01246-----
June 1, 7 a. m.-----	½ flood; wind NNE., force 1-----	0-----	20. 0-----	19. 8-----	9. 10-----	1. 00526-----
		12. 81-----		18. 9-----	13. 77-----	1. 00895-----
1922						
Jan. 23, 9 a. m.-----	⅓ flood; sea rolling; wind NNE., force 4-----	0-----	2. 22-----	2. 9-----	18. 19-----	1. 01450-----
		12. 81-----		2. 8-----	18. 78-----	1. 01503-----
Mar. 26, 6.31 p. m.-----	Full ebb; sea moderate; wind S. by E., force 2.-----	0-----	9. 44-----	8. 0-----	11. 55-----	1. 00898-----
		12. 81-----		6. 7-----	16. 60-----	1. 01305-----

Station 20

1920						
Mar. 9, 10.56 a. m.	¾ ebb	0		0.6	14.21	1.01140
		5		.6	14.86	1.01193
		10		.7	15.77	1.01265
May 6, 6.15 a. m.	½ ebb	0		12.8	11.15	1.00808
		5		12.6	12.34	1.00902
		10		12.8		
		Bottom.			13.09	1.00953
July 7, 4.10 p. m.	¾ flood	0		24.5	14.71	1.00829
		Bottom.		24.4	14.79	1.00838
Aug. 23, 5.45 p. m.		0		26.0	14.73	1.00783
		Bottom.		25.3	17.64	1.01025
Oct. 20, 6.08 a. m.		0		20.3	15.08	1.00963
		Bottom.		19.8	17.14	1.01131
Dec. 6, 3.21 p. m.	½ ebb			9.4	16.99	1.01304
		Bottom.		9.3	16.96	1.01306
1921						
Jan. 24, 12.43 p. m.	⅔ flood; sea choppy; wind NNW., force 3	0	6.1	3.9	15.47	1.01236
		10.53		3.9	15.54	1.01242
Apr. 1, 5.30 p. m.	Flood; sea choppy; wind N., force 5	0	7.7	11.2	15.17	1.01142
		12.8		11.5	15.26	1.01145
June 1, 7.53 a. m.	⅔ flood; sea smooth; wind NNE., force 1	0	20.0	19.9	11.42	1.00932
		10.62		18.5	14.70	1.00966
1922						
Jan. 23, 9.55 a. m.	Full flood; sea moderate; wind NNE., force 4.	0	2.22	2.8	18.10	1.01449
		12.23		2.7	19.18	1.01536
Mar. 26, 6.10 p. m.	¾ ebb; sea smooth; wind SSW., force 1	0	10.00	7.7	15.65	1.01223
		13.0		6.0	12.09	1.00956

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 21

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920						
Jan. 14, 8.50 a. m.		0		0. 45	14. 85	1. 01192
		42. 1		. 45	21. 78	1. 01749
Mar. 9, 1.02 p. m.	Beginning flood	0		. 3	13. 00	1. 01044
		10		. 3	15. 58	1. 01250
		20		1. 0	16. 88	1. 01355
		30		. 6	17. 31	1. 01390
		40		. 7	17. 36	1. 01393
		44. 3		. 6	17. 53	1. 01408
May 6, 8.19 a. m.	¾ ebb	0		13. 3	9. 97	1. 00696
		10		13. 1	15. 76	1. 01157
		20		13. 3	18. 15	1. 01339
		30		13. 1	18. 98	1. 01407
		40		13. 1	19. 08	1. 01414
		44. 09		13. 3	19. 59	1. 01449
July 7, 6.25 p. m.	Flood	0		24. 7	14. 56	1. 00812
		Bottom.		22. 4	19. 82	1. 01268
Aug. 23, 4.35 p. m.		0		26. 0	14. 03	1. 00735
		10		26. 0	13. 97	1. 00732
		20		26. 0	13. 89	1. 00726
		30		25. 2	17. 76	1. 01035
		Bottom.		24. 8	21. 93	1. 01302
Oct. 20, 8.10 a. m.		0		20. 0	14. 87	1. 00954
		10		19. 8	18. 27	1. 01216
		20		19. 3	22. 80	1. 01569
		30		19. 5		
		40		19. 1	23. 66	1. 01617
		Bottom.		19. 2	23. 79	1. 01641
Dec. 6, 1.47 p. m.	¼ ebb	0		9. 5	16. 62	1. 01277
		10		9. 5	16. 65	1. 01279
		20		9. 7	18. 25	1. 01401
		30		10. 0	20. 53	1. 01574
		40		10. 0	20. 97	1. 01607
		Bottom.		10. 0	21. 10	1. 01617
1921						
Jan. 24, 11.17 a. m.	½ flood; sea broken; wind N., force 2; sky partly cloudy and hazy.	0	5. 0	3. 9	13. 12	1. 01050
		10		4. 6	13. 54	1. 01080
		20		3. 9	17. 51	1. 01495
		30		4. 0	18. 03	1. 01437
		40		4. 1	18. 65	1. 01484
		43. 01		4. 0	18. 72	1. 01491
Apr. 1, 6.30 p. m.	Flood; sea choppy; wind N., force 3	0	8. 8	10. 9	14. 30	1. 01079
		10		10. 9	14. 39	1. 01086
		26		11. 2	16. 84	1. 01269
June 1, 5.25 a. m.	¼ flood; sea smooth; calm	0	20. 0	19. 6	11. 25	1. 00096
		10		18. 8	13. 85	1. 00903
		20		17. 7	18. 98	1. 01307
		30		17. 5	19. 65	1. 01372
		40		17. 8	20. 85	1. 01456
		43. 92		17. 7		
1922						
Jan. 23, 7.30 p. m.	¼ flood; sea rolling; wind NE., force 4	0	2. 22	3. 4	15. 96	1. 01276
		10		3. 0	15. 27	1. 01224
		20		3. 2	15. 99	1. 01280
		30		2. 7	16. 01	1. 01285
		40		3. 3	16. 00	1. 01280
		43. 92		2. 8	18. 27	1. 01463
Mar. 26, 5.21 p. m.	¾ ebb; sea moderate; wind S., force 2	0	12. 22	8. 1	11. 62	1. 00905
		10		6. 2	17. 10	1. 01348
		20		6. 2	17. 89	1. 01410
		30		6. 5	18. 26	1. 01438
		40		6. 2	18. 34	1. 01447
		43. 0		6. 6		

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 22

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920						
Jan. 13, 4.48 p. m. -----		0 -----		0. 7 -----	16. 85 -----	1. 01353 -----
		12. 8 -----		. 7 -----	22. 26 -----	1. 01786 -----
Mar. 9, 4.06 p. m. -----	½ flood -----	0 -----		1. 1 -----	16. 22 -----	1. 01303 -----
		5 -----		1. 3 -----	16. 23 -----	1. 01303 -----
		10 -----		1. 2 -----	16. 34 -----	1. 01311 -----
		12. 8 -----		1. 1 -----	17. 38 -----	1. 01396 -----
May 5, 6.14 a. m. -----		0 -----		13. 8 -----	11. 95 -----	1. 00855 -----
		13. 18 -----		13. 6 -----		
July 8, 5.25 a. m. -----		0 -----		24. 3 -----	15. 57 -----	1. 00906 -----
		Bottom. -----		24. 2 -----	21. 55 -----	1. 01352 -----
Aug. 23, 1.38 a. m. -----		0 -----		26. 0 -----	16. 45 -----	1. 00916 -----
		Bottom. -----		26. 0 -----	17. 33 -----	1. 00982 -----
Oct. 20, 10.45 a. m. -----		0 -----		19. 8 -----	16. 74 -----	1. 01101 -----
		Bottom. -----		20. 1 -----	18. 90 -----	1. 01258 -----
Dec. 6, 10.25 a. m. -----	¾ flood -----	0 -----		9. 5 -----	18. 25 -----	1. 01403 -----
		Bottom. -----		9. 5 -----	18. 88 -----	1. 01452 -----
1921						
Jan. 24, 8.10 a. m. -----	Slack ebb; sea broken; wind N., force 3 -----	0 -----	4. 4 -----	3. 7 -----	14. 69 -----	1. 01175 -----
		12. 81 -----		3. 7 -----	14. 72 -----	1. 01178 -----
Apr. 1, 8.26 p. m. -----	Ebb; sea choppy; wind N., force 1 -----	0 -----	8. 8 -----	11. 1 -----	16. 48 -----	1. 01244 -----
		10 -----		11. 2 -----	17. 08 -----	1. 01287 -----
		14. 64 -----		11. 3 -----		
May 31, 4.40 p. m. -----	Full ebb; sea rolling; wind ENE., force 1 -----	0 -----	25. 5 -----	20. 0 -----	13. 27 -----	1. 00834 -----
		13. 17 -----		19. 1 -----	15. 08 -----	1. 00991 -----
1922						
Jan. 22, 5.40 p. m. -----	Beginning flood; calm -----	0 -----	8. 89 -----	3. 5 -----	22. 33 -----	1. 01781 -----
		12. 81 -----		3. 8 -----	17. 04 -----	1. 01360 -----
Mar. 26, 2.49 p. m. -----		0 -----		9. 3 -----	14. 28 -----	1. 01098 -----
		13. 0 -----		7. 0 -----	18. 18 -----	1. 01427 -----

Station 23

1920						
Jan. 13, 3.20 p. m.		0		0.7	16.48	1.01323
		12.8		.7	23.27	1.01867
Mar. 9, 4.55 p. m.	¾ flood	0		1.4	16.62	1.01334
		5		1.4	16.70	1.01340
		10		1.4	16.73	1.01342
		12.8		1.1	17.88	1.01435
May 5, 6.14 p. m.	½ flood	0		13.8	11.95	1.00855
		13.18		13.6		
July 8, 5.25 a. m.		0		24.3	15.57	1.00906
		Bottom.		24.2	21.55	1.01352
Aug. 23, 12.50 a. m.		0		26.0	18.71	1.01085
		Bottom.		25.1	20.48	1.01243
Oct. 20, 11.25 a. m.		0		20.1	17.90	1.01182
		Bottom.		19.2	25.21	1.01756
Dec. 6, 9.37 a. m.	½ flood	0		9.5	19.24	1.01481
		10		9.5	19.43	1.01495
		Bottom.		9.5	19.66	1.01511
1921						
Jan. 24, 7 a. m.	Full ebb; sea broken; wind N., force 2	0	5.0	4.2	17.66	1.01407
		12.81		4.0	17.93	1.01428
Apr. 1, 8.42 p. m.	Ebb; sea choppy; wind N., force 1	0	9.4	11.0	17.14	1.01297
		12.81		11.3	17.42	1.01314
May 31, 4.20 p. m.	Full ebb; sea rolling; wind ENE., force 2	0	25.5	20.0	12.61	1.00859
		12.81		19.8	13.86	1.00882
1922						
Jan. 22, 5 p. m.	Beginning flood; calm	0	10.0	3.2	18.19	1.01454
		12.81		3.8	22.99	1.01831
Mar. 26, 1.55 p. m.	Beginning ebb; wind S., force 1	0	15.0	7.8	15.40	1.01201
		13.0		6.8	18.85	1.01480

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 24

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920						
Jan. 13, 11.50 a. m.		0		1.45	18.05	1.01448
		14.7		1.45	23.55	1.01888
Mar. 10, 12.46 a. m.	½ ebb	0		1.4	17.23	1.01383
		5		1.4	17.25	1.01384
		10		1.4	18.01	1.01445
		14.6		1.4	19.92	1.01599
2.16 a. m.	¾ ebb	0		1.7	17.69	1.01419
		5		1.7	17.82	1.01429
		10		1.4	17.66	1.01418
		14.6		1.7	17.72	1.01421
3.46 a. m.	¾ ebb	0		1.7	17.50	1.01404
		5		1.7	17.65	1.01416
		10		1.7	19.17	1.01538
		14.6		1.7	19.94	1.01599
5.16 a. m.	Slack	0		1.7	17.60	1.01411
		5		1.4	17.90	1.01437
		10		1.4	18.94	1.01520
		14.6		1.4	19.74	1.01584
6.46 a. m.	Beginning flood	0		1.4	17.56	1.01409
		5		1.4	17.58	1.01411
		10		1.4	19.07	1.01531
		14.6		1.4	19.57	1.01570
8.16 a. m.	¼ flood	0		1.7	17.52	1.01405
		5		1.7	17.58	1.01401
		10		1.7	18.63	1.01494
		14.6		1.7	18.69	1.01499
9.46 a. m.	½ flood	0		1.7	17.50	1.01404
		5		1.7	17.55	1.01407
		10		1.7	17.58	1.01410
		14.6		1.7	18.36	1.01472
11.16 a. m.	¾ flood	0		1.9	17.39	1.01394
		5		1.9	17.35	1.01392
		10		1.7	17.87	1.01434
		14.6		1.7	19.16	1.01537
12.46 p. m.	Beginning ebb	0		2.0	17.38	1.01393
		5		2.0	17.79	1.01426
		10		1.7	18.80	1.01505
		14.6		1.7	19.55	1.01568
2.16 p. m.	¼ ebb	0		2.7	17.38	1.01391
		5		2.4	17.94	1.01437
		10		2.2	18.22	1.01460
		14.6		2.2	19.56	1.01566
3.46 p. m.	¾ ebb	0		3.0	17.52	1.01401
		5		2.7	17.86	1.01430
		10		2.7	18.55	1.01485
		14.6		2.7	19.57	1.01565
5.16 p. m.	Beginning flood	0		2.7	17.60	1.01409
		5		2.2	17.96	1.01439
		10		3.2	17.95	1.01430
		14.6		2.7	17.80	1.01425
6.46 p. m.	¼ flood	0		1.7	17.71	1.01420
		5		1.7	18.01	1.01444
		10		1.7	18.56	1.01488
		14.6		1.7	19.49	1.01561
May 5, 4.22 p. m.	¼ flood	0		14.3	14.66	1.01053
		10		14.5	20.55	1.01501
		14.54		14.3	21.04	1.01542
July 8, 7.20 a. m.	Slack ebb	0		24.8	16.70	1.00969
		Bottom.		22.5	21.76	1.01411
Aug. 23, 11.44 a. m.		0		26.0	18.94	1.01102
		Bottom.		24.0	24.98	1.01612
Oct. 20, 1.35 p. m.		0		20.3	17.90	1.01176
		Bottom.		19.7	25.12	1.01736
Dec. 6, 7.05 a. m.	¼ flood	0		9.8	20.58	1.01580
		Bottom.		9.8		
1921						
Jan. 23, 5.23 p. m.	¾ ebb; sea choppy; wind W., force 1	0	11.1	5.4	16.21	1.01285
		10		4.6	16.20	1.01288
		14.64		4.2	21.59	1.01117
Apr. 1, 10.13 p. m.	Ebb; sea choppy; wind N., force 1	0	10.0	11.3	19.49	1.01475
		12.81		11.4	19.67	1.01489
May 31, 2.55 p. m.	¾ ebb; sea moderate; wind NNE., force 2	0	25.0	19.0	18.85	1.01280
		10		18.5	19.54	1.01346
		15.61		17.6	25.02	1.01771

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 24—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1922						
Jan. 22, 3.50 p. m.	Full ebb; calm	0	12. 22	3. 9	21. 46	1. 01731
		10		4. 9	23. 47	1. 01861
		15. 55		3. 9	24. 45	1. 01946
Mar. 26, 12.35 p. m.	Full flood; wind SW., force 1	0	15. 00	8. 2	15. 69	1. 01219
		10		6. 9	18. 82	1. 01477
		16. 5		6. 8	19. 44	1. 01527

Station 25

1920						
Jan. 13, 1.20 p. m.		0		0. 6	18. 83	1. 01511
		7. 8		. 7	20. 08	1. 01612
May 5, 3.20 p. m.	Slack ebb	0		14. 3	17. 72	1. 01288
		7. 72		14. 3	18. 27	1. 01330
July 8, 8.45 a. m.	¼ flood	0		24. 8	17. 72	1. 01046
		Bottom.		24. 8	17. 70	1. 01045
Aug. 23, 10.50 a. m.		0		26. 5	19. 41	1. 01122
		Bottom.		25. 3	21. 66	1. 01314
Oct. 20, 12.54 p. m.		0		20. 6	17. 20	1. 01115
		Bottom.		19. 7	20. 99	1. 01424
Dec. 6, 8.05 a. m.	½ flood	0		9. 6	20. 95	1. 01612
		Bottom.		9. 6	20. 91	1. 01690
1921						
Jan. 23, 4.29 p. m.	½ ebb; sea smooth; wind NNW., force 1	0	12. 2	5. 3	18. 05	1. 01419
		7. 78		4. 6	18. 58	1. 01476
Apr. 1, 9.36 p. m.	Ebb; sea choppy; wind N., force 1	0	10. 0	11. 4		
		13. 5		11. 6	21. 64	1. 01635
May 31, 2 p. m.	½ ebb; sea moderate; wind NNE., force 2	0	24. 4	19. 4	18. 92	1. 01274
		8. 34		17. 6	24. 92	1. 01771
1922						
Jan. 22, 2.55 p. m.	¾ ebb; calm	0	12. 22	4. 5	20. 56	1. 01635
		8. 24		4. 9	22. 53	1. 01887
Mar. 26, 11.37 a. m.	¾ flood; sea smooth; wind SW., force 1	0	14. 44	8. 2	17. 61	1. 01369
		8. 23		7. 6	18. 00	1. 01406

Station 26

1920						
Jan. 13, 9.01 a. m.		0		1. 7	20. 26	1. 01626
		22. 0		1. 7	23. 84	1. 01910
Mar. 11, 9.04 a. m.	Ebb	0		2. 7	18. 17	1. 01453
		10		2. 7	19. 34	1. 01547
		20		2. 4	21. 48	1. 01716
		23. 7		2. 4	22. 51	1. 01801
May 5, 12.49 p. m.	¾ ebb	0		14. 0	15. 54	1. 01127
		10		13. 8	23. 06	1. 01707
		20		13. 8	24. 73	1. 01834
		23. 63		14. 0	24. 91	1. 01845
July 8, 10.30 a. m.	¾ flood	0		24. 9	17. 72	1. 01044
		Bottom.		24. 8	21. 99	1. 01354

Station 27

1920						
Jan. 12, 5.38 p. m.		0		1. 7	19. 74	1. 01583
		10. 0		1. 7	21. 90	1. 01755
Mar. 11, 11.35 a. m.	Beginning flood	0		2. 7	18. 48	1. 01478
		5		2. 7	18. 23	1. 01459
		10		2. 7	18. 96	1. 01517
May 5, 10.27 a. m.	½ ebb	0		13. 8	13. 95	1. 01008
		10		13. 6	16. 25	1. 01188
July 8, 12.30 p. m.	Slack	0		25. 3	17. 28	1. 00998
		Bottom.		24. 2	22. 06	1. 01238

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 27—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920—Continued						
Aug. 23, 5.40 a. m.-----		0-----		26. 0-----	19. 48-----	1. 01142-----
		5-----		25. 5-----	20. 79-----	1. 01255-----
		Bottom.-----		24. 0-----	24. 20-----	1. 01553-----
Oct. 20, 4.42 p. m.-----		0-----		21. 3-----	17. 31-----	1. 01108-----
		Bottom.-----		19. 6-----	24. 53-----	1. 01694-----
Dec. 5, 2.20 p. m.-----	¾ flood-----	0-----		10. 4-----	21. 51-----	1. 01644-----
		Bottom.-----		10. 2-----	21. 51-----	1. 01647-----
1921						
Jan. 23, 12.27 p. m.-----	¼ ebb; sea tide rips; wind W., force 2-----	0-----	13. 3-----	5. 4-----	18. 73-----	1. 01483-----
		10. 07-----		4. 8-----	23. 39-----	1. 01856-----
Apr. 2, 8.48 a. m.-----	Ebb; sea smooth; wind NNE., force 1-----	0-----	11. 6-----	11. 4-----	21. 14-----	1. 01600-----
		8-----		11. 1-----	21. 23-----	1. 01612-----
May 31, 10.12 a. m.-----	Beginning ebb; sea choppy; wind NNE., force 3.-----	0-----	19. 4-----	19. 5-----	16. 10-----	1. 01057-----
		9. 15-----		19. 1-----	17. 10-----	1. 01135-----
1922						
Jan. 22, 11.15 a. m.-----	½ ebb; light swell; wind NW., force 1-----	0-----	7. 78-----	4. 1-----	20. 06-----	1. 01606-----
		10. 06-----		4. 3-----	20. 53-----	1. 01633-----
Mar. 26, 8.55 a. m.-----	¼ flood; sea smooth; wind SW., force 1-----	0-----	13. 33-----	7. 8-----	17. 83-----	1. 01390-----
		8. 0-----		7. 4-----	18. 82-----	1. 01473-----

Station 28

1920						
Jan. 12, 4.30 p. m.		0		1.7	19.34	1.01551
		12.3		1.7	22.60	1.01811
Mar. 11, 1 p. m.	½ flood	0		2.7	18.44	1.01475
		5		2.7	18.48	1.01477
		10		2.7	19.36	1.01548
		12.8		2.7	19.64	1.01570
May 5, 9.22 a. m.	½ ebb	0		13.3	14.53	1.01018
		12.73		13.6	20.65	1.01525
July 8, 1.38 p. m.	¾ ebb	0		25.8	19.37	1.01135
		Bottom.		22.0	22.49	1.01480
Aug. 22, 5.05 p. m.		0		27.0	19.27	1.01104
		10		25.5	20.99	1.01270
		Bottom.		22.2		
Oct. 20, 5.25 p. m.		0		20.3	17.14	1.01116
		Bottom.		19.5	26.44	1.01842
Dec. 5, 1.26 p. m.	¾ flood	0		10.4	22.21	1.01701
		Bottom.		10.2	21.95	1.01681
1921						
Jan. 23, 11.17 a. m.	Beginning ebb; sea smooth; wind W., force 2	0	10.5	4.9	19.02	1.01510
		Bottom.		5.0	24.56	1.01946
Apr. 2, 9.43 a. m.	Ebb; sea smooth; wind NNE., force 1	0	11.6	11.3	22.34	1.01617
		11.6	11.6	11.3	23.01	1.01747
May 31, 9.30 a. m.	Beginning ebb; sea choppy; wind NNE., force 3.	0	18.8	19.0		
		12.81	18.8	19.0	17.73	1.01194
1922						
Jan. 22, 10.15 a. m.	½ ebb; sea moderate; wind NW., force 1	0	7.22	3.6	19.67	1.01569
		12.81	7.22	4.5	24.03	1.01907
Mar. 26, 7.59 a. m.	Beginning flood; sea smooth; wind SW., force 1.	0	12.22	7.6	17.42	1.01360
		13	12.22	7.6	23.74	1.01855

Station 29

1920						
Jan. 12, 2.40 p. m.		0		1.7	20.34	1.01631
		12.8		1.7	24.33	1.01948
Mar. 11, 2.53 p. m.	¾ flood	0		3.2	18.54	1.01482
		5		2.9	18.97	1.01517
		10		2.9	19.73	1.01577
		13.3		2.9	20.31	1.01623
May 5, 7.48 a. m.	½ ebb	0		13.8	16.07	1.01171
		5		13.6		
		10		13.8	22.37	1.01654
		13.18		13.6	19.22	1.01416

TABLE 5.—Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued

Station 29—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920—Continued						
July 8, 2.50 p. m.-----	¾ ebb-----	0----- Bottom.-----	-----	24. 8----- 22. 1-----	18. 88----- 23. 06-----	1. 01132----- 1. 01853-----
Aug. 22, 4.16-4.38 p. m.-----	-----	0----- 10----- Bottom.-----	-----	27. 5----- 25. 1----- 25. 0-----	19. 20----- 24. 00----- 24. 34-----	1. 01077----- 1. 01507----- 1. 01536-----
Oct. 21, 6.56-7.26 a. m.-----	-----	0----- Bottom.-----	-----	19. 9----- 20. 0-----	18. 96----- 23. 87-----	1. 01267----- 1. 01635-----
Dec. 5, 12.34-12.51 p. m.-----	½ flood-----	0----- Bottom.-----	-----	10. 2----- 10. 4-----	22. 43----- 22. 50-----	1. 01718----- 1. 01723-----
1921						
Jan. 23, 10.10 a. m.-----	¾ flood; sea smooth; wind W., force 2-----	0----- 12. 81-----	8. 3-----	5. 0----- 5. 0-----	18. 18----- 24. 53-----	1. 01439----- 1. 01943-----
Apr. 2, 10.04 a. m.-----	Ebb; sea smooth; wind NNE., force 1-----	0----- 12. 81-----	11. 6-----	11. 3----- 11. 1-----	22. 72----- 23. 38-----	1. 01723----- 1. 01777-----
May 31, 8.22 a. m.-----	Full flood; sea choppy; wind NNE., force 3-----	0----- 12. 81-----	18. 3-----	18. 9----- 16. 9-----	----- 26. 98-----	----- 1. 01946-----
1922						
Jan. 22, 9.13 a. m.-----	¼ ebb; heavy swell; wind NW., force 1-----	0----- 12. 81-----	5. 56-----	3. 8----- 4. 8-----	21. 08----- 28. 50-----	1. 01679----- 1. 02259-----
Mar. 26, 6.56 a. m.-----	Slack; sea smooth; wind SW., force 1-----	0----- 13-----	9. 44-----	7. 8----- 6. 9-----	16. 65----- 22. 26-----	1. 01297----- 1. 01744-----

Station 30

1920						
Jan. 11, 5.25 p. m.		0		1.95	23.32	1.01867
		38.5		1.95	29.34	1.02347
Mar. 11, 4.42 p. m.	Flood	0		3.4	18.70	1.01493
		10		3.2	19.62	1.01567
		20		3.2	20.13	1.01606
		30		3.2	20.81	1.01661
		40		2.9	22.94	1.01831
		42.9		2.9	23.09	1.01843
May 5, 5.50 a. m.	¾ ebb	0		13.8	20.87	1.01539
		10		13.6	23.40	1.01737
		20		13.6	23.75	1.01863
		30		14.5		
		40		13.5	25.32	1.01886
		42.72		13.5	24.63	1.01833
July 8, 4.45 p. m.	½ ebb	0		24.2	21.72	1.01361
		Bottom.		21.9	25.23	1.01689
Aug. 22, 3.10 p. m.		0		27.0	22.86	1.01736
		10		23.0	26.94	1.01787
		20		22.2	27.43	1.01847
		30		21.3	28.09	1.01920
		40		21.2	28.19	1.01930
		45.75		21.3	28.46	1.01948
Oct. 21, 10 a. m.		0		20.4	21.99	1.01482
		10		20.1	24.84	1.01705
		20		20.0	26.18	1.01809
		30		19.4	27.02	1.01888
		40		19.3	27.08	1.01895
		Bottom.		19.3	27.06	1.01903
Dec. 5, 10.20 a. m.	¼ flood	0		10.3	22.78	1.01744
		10		10.3	22.88	1.01752
		20		10.2	22.89	1.01753
		30		10.2	22.86	1.01752
		40		10.2	22.88	1.01753
		Bottom.		10.2	23.96	1.01838
1921						
Jan. 23, 8.20 a. m.	¼ flood; sea smooth; wind SW., force 2	0	7.7	4.9	18.36	1.01495
		10		4.8	22.35	1.01737
		20		4.9	24.61	1.01925
		30		4.8	18.74	1.01498
		40		4.9	26.07	1.02056
		Bottom.		4.9	25.42	1.02041
Apr. 2, 10.37 a. m.	Ebb; sea smooth; wind NNE., force 1	0	11.6	12.1	21.56	1.01621
		10		11.2	23.47	1.01783
		20		11.3	24.62	1.01870
		30		11.4	28.23	1.02147
		43.5		11.5	28.27	1.02148

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 30—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1921—Continued						
May 31, 5.32 p. m.-----	$\frac{3}{8}$ flood; sea choppy; wind NNE., force 3	0	16. 6	18. 7	20. 18	1. 01386
		10		18. 1	23. 30	1. 01639
		20		18. 0	26. 30	1. 01895
		30		17. 1	26. 92	1. 01935
		43. 92		17. 1	26. 85	1. 01930
1922						
Jan. 22, 7.32 a. m.-----	Full flood; sea moderate; wind NNW., force 1.	0	3. 33	4. 40	23. 96	1. 01903
		10		4. 0	25. 21	1. 02006
		20		4. 5	25. 71	1. 02040
		30		4. 1	25. 89	1. 02058
		44. 83		4. 2	25. 88	1. 02056
Mar. 25, 6.17 p. m.-----	$\frac{1}{4}$ flood; sea smooth; wind SE., force 1	0	15	7. 3	19. 33	1. 01512
		10		7. 7	21. 09	1. 01646
		20		7. 0	23. 91	1. 01874
		30		6. 7	25. 10	1. 01971
		41		6. 8	25. 37	1. 01991

Station 31

1920						
Jan. 10, 3.30 p. m.-----		0		2. 7	21. 33	1. 01703
		2. 7		2. 7	23. 78	1. 01898
Jan. 11, 2.05 p. m.-----		0		2. 4	24. 79	1. 01983
		7. 3		2. 4	25. 89	1. 02069

Station 32

1920						
Jan. 10, 3.30 p. m.-----		0		2. 7	21. 33	1. 01706
		27		2. 7	23. 78	1. 01901
Mar. 12, 2.39 p. m.-----	Beginning flood-----	0		4. 7	17. 73	1. 01409
		10		4. 7	18. 22	1. 01448
		20		4. 7	21. 78	1. 01746
		28. 8		4. 7	28. 81	1. 02281
May 1, 10.53 a. m.-----	½ ebb-----	0		14. 8	16. 34	1. 01174
		10		14. 6	19. 82	1. 01467
		20		14. 8	24. 54	1. 01800
		27. 99		14. 6	25. 78	1. 01899
Dec. 4, 11.55 a. m.-----	¾ ebb-----	0		9. 6	14. 78	1. 01132
		10		9. 6	18. 01	1. 01382
		20		10. 0	22. 69	1. 01741
		Bottom.		10. 1		
1921						
Jan. 22, 11.02 a. m.-----	¾ ebb; sea smooth; wind SW-----	0	11. 1	4. 8	17. 75	1. 01410
		10		4. 4	18. 82	1. 01498
		20		4. 4	19. 46	1. 01550
		27. 91		4. 4	21. 20	1. 01686
Apr. 2, 3.30 p. m.-----	Flood; sea smooth; wind SE., force 1-----	0	13. 3	13. 4	26. 30	1. 01964
		10		11. 6	25. 38	1. 01925
		23		11. 4	31. 22	1. 02379
May 30, 10.49 p. m.-----	¾ ebb; sea choppy; wind NNE., force 3----	0	18. 8	19. 7	18. 72	1. 01253
		10		19. 6	19. 49	1. 01312
		20		19. 9	25. 84	1. 01785
		27. 81		16. 8	27. 63	1. 02094
1922						
Jan. 21, 11.45 a. m.-----	½ flood; sea choppy; wind WSW., force 1--	0	13. 33	8. 9	20. 15	1. 01560
		10		4. 2	20. 99	1. 01571
		20		9. 4	22. 65	1. 01746
		27. 90		4. 2	23. 75	1. 01889
Mar. 25, 10.18 a. m.-----	Full flood; wind N. by E., force 2-----	0	14. 44	7. 8	18. 38	1. 01432
		10		5. 6	26. 25	1. 02073
		20		6. 6	27. 21	1. 02138
		27. 45		6. 4	27. 19	1. 02138

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 33

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920						
Jan. 11, 9.45 a. m.		0		2. 45	25. 62	1. 02044
		14. 7		2. 45	30. 88	1. 02462
Dec. 4, 2.04 p. m.	¼ flood	0		10. 0	20. 64	1. 01581
		Bottom.		10. 9	28. 30	1. 02161

Station 34

1920						
Jan. 11, 11.45 a. m.		0		3. 2	29. 42	1. 02338
		16. 5		3. 2	30. 90	1. 02462
Mar. 12, 8.35 a. m.	½ ebb	0		3. 7	24. 53	1. 01952
		10		3. 7	27. 34	1. 02175
		16. 7		3. 4	29. 80	1. 02371
May 1, 5.32 p. m.	Flood	0		14. 0	20. 00	1. 01264
		5		13. 8	20. 02	1. 01274
		10		13. 8	23. 34	1. 01727
		18. 18		13. 6	22. 60	1. 01675
July 9, 6.07 a. m.	¼ flood	0		22. 4	29. 78	1. 02019
		Bottom.		18. 2	25. 40	1. 01794
Aug. 22, 1.12 p. m.		0		22. 2	28. 94	1. 01960
		10		21. 5	29. 73	1. 02039
		18. 3		20. 9	30. 60	1. 02120
Oct. 21, 12.43 p. m.		0		20. 4	20. 22	1. 01350
		10		20. 0	29. 49	1. 02060
		Bottom.		19. 8	30. 38	1. 02133
Dec. 5, 7.30 a. m.	Full ebb	0		11. 5	28. 77	1. 02188
		10		11. 2	28. 86	1. 02182
		Bottom.		11. 2		
1921						
Jan. 22, 4.23 p. m.	Slack ebb; sea smooth; wind WSW., force 1.	0	10. 0	5. 1	28. 58	1. 02261
		10		5. 0	28. 29	1. 02239
		18. 30		5. 5	29. 98	1. 02367
Apr. 2, 1.22 p. m.	Ebb; sea smooth; wind NNE., force 1.	0	11. 6	11. 4	29. 07	1. 02117
		14. 64		10. 1	29. 01	1. 02229
May 30, 4.09 p. m.	¾ flood; sea choppy; wind NE., force 4.	0	17. 7	17. 1	30. 40	1. 02199
		10		17. 0	30. 30	1. 02093
		18. 30		16. 8	30. 40	1. 02206
1922						
Jan. 21, 4.20 p. m.	¾ flood; rain; sea smooth; wind NNE., force 3.	0	7. 22	4. 6	28. 88	1. 02291
		10		4. 9	30. 35	1. 02404
		18. 30		5. 0	31. 26	1. 02405
Mar. 25, 3.33 p. m.	Beginning flood; sea smooth; wind SE., force 1.	0	17. 78	8. 0	24. 22	1. 01886
		10		7. 0	26. 69	1. 02092
		16. 00		7. 1	25. 06	1. 01963

Station 35

1920						
Jan. 11, 9.45 a. m.		0		2. 4	25. 62	1. 02048
		14. 7		2. 4	30. 88	1. 02467
Mar. 12, 10.28 a. m.	Full ebb	0		4. 4	21. 72	1. 01725
		10		4. 4	30. 29	1. 02402
		15. 5		4. 4	30. 30	1. 02403
May 1, 3.55 p. m.	Half flood	0		13. 8	25. 40	1. 01886
		5		13. 6	27. 72	1. 02069
		10		13. 8	28. 34	1. 02112
		15. 90		13. 6	28. 58	1. 02134
July 9, 7.48 a. m.	¼ flood	0		23. 6	21. 26	1. 01345
		Bottom.		18. 8	28. 08	1. 01983
Aug. 22, 11.56 a. m.		0		26. 0	23. 18	1. 01419
		10		19. 4	29. 09	1. 02044
		Bottom.		17. 3	31. 08	1. 02242
Oct. 21, 1.49 p. m.		0		20. 4	21. 30	1. 01430
		10		19. 9	29. 50	1. 02063
		Bottom.		20. 3	29. 31	1. 02039
Dec. 4, 5.38 p. m.	Full flood	0		10. 6	25. 29	1. 01934
		10		10. 6	27. 44	1. 02100
		Bottom.		11. 0	27. 78	1. 02178

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 35—Continued

Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1921						
Jan. 22, 2.54 p. m.-----	¾ ebb; sea smooth; wind W., force 1-----	0	11. 1	5. 5	21. 57	1. 01707
		10	-----	5. 4	26. 52	1. 02097
		11. 1	-----	5. 4	27. 43	1. 02168
May 30, 3.07 p. m.-----	½ flood; sea choppy; wind ENE., force 4---	0	18. 3	18. 4	24. 08	1. 01688
		10	-----	16. 5	-----	-----
		15. 56	-----	16. 5	28. 84	1. 02094
1922						
Jan. 21, 3 p. m.-----	½ flood; sea choppy; wind N., force 2-----	0	13. 89	9. 5	29. 04	1. 02246
		10	-----	11. 5	27. 44	1. 02086
		15. 55	-----	5. 6	24. 16	1. 01908
Mar. 25, 2 p. m.-----	¾ ebb; sea smooth; wind E., force 1-----	0	20. 00	8. 3	19. 42	1. 01511
		10	-----	6. 5	30. 15	1. 02370
		15. 00	-----	6. 4	30. 63	1. 02408

Station 36

1920						
Jan. 11, 7.50 a. m.-----	-----	0	-----	3. 4	28. 19	1. 02245
		27	-----	3. 4	31. 11	1. 02478
Mar. 12, 11.46 a. m.-----	Slack-----	0	-----	4. 7	20. 64	1. 01638
		10	-----	4. 7	30. 38	1. 02407
		20	-----	4. 4	30. 70	1. 02435
		23. 7	-----	4. 4	30. 74	1. 02439
May 1, 2.02 p. m.-----	Slack ebb-----	0	-----	14. 3	19. 26	1. 01407
		10	-----	14. 1	20. 02	1. 01450
		20	-----	13. 6	25. 31	1. 01883
July 9, 9.02 a. m.-----	½ flood-----	24. 09	-----	13. 8	25. 77	1. 01914
		0	-----	24. 2	20. 54	1. 01267
Aug. 22, 10.13 a. m.-----	-----	Bottom.	-----	-----	30. 39	-----
		0	-----	27. 0	22. 75	1. 01339
		10	-----	20. 2	29. 05	1. 02021
		20	-----	17. 2	31. 26	1. 02263
		Bottom.	-----	15. 5	31. 74	1. 02338
Oct. 21, 2.39 p. m.-----	-----	0	-----	20. 4	20. 28	1. 01353
		10	-----	19. 9	28. 18	1. 01937
		Bottom.	-----	19. 7	30. 97	1. 02180
Dec. 4, 4.25 p. m.-----	¾ flood-----	0	-----	10. 5	25. 20	1. 01934
		10	-----	10. 8	28. 76	1. 02199
		20	-----	11. 3	30. 22	1. 02303
		Bottom.	-----	11. 6	30. 96	1. 02356
1921						
Jan. 22, 1.24 p. m.-----	½ ebb; sea smooth; wind SW., force 1; sky cloudy.	0	11. 6	5. 9	19. 22	1. 01517
		10	-----	6. 0	28. 29	1. 02229
		20	-----	6. 0	28. 10	1. 02214
		22. 87	-----	5. 9	28. 76	1. 02268
Apr. 2, 1.45 p. m.-----	Flood; sea smooth; wind SE., force 1-----	0	12. 2	12. 1	27. 74	1. 02097
		10	-----	10. 1	31. 15	1. 02395
		23	-----	9. 9	31. 33	1. 02419
May 30, 2 p. m.-----	¼ flood; sea choppy; wind ENE., force 3-----	0	18. 8	19. 0	21. 98	1. 01509
		10	-----	17. 4	27. 91	1. 02002
		22. 88	-----	15. 2	30. 13	1. 02261
1922						
Jan. 21, 2 p. m.-----	¼ flood; sea choppy; wind SSW., force 2-----	0	14. 44	12. 9	23. 91	1. 01789
		10	-----	5. 1	27. 40	1. 02169
		20	-----	5. 9	29. 15	1. 02298
		23. 79	-----	5. 6	29. 26	1. 02321
Mar. 25, 12.40 p. m.-----	¾ ebb; sea smooth; wind N., force 1-----	0	17. 78	8. 9	18. 36	1. 01420
		10	-----	6. 6	30. 65	1. 02407
		24	-----	6. 5	31. 10	1. 02445

TABLE 5.—*Salinity and density of water at different depths at 41 stations in Chesapeake Bay—Continued*

Station 37						
Date and time of collection	Tide, etc.	Depth (meters)	Temperature (° C.)		Salinity (parts per thousand)	Density
			Air	Sample		
1920						
Aug. 22, 5.48 a. m.-----	-----	0 Bottom.	----- -----	21. 7 11. 0	32. 55 30. 66	1. 02146 1. 02340
Station 38						
1920						
Aug. 21, 11.05 p. m.-----	-----	0 Bottom.	----- -----	25. 3 8. 9	29. 74 33. 58	1. 01931 1. 02606
Station 39						
1920						
Aug. 21, 8.40 p. m.-----	-----	0 20 Bottom.	----- ----- -----	24. 1 17. 8 8. 5	29. 91 33. 26 33. 29	1. 01886 1. 02396 1. 02586
Station 40						
1920						
Aug. 21, 7 p. m.-----	-----	0 20 40 Bottom.	----- ----- ----- -----	24. 6 10. 4 10. 5 10. 8	29. 76 33. 65 34. 13 34. 45	1. 01854 1. 02489 1. 02620 1. 02640
Station 41						
1920						
Aug. 21, 5.13 p. m.-----	-----	0 20 40 60 80 Bottom.	----- ----- ----- ----- ----- -----	25. 0 10. 5 11. 1 11. 3 11. 4 10. 7	33. 84 29. 78 35. 78 38. 41 38. 45 35. 01	1. 02249 1. 02283 1. 02740 1. 02940 1. 02941 1. 02687

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