were collecting samples of sea water in the channel north of San Juan Island, when the characteristic roar of a tide-rip was heard. As it approached the boat, a marked difference in the color of the waters on each side of the rip was observed, the water of one current being a decided blue, while that of the other was a distinct green. The line of demarcation was very sharp. The boat drifted so that it was directly on this line, with the blue water on one side, the green water on the other. With the utmost haste, samples were taken simultaneously from both sides of the boat, approximately twenty feet apart. On analysis, these samples gave the following results:

	Green water	Blue water
Temperature, °C.	16.4	14.0
pH (corrected for salt error after Ramage and Miller[1])	8.16	7.94
Mobile CO_2, mg. per liter	0.84	1.83
Combined CO_2, mg. per liter	63.64	78.79
Total CO_2, mg. per liter	64.48	80.62
Chlorinity, gms. per kilo	11.94	14.74
Specific gravity (δt, after Knudsen[2])	15.40	19.77
Osmotic pressure (calculated from equations of Stenius[3])	14.79	18.91

The green water was without doubt sea water coming in from the Gulf of Georgia, which had been diluted by the inflow of the Fraser River. This would account for its higher temperature, lower chlorine content and specific gravity, and probably for the color, which may be attributed at least in part to suspended matter. The clearer blue water was that flowing in from the Strait of Juan de Fuca, thus representing less diluted sea water.

In explanation of the higher pH value and the lower content of carbon dioxide, both mobile and bound,[4] we may assume a more rapid rate of photosynthesis in the diluted water from the Gulf of Georgia, because of its higher temperature or for other reasons.

It is a matter of considerable interest, and of no little biological importance, that such marked differences in the condition of the water should occur but a few feet apart, in opposing tidal currents. A sudden change of 2.4° C. in temperature, 0.22 pH unit in hydrogen-ion concentration and 2.8 parts per thousand of chlorine, with corresponding changes in associated conditions, would be presumed to exert a decided effect on marine organisms.

The differences recorded occurred, of course, at the surface of the water. It is doubtful that bottom living forms would be exposed to so wide a range of conditions (the depth at this locality was 175 meters). Plankton organisms would be carried with their respective currents, and hence would be exposed to these differences only at the very margins of the tide rip. But fish and other nekton forms must be assumed either to make extensive and frequent migrations with the tides or to be able to accommodate themselves to differences in the condition of the water more sudden and marked than some authors have considered to be the case.

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[1] Ramage, W. D., and Miller, R. C., *Jour. Amer. Chem. Soc.*, 47, 1230, 1925.

[2] Knudsen, M., Hydrographische Tabellen, Copenhagen, 1901.

[3] Stenius, S., Öfversigt af finska vetenskaps-societetens förhandlingar, 46, No. 6, Helsingfors, 1904.

[4] Carbon dioxide was determined by aspiration into a standardized solution of barium hydroxide.

THE INFLUENCE OF CO_2 TENSION ON THE OXYGEN DISSOCIATION CURVE

THE influence of acids or CO_2 tension in lowering the oxygen dissociation curve is a well-known phenomenon.[1, 2] This has been interpreted as an evidence that CO_2 in the capillary bed increases the dissociation of oxygen from its combination with hemoglobin.

Whereas we have an adequate account of the mechanism involved in the displacement of CO_2 by O_2 in the pulmonary capillaries, no adequate account has been offered for the reverse mechanism occurring in the tissues whereby, as mentioned above, CO_2 tends to displace oxygen and thus lower the oxygen dissociation curve.

It occurred to us that perhaps the process can be simply explained if we assume a double dissociation process of oxyhemoglobin ($HHbO_2$) as follows:

$$(1)\quad HHbO_2 \rightleftarrows HHb + O_2\uparrow$$
$$(2)\quad HHbO_2 \rightleftarrows H^+ + HbO_2^-$$

Equation (1) presumably takes place since O_2 is absorbed by the tissues and reduced hemoglobin is obtained. Equation (2) is evidently present if we accept the well-known fact that oxyhemoglobin acts as an acid and consequently would dissociate accordingly. It would therefore behave as a weak electrolyte as follows:

$$K = \frac{[H^+]\ [HbO_2^-]}{HHbO_2}$$

Now, with the formation of carbonic acid in the tissues the concentration of hydrogen ions $[H^+]$ is

[1] Bohr, Hasselbalch and Krogh, *Skand. Arch. f. Physiol.*, 16, p. 602, 1904.

[2] Barcroft, "The Respiratory Function of the Blood," 1914.

increased and hence in equation (2) the reaction would be driven back and thus tend to increase the concentration of the undissociated $HHbO_2$. Or, simply stated, in terms of the law of mass action, the ionization of $HHbO_2$ would be repressed.

An increase in concentration of $HHbO_2$ would necessarily involve a shift in the equilibrium of equation (1) to the right. The consequence would be an increase in the production of O_2.

It is thus suggested that by presenting this idea of a double dissociation of $HHbO_2$, a chemical mechanism has been offered to account for the lowering of the oxygen dissociation curve by an increase in the CO_2 tension.

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THE REGULAR FALL MEETING OF THE EXECUTIVE COMMITTEE OF THE COUNCIL

THE regular fall meeting of the executive committee of the association council was held on October 21 at the Cosmos Club, in Washington, with the following members present: Cattell (chairman), Curtiss, Humphreys, Johnston, Kellogg, Livingston, Moulton, Ward. Those absent were: Osborn, Pupin and Wilson. Three sessions were held, forenoon, afternoon and evening. Most of the members lunched together, with Dr. Dayton C. Miller and Mr. G. L. Bowe, who were present by invitation to discuss the proposal that the annual meeting of December, 1930, be held in Cleveland, Ohio. The committee dined together as usual. The following is a summary of the business transacted.

(1) The permanent secretary reported that the minutes of the last meeting had been approved by mail.

(2) The treasurer's annual report was accepted and referred to the council. The endowment fund is now $143,976.66 and the treasury reserve is $6,119.00, the latter having been increased by $1,754.92 in 1927–28. There is available for appropriation in 1929, $4,904.48.

(3) The permanent secretary's financial report for 1927–28 was presented, accepted and referred to the council.

(4) The permanent secretary's budget for 1928–29 was approved.

(5) The permanent secretary's report on membership was accepted. In the year just closed the membership has increased from 13,930 to 15,437, a net gain of 1,507. The total enrolment shows a corresponding gain of 1,466; therefore the membership has increased considerably more than the total enrolment. The membership now represents 94.54 per cent. of the total enrolment, the latter including names still carried on the roll although one or two years in arrears on September 30, 1928.

(6) The permanent secretary reported on invitations received from institutions in Cleveland, Ohio, asking the association to hold its meeting of December, 1930, in that city. The following institutions have sent very cordial invitations: The City of Cleveland, the Convention Board of the Cleveland Chamber of Commerce, the Cleveland Board of Education, the Cleveland School of Art, the Cleveland Museum of Natural History, the Cleveland Museum of Art, Western Reserve University, Case School of Applied Science, John Carroll University, Huntington Polytechnic Institute.

(7) It was voted that the executive committee favors holding the meeting of December, 1930, at Cleveland, Ohio, if satisfactory arrangements can be completed.

(8) It was voted that the executive committee would regard as a satisfactory financial arrangement the underwriting of a local fund of $7,500 for the proposed Cleveland meeting.

(9) The permanent secretary reported on the nominations (received from the fellows) for section officers, which are still to be reviewed and balloted on by the section committees. It was voted that the candidates for these offices receiving the largest number of votes from the section committee in each case are to be asked if they would accept the election. In the case of nominations for the section chairmanships and secretaryships, if they intimate their willingness their names are to be presented to the council for election. If any find it impossible to accept, another candidate is to be selected by the section committee, etc. The result should be that the names presented to the council (as nominations for section chairmanships and section secretaryships and as elections for section committee memberships) will be those of the most suitable and available persons, in the judgments of the respective section committees. The permanent secretary was instructed to carry out the nomination ballots for the section officers in accordance with these ideas.

(10) The permanent secretary reported progress in the securing of presidential nominations from the members. Thus far, 1,638 votes have been received.

(11) A report was presented and accepted from the Committee on Linguistic Science in the association (Dr. E. S. Sapir, chairman). This report is summarized as follows: The proposal that a special section be organized for linguistic science would be allowed to lapse for the present in view of the present proposal to reorganize the association into about three