In deep water the meteorological current is often much stronger than the tidal; but as it has not the period of the latter, the measurement of the rise and fall of the tide and of the velocity of the flow and ebb could hardly be seriously affected by its presence.

The object of looking into the several sources of error has been to ascertain when the errors are small enough to be neglected rather than to attempt correcting for them in actual measurements. R. A. HARRIS.

February, 1904.

SEX DIFFERENCES IN THE SENSE OF TIME.

IN going over the results of a series of demonstration tests of the sense of time given to a mixed class recently, the returns from men and women were separately reduced, the summaries of which presented features of sex differentiation concerning which corroboration or revision on the part of others is sought through this note.

The test involved periods of time extending from a quarter of a minute to a minute and a half in duration. The intervals were filled in four ways: (1) The instructor read aloud to the class from a psychological work unfamiliar to its members; (2) the members of the class marked as rapidly as possible all the letter m's in a page of printed text; (3) the class waited in idleness for the period to pass by, refraining as far as possible from counting or other means of recording the lapse of time; (4) each person estimated as accurately as possible the period in question, using whatever method he had personally found most serviceable for the purpose. As there were fifteen men in the class, the tabulation of returns from the women was brought to a close when an equal number of judgments had been entered therein.

Only in the case of the one-minute period was estimation made under all four conditions mentioned. The results are presented in the following table, in which the signs plus and minus indicate respectively over- and under-estimation of the duration in terms of seconds, and the figures at the tops of the columns the series of conditions enumerated above:

	Period. One Minute.			
Sex.	1	2	3	4
Men.	+29	+1.3	+22	−3.5
Women.	+66	+27	+80	+ 24

Incidentally, the purpose of the test was to call attention to the differences in one's estimation of time under conditions (1) and (2), and similarly in the case of (3) and (4). The relation of the members of these two pairs to each other is made apparent in the table. It is also to be noted that with the exception of the first entry in column (4), the only minus quantity in the whole series of tests, the error is throughout one of pronounced over-estimation. This tendency is very much stronger in the women than in the men, the first point of contrast in the comparison of sex differences. For this period of time the constant errors of the two sexes stand in a ratio of one to four. The clearest indication that this over-estimation of short periods of time on the part of women is a persistent habit, and not due to variable factors in the conditions of experimentation, appears in the fourth column of the table. In the case of men, keeping tally of the passing seconds results in the elimination of the positive error and the appearance of a slight under-estimation. In the case of women, on the contrary, over-estimation still persists to the amount of two fifths of the period in question; in other words, their unit of measurement is much in defect of the objective period which it is meant to represent.

The results of the various other tests made in the same series are summed in the following table, in which the same general relations are presented as in the preceding group.

	One quarter Minute.		One half Minute.		One and One half Minute.	
Sex.	3	4	1	4	1	3
Men.	+ 6	+0.5	+30	+ 3	+19	+ 70
Women.	+17	+10	+33	+12	+73	+189

There is also to be considered in such a comparison as the present the average variations of the individual judgments of men and women respectively from objective accuracy, of which the formulation of their constant

errors affords no indication. These are given in the following tables, the numbers in which are, as before, in terms of seconds:

Period. One Minute.				
Sex.	1	2	3	4
Men.	32	18	25	11
Women.	68	41	86	36

	One quarter Minute.		One half Minute.		One and One half Minute.	
Sex.	3	4	1	4	1	3
Men.	8	2	30	8	26	70
Women.	18	12	35	18	73	189

In sum, the excess of general inaccuracy in the estimation of the given periods of time on the part of women, as compared with men, is no less marked than their tendency to over-estimation. The extremes of individual judgment are very great; for instance, estimation of the duration of the 1½ minute period under condition (3) ran as high as ten minutes. In the case of men the highest was three and one half minutes. The average error of judgment among the men, all periods included, was 45 per cent. of the value of the periods estimated; that of the women amounted to 111 per cent., or two and one half times that of the men.

The noting of these sex differences was incidental to the primary purpose of the test, and attention is called to them here in order that observations on the part of others may be brought into comparison with the results presented by this group of persons, all of whom had some acquaintance with psychological experimentation, but few any systematic training in laboratory methods. The writer would be glad to learn whether the judgments of children of the two sexes present a closer approximation in character than those embodied in the preceding tables; and, in case they do, whether any systematic test has been made of their progressive differentiation with advance in age.

Robert MacDougall.
New York University.

*THE NATIONAL PHYSICAL LABORATORY.**

The annual inspection of the National Physical Laboratory by the general board took place on March 18, when also a large number of gentlemen interested in physical and mechanical science accepted the invitation of Sir William Huggins, president of the Royal Society, and of Lord Rayleigh, president of the general board, to examine the work carried on by the institution at Bushy House. All the departments of the laboratory were thrown open to the visitors, who were free to go where they pleased, and who found Dr. R. T. Glazebrook, the director, and his assistants ready to give every explanation of the apparatus displayed and the purposes to which it was being placed. The report for 1903 contains full details of the work which was carried out during that year, and also an outline of the program for the present year. In the engineering department this includes a continuation of the research on wind-pressure and of that on the mechanical properties of nickel-steels, undertaken jointly with Mr. Hadfield; an inquiry into the specific heat of superheated steam on a large scale; the erection and testing of the new screw-cutting lathe, for which a special house has been built and which is to be used for making standard leading screws on behalf of the Standard Leading Screw Committee of the War Office; and the construction of a machine for determining the friction of bearing surfaces. In the physics department, among other things, the construction of a standard ampere balance, together with various electrical tests, is to be undertaken for the engineering standards committee; various methods of measuring temperatures between 1,400 C. and 1,800 C., and the suitability of different glasses for high temperature thermometry, are to be investigated; the standardization of the steel yard and nickel meter is to be completed, and the urgently required work of comparing an 'end' yard and an 'end' meter with the 'live' standards, and of calibrating the subdivisions of each, is to be undertaken; and an inquiry is to be initiated into the conditions in which the pentane lamp may be treated as a standard, and measurements made of the refractivity and absorption of various glasses used by opticians.

* From the London *Times*.