Special Papers.

OUR OVERCROWDED PROFESSION.

BY J. WALLIS, H.M.P.S., BOTHWELL.

I AM sure the letters on the above subject that have appeared in the JOURNAL have been read with interest; but I do not think the root of the evil has yet been reached. Mr. John Dearness, some time before the end of last year, discussed the question in your paper, and suggested that fewer of the students-in-training at the model schools be granted certificates—that the examiners should allow only the best qualified to pass. Some model school masters doubt the wisdom of rejecting the unpromising students and allowing only those to pass who seem better fitted to succeed as teachers. The reason for this will appear from the following:—In one of the county model schools, there was, not long ago, a candidate for a third-class certificate who was considered by the head master especially promising—the pick in his class. He received a certificate, secured a school, proved an utter failure, and in three months was literally turned out of the school by the pupils, who rose *en masse*.

In the same model school, and, I believe, in attendance during the same term, was another student, of whose fitness to receive a certificate the board of examiners had very serious doubts, but who also passed. He became one of the very best teachers in the county—was a success from the first. These instances illustrate the difficulty of deciding on the fitness of candidates by their proficiency as model school students. At the close of the term during which I attended the Toronto Normal School, some of the most skilful teachers among the students failed at the final examination, and others, who were but very indifferent teachers, obtained certificates. Lest any one should think this statement savors of disappointed hopes, I may mention the fact that I passed the examination.

As a partial remedy for the evils arising from our overcrowded profession, I suggest that the time has come when third-class certificates should cease to be issued; and on the ground that a sufficient number of teachers holding second-class certificates can be engaged to fill all the vacancies that occur. Should the people of the back townships not be able to pay a second-class teacher, some special arrangement might be made for those townships.

From the report of the Hon. Minister of Education for 1886, I learn that the total number of public school teachers engaged in the public schools in 1885 was 7,218, and that in 1886 the number of certificates issued was as follows:—Professional first-class, 45; second-class, 445; third-class, 1,376; temporary certificates, 259; extended third-class, 203; making a total of 1,866 exclusive of the last two classes, and a grand total of 2,328. Now let us try to find how many vacancies there were for these teachers to fill. The report for 1884 shows that in that year 1,017 professional third-class certificates were issued. I have not the means of knowing how many were granted in 1883, but probably 1,000 would not be far from the actual number. These would expire in 1886, and so vacancies would be made for 1,000 teachers. As the decrease in temporary certificates from 1884 to 1885 was 123, it may be set down at 140 for the next year, making 140 more vacancies. There were 133 more public school teachers employed in the Province in 1885 than in the previous year, and so we may suppose a similar increase in 1886 opened employment for 140 more teachers. Then there was a decrease of fifty-nine in the number of old county board firsts and seconds, and if fifty deaths occured among the active members of the profession, there would be openings for new teachers as shown below:—

Vacancies caused by expiration of thirds, 1,000; by old county board certificates, 59; by decrease in temporary certificates, 140; vacancies in newly-opened schools, 140; vacancies caused by death, 50; total estimated vacancies, 1,389. Excess of newly qualified teachers above demand, 939. In other words, 2,328 teachers received certificates to fill 1,389 situations. It reminds us of Mrs. Leo Hunter's party in "Pickwick"—invitations for one hundred, lunch for fifty. I do not think the teachers' case is overdrawn; and if it be not, in 1866 more than 900 experienced teachers left the profession. That these were by no means made up of those third-class teachers whose certificates expired in 1886, it is not difficult to show. In 1885, 121 more second-class teachers were employed in the public schools than in 1884, but in the latter year 426 professional second-class certificates were issued. The increase should therefore have been 426, or a little less, allowing for deaths. Some 300 second-class teachers left the profession in 1885, and it is probable that at least as many left in 1886.

It is certain that the third-class teachers are crowding out those holding a second-class. There were, in 1885, 133 more teachers employed in the public schools than in 1884. Suppose these were second and first-class teachers. The increase of number of third-class teachers was 172; whose places did they occupy? Some third-class teachers, no doubt, left the profession, and made room for some of these, but there is equally little doubt that some second-class teachers gave way to others holding a third-class. I can name instances of this. A school board usually cares less about the class of certificate than about the salary asked, and, in more places than one, at the beginning of this year, a second-class teacher was followed by a third, and a first by a second.

Now that our normal schools can train 445 teachers a year, surely in a total of some 7,300 these are sufficient to fill all vacancies that should occur. It is evident that a teacher having just received a certificate can and will teach for less than one who has taught successfully for years. We wonder that the Hon. Minister of Education, who, we are sure, wishes to see our educational system made the best in the world, does not take some more practical way of bringing to the Province the value of the higher certificates which are issued.

NEW THERMOMETER SCALE.

BY J. ASHER.

I HAVE recently devised a new scale for the thermometer. I divide the space between the absolute zero (—459.4°Fah.), and the melting point of ice into 1000 degrees. It has the following advantages over all other scales:—

1. It has no minus degrees and not a conventional, but an absolute zero. Hence no ambiguity can occur.

2. The temperature of solids express ratios of intensity in heat. For example, a solid body at 2000° is twice as hot as at 1000°.

3. The two chief points are absolutely fixed. The boiling point, which is one of the chief points in other scales, is faulty in this regard, for it varies with the air pressure.

4. Its degrees are smaller than in any other scale, hence greater accuracy may be had when we use only whole numbers. Each is nearly half a degree Fahrenheit. The ratio is as 30 to 61.

5. Barometric correction being presupposed, the reading of the thermometer at any time gives the fraction of the standard volume in thousandths, which a gas then occupies. A gas expands .001 of its volume at the standard, for each degree. To reduce a gas to its volume at the standard temperature: Annex three °'s and divide by the temperature.

I have prepared two formulas for changing the readings of two scales into that which I have named the Milligrade. F represents degrees of Fahrenheit; C, Celsius, or Centigrade; and M, mine, or Milligrade.

$$M = \tfrac{61}{30}(F - 32) + 1000$$
$$= \tfrac{11}{3} C + 1000$$

Here are some important temperatures in the new scale:

M.	
1366°	Water boils
1287°	Alcohol boils
1134°	Blood heat
1000°	Ice melts
857°	Mercury freezes
523°	Alcohol freezes
0°	Absolute zero

For common use the scale will not extend below 857°.

Additional Information.—Several scales are in use, but all are wretched. In Fahrenheit's—the best in use—the degrees are small; and the zero, the temperature of a mixture of two parts snow and one of salt, is so low that minus degrees are seldom used. The scale looks as if thrown together at haphazard, but the space between the freezing and the boiling point is divided into 180°. I suppose G. D. Fahrenheit, of Dantzic, thought of the the greatest longitude a place can have. The scale of Celsius, or the Centigrade, now used by scientists, is the worst of all but one, and that is Reaumer's, whose Degrees of Centigrade are twice as long as those of Fahrenheit, and the zero is the melting point of ice, hence minus degrees are often used. This scale has a scientific sort of look, for the space between the freezing and the boiling point is divided into 100°. This presents no advantage in calculation. De Lisle's scale counts downward from the boiling point, which is 0°, and the freezing point 150°. Its degrees are short. In De Luc's, usually called Reaumer's scale, the freezing point is 0°, and the boiling point 80°. I suppose 80° was chosen because it can be divided into halves, fourths, eighths, and sixteenths. This may formerly have been of some advantage in graduation. The degrees in this scale are 2¼ times as long as those of Fahrenheit.

Olszewski, of St. Petersburgh, recently obtained perhaps the lowest temperature yet reached. By evaporating liquefied nitrogen, he observed a temperature of 390° below zero, Fahrenheit. The absolute zero, the point where there would be no heat, has never been reached, but it can be shown to be —459.4° F., or —273° C., or 0° M. This information is obtained in the following way:—Gases are observed to contract with almost perfect uniformity when subjected to a diminishing temperature. Suppose that a long glass tube of uniform bore is closed at one end, and contains any gas shut off from the air by a drop of mercury, and that the temperature of the gas is 212°. Mark the position of the mercury. Cool the gas until its temperature becomes 32°. Again mark the position of the mercury. By measurement, we find the distance from the second position of the mercury to the closed end of the tube is 2.73 times the space between the two marks. Hence the point beyond which a gas cannot contract, or the point at which it has no temperature is 2.73+180°=491.4° below the freezing point, or 459.4° F. below zero.

The freezing and the boiling point of water were suggested, for fixed points in thermometers, by Dr. Robert Hooke, F.R.S., of the Isle of Wight, about two centuries ago.

The thread of mercury or alcohol in a thermometer sometimes parts. I discovered that it can usually be re-united by tying a stout string to the pendant ring and whirling the instrument swiftly like a sling. Alcohol returns to its place in this way more easily than mercury.

Mercury is better than alcohol in a thermometer for general use. The mercurial thermometer is very prompt in showing the temperature; it is opaque, hence the thread may be made very small and the instrument very sensitive. It expands with almost perfect uniformity, hence the degrees are nearly the same length in all parts of the scale. It can measure extremely high and quite low temperatures. However, it sometimes freezes in very cold weather. Alcohol can measure extremely low temperatures; but an alcohol thermometer must not be exposed to a scalding heat or the vapor will blow the bottom out of the bulb. Alcohol thermometers are graduated point by point by comparison with a standard instrument. The degrees are of unequal lengths in different parts of the scale.

STRATHROY, *February 23, '88.*

"How is power applied in this machine?" asks a professor, as he starts it. "It is turned by a crank," is the giggling reply.

"WHERE are you going?" "To school." "What do you go for, to read?" "No." "To write?" "No." "To count?" "No." "What do you go for?" "To wait for school to let out."

A FIVE-YEAR-OLD returned from his first day at school disgusted with the ignorance of the teacher. "Why, she kept asking questions all the time. She even asked how much two and two were."