of things in which our navy is intrusted with the exploration of the deeper seas and the mapping of far distant coasts, while it is held unfit to survey the shallower waters of our own shores.

There is probably no other subject in which practice lags so far behind knowledge as it does in the teaching of small children, and especially in country schools. The latest appliances in electrical apparatus are no sooner invented and tested, than they are brought into use, and supersede what were good appliances yesterday; but the antiquated way of teaching arithmetic and reading is still almost universal, in spite of its having been proved again and again that they can be taught by a scientific method in half the time. It was a witty Spaniard who said that the reason English-speaking people are so illogical, is that they have to learn to spell when they are young. The wonder daily grows that their instruction in arithmetic does not wholly destroy what residue of reason their spelling has left behind. A marked and much-needed change was brought about in England by the Association for the improvement of bread-making; and there is no doubt, that, by a vigorous associated effort, — by holding public meetings, by distributing pamphlets, and by all the usual means of agitation, — something might be done to awaken school-committee men and superintendents to some sense of responsibility. There is no better field for the missionary energy of those persons whose first interest is in the maimed and tortured of their own country.

Meantime the Society to encourage study at home could do no better work than to offer a course in pedagogics to primary-school teachers. The teachers of country schools are often intelligent, and eager to learn; but it would be asking too much to expect each one to discover for herself methods of teaching that have only been perfected by many generations of experience. To put them in the way of reading a few inspiring books on the subject would often be to work a transformation in them. This suggestion is made by the circular of information in regard to rural schools, recently sent out by the Bureau of education. That circular itself, if it were widely distributed, would do a great deal of good by means of the model lessons in arithmetic which it reprints from the report of the Massachusetts board of education. They must be in the nature of a revelation to most untrained teachers. It is a pity that the compiler of the circular could not find an equally good and explicit description of the modern art of teaching how to read.

LETTERS TO THE EDITOR.

The relation of form to time of maturity in esculent roots.

Many facts seem to indicate that a direct relation exists between the form of esculent roots and their time of maturity in the different varieties of the same species.

In the spring of 1883 a few typical roots of the 'long hollow crown' and 'Carter's new Maltese' parsnip were set out for seed in the garden of the New-York agricultural experiment-station, with other roots selected from each of these varieties, which were short and thick, approaching to napiform. As the flower-stalks developed, those from the short, thick roots in both of the varieties were considerably earlier in blooming than the longer typical roots. This unexpected event recalled the fact that the 'round' or 'turnip-rooted' parsnip is earlier in developing its root than the long varieties; also that in the 'Egyptian' and 'eclipse' beets, the earliest two varieties, and the 'French forcing' carrot, the earliest of its kind, the roots are shorter in proportion to their length than in other varieties.

Printed descriptions [1] from the most careful writers upon vegetables indicate that a similar relation exists in the onion and turnip. Thus in the onion the axial diameter in nineteen so-called varieties is noted as less than the transverse diameter. Of these, five are called 'very early,' five are called 'early,' seven 'half early,' one 'rather early,' and one 'rather late.' In seven so-called varieties, in which the axial diameter equals or exceeds the transverse diameter, five are called 'late,' one 'not early,' and one 'early.'

In addition to these, in which the dimensions are given in figures, the 'brown Teneriffe' is described as being 'very flat,' and, with one exception, is called 'earliest of all.' The 'intermediate red Wethersfield' is described as flattened, and the 'two bladed' as 'flat.' Both of these are called 'early.' The 'early white silver-skinned' onion is described as 'about the same diameter as the Nocera, but thicker' (through the axis), and is said to be 'a little less early than the Nocera.' The 'white Portugal' is noted as "a little less flat than the Nocera or 'early

[1] The descriptions examined are from Burr's Field and garden vegetables of America, and from Les plantes potagères of Vilmorin, Andrieux, et Cie.

white silver-skinned;' it is also a little less early." It may be noted, further, that the Messrs. Landreth of Philadelphia declare their 'extra early Bloomsdale pearl,' which is remarkably flattened in form to be the earliest of all onions.

In twenty so-called varieties of the turnip, the axial diameter is noted as less than, or equal to, the transverse diameter. Of these, one is called 'very early,' nine are called 'early,' one is called 'rather early,' and five are called 'half early.' In fourteen varieties the axial distance is noted as greater than the transverse diameter. Of these, one is called 'late,' one 'a little late,' one 'medium,' five are called 'half early,' three 'rather early,' and three 'early.' The 'rouge plat de mai de Munich,' described as being 'very much flattened,' is said to be 'unquestionably the earliest of turnips.' The 'rouge de Milan,' called 'very flat,' is pronounced 'one of the earliest.' In the majority of the long-rooted turnips the season of maturity is not noted, — a fact in itself suggestive; for the more depressed forms would hardly be noted as 'early,' if they were not earlier than others.

It may be objected to this hypothesis, that a root or bulb that grows in a round or flattened form would naturally sooner acquire the requisite size for table use than one that grows long and slender, and that this fact alone is not sufficient to indicate a physiological relation between the form of the root and its time of maturity. The time of the first bloom, and the first ripe seed in different varieties, mark definite stages of development, which, we may assume, are less dependent upon the influence of selection. If, therefore, we find that the time of bloom and of seed maturity bear a relation to the form of the root, we have additional evidence in favor of our hypothesis. We have gathered from records of the station such data as bear upon the point, with the results noted in the following table:—

	No. of varieties.	Average days to first bloom.	Average days to first ripe seed.
Radish (1883).			
Turnip-rooted	6	$57\frac{1}{3}$	$116\frac{1}{2}$
Long-rooted	7	$57\frac{3}{7}$	$123\frac{3}{6}$
Radish (1884).			
Round, or turnip-rooted	22	$60\frac{7}{10}$	108
Long-rooted	22	63	$112\frac{1}{2}$
Beet (1883).			
Turnip-rooted	3	$57\frac{2}{3}$	112
Long-rooted	1	59	116
Carrot (1883).			
Short-rooted	2	52	119
Long-rooted	1	69	122

In the radishes, those have been called 'long-rooted' in which the axial diameter exceeded the transverse diameter. In the beet and carrot the division was necessarily more arbitrary, but the shortest-rooted varieties were called respectively 'turnip-shaped' and 'short.' It is evident that the figures given in the table sustain the hypothesis, so far as they go. Observations made in the station garden upon many varieties of beet, carrot, onion, radish, and parsnip, indicate, that, in general terms, the degree of earliness is proportionate to the degree of 'flatness' of the root, though exceptions are not very uncommon.

Should further evidence establish this hypothesis, we have a valuable guide for selection in producing new varieties. We may not only hope to increase our earlier varieties by selecting the more flattened roots; but by rendering the roots of the earliest long varieties short through selection, or possibly through influence of cross-fertilization, we may reasonably hope to secure earlier varieties than have as yet been obtained. For example: the 'early long scarlet' radish, though it has a long slender root, is scarcely less early than the 'early scarlet turnip-rooted.' It would appear, therefore, that in this variety we have a parent for an earlier radish than is at present known. The roots of this variety vary considerably in thickness as compared with the length. By selecting for seed through a series of generations the roots having the greatest proportional diameter, we may hope to promote earliness. Experiments in this line are already in progress at our station.

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N. Y. agricultural experiment-station.

Domes mounted on cannon-balls.

The chief objection urged against the mounting of rotatory domes on cannon-balls is the difficulty experienced in keeping the balls at equal distances apart. If the dome is much used, this objection becomes a serious one; and no dome so large that it would require more than four balls should be mounted in this manner. If the sill and the bed-plate of the dome are so well built that they retain their figure sensibly perfectly, and the track is kept thoroughly clean, the balls will ordinarily not be found to change their relative position very much, except during the winter season. At this time of the year, and under favorable conditions of temperature, the fine snow which is often driven into the observatory, underneath the dome, will, if allowed to remain in the track, form an icy coating over the balls as they pass through it, no matter what the weight of the dome may be. Under such conditions, if the dome is forcibly moved, the incrusted ball will often change its relative position several feet, thereby perhaps imperilling the safety of the dome.

DAVID P. TODD.

A NEW PLAN FOR THE SCIENTIFIC ASSOCIATIONS OF BOSTON.

A SHORT time ago we referred to the difficulty of obtaining a reasonable attendance at the meetings of scientific societies in Boston, and found one obstacle to be the comparative infrequency with which our scientific men come into general contact with one another and with the public. To-day we propose one external remedy, which may serve in time to better this state of things by multiplying the opportunities, and so increasing the chances of contact. By it we believe that not only science, but the whole community, will be the gainer.

Our plan consists in the concentration of the principal scholarly institutions of the city in a