little bit of personal exertion involved in his annual quest of a new field of uselessness is cheerfully incurred as the very moderate purchase of another twelve-months *otium cum dignitate*. Everybody knows how the matter stands, but who can prove it?

My sole object in this paper is, first, to diagnose a widespread malignant disorder, and then to prescribe a remedy. The malady is indeed chronic, but the purgative will prove effectual. It is this. Let the school law be so amended or so supplemented, that the Inspector and Trustees may act conjointly in dealing with all cases of inefficiency, in a summary manner and with perfect immunity from the risk of legal prosecution. Let them be empowered to sit in judgment on the teacher *at any time* during the period of his engagement. Let it be made their *duty* to do so, on receipt of a complaint of inefficiency made against the Teacher, in writing, and signed by any three ratepayers of the section. Let their decision be *final*, and let the power of instant dismissal vest in the Trustees, should the decision of the Board of Trial be adverse to the Teacher, and bear the signatures of the Inspector and two of the Trustees at least.

Finally, let it be lawful and compulsory for the Trustees to pay the teacher in full up to date of dismissal, and for the Inspector to publish his name as a dismissed teacher in the SCHOOL JOURNAL, should his failure be the result of mere carelessness or indifference. Some such remedy as this would prove as effectual as it is desirable for the relief of the present distress.

To the Editor of the Canada School Journal.

SIR,—It appears we have very few Roman Catholic Separate School teachers holding 1st class A. Normal School certificates. I shall be glad to give a premium of one hundred dollars to any Catholic teacher who may win a first-class A. at Toronto. This offer to continue for 10 years, but not more than one such premium to be given each year. I suppose it is our own fault if a Normal School into which so many thousands of our money has gone has yielded us so little advantage.

I have the honour to be, yours truly,
M. STAFFORD, P.P.

Lindsay, April 15th, 1878.

To the Editor of the Canada School Journal.

SIR,—I notice in some American journals that Public School teachers are proposing to organize Mutual Benefit Life Assurance Companies, and I desire, through the medium of the CANADA SCHOOL JOURNAL, to bring the matter before the teachers of Canada. The idea is for teachers to form themselves into a regular association on whose members a tax of one dollar each is levied on the death of any member. This, while only a trifle to each teacher, produces a large total for the benefit of the friends of the deceased. I would like to hear from some teachers on the subject.

Yours, &c., S. H. M.

Mathematical Department.

Communications intended for this part of the JOURNAL should be on separate sheets, written on only one side, and properly paged to prevent mistakes.
ALFRED BAKER, B.A., EDITOR.

YOUNG'S METHOD OF FINDING STURM'S FUNCTIONS.

The numerical labour of finding Sturm's functions for determining the limits of the roots of an equation, becomes very considerable as the degree of the equation increases. Young's method proposes to diminish the difficulty of the process by a plan similar to Horner's sythetic division.

The problem is to divide, with the least expenditure of labour, a rational polynomial in x of the n^{th} degree, by another of the degree $n-1$, avoiding the entrance of fractions into the quotient or remainder. Let the dividend be $ax^n+b\,n^{n-1}+c\,x^{n-2}+d\,x^{n-3}+\ldots$, and the divisor $a'x^{n-1}+b'x^{n-2}+c'x^{n-3}+d'x^{n-4}+\ldots$. The remainder of degree $n-2$ presents itself after two terms of the quotient have been found. The first of these two terms, when incorporated with the divisor, destroys the first term of the dividend, giving remainder of degree $n-1$, the first term of which is in like manner removed by the quotient; and we have then the reminder sought. That the first terms of the quotient may be integral, it is only necessary to multiply the dividend by a'. The first term of the remainder is then $(a'b-ab')x^{n-1}$, so that the second term of the quotient would be $\frac{a'b-ab'}{a'}$, which may be fractional. Accordingly, to effectually preclude the entrance of fractions, multiply the dividend by a'^2; the quotient must then be $a'ax+(a'b-ab')$. Multiplying then each of these terms by the divisor, and writing down the several partial products with the signs changed, instead of actually subtracting them from the dividend, the work under this dividend will arrange itself as follows, the remainders being really obtained by addition:

$$\begin{array}{l} a'^2ax^n + a'^2bx^{n-1} + a'^2cx^{n-2} + a'^2dx^{n-3}+\ldots \\ -a'aa'x^n - a'ab'x^{n-1} - a'ac'x^{n-2} - a'ad'x^{n-3} - \ldots \\ -(a'b-ab')a'x^{n-1} - (a'b-ab')b'x^{n-2} - (a'b-ab')c'x^{n-3} - \ldots \\ \hline 0 + 0 + a''x^{n-2} + b''x^{n-3}+\ldots \end{array}$$

The first two terms in the result disappear; we may avoid then putting down the terms from which these zeroes arise. The first term $a'x^{n-1}$ in the divisor when multiplied does not occur in the terms that go to make up the remainder. By allowing its sign, therefore, to remain unaltered while the other terms of the divisor change sign, no error will be produced, and we shall form more readily the coefficients of the quotient; for multiplying crosswise in $\begin{matrix} a'-b' \\ a+b \end{matrix}$ we obtain $a'b-ab'$, and multiplying the first two terms, $a'a$. Lastly, the coefficients only need be retained. The whole process will then arrange itself most conveniently as follows:

$$\begin{array}{ll}
 & a'-b'-c'-d'-\ldots \\
 & \quad\times \\
\text{Multipliers.} & a+b+c+d+\ldots \\ \cline{2-2}
A=(a'b-ab'). & -Ab'-Ac'-Ad'-\ldots \\
B=aa'. & -Bc'-Bd'-Be'-\ldots \\
C=a'^2. & +Cc+Cd+Ce+\ldots \\ \cline{2-2}
 & a''+b''+c''+\ldots = \text{1st rem.} \\ \cline{2-2}
 & -a''-b''-c''-\ldots = \text{1st remainder with signs changed.} \\ \cline{2-2}
 & -a''+b''+c''+\ldots = \text{1st remainder ready for next division.} \\
 & \quad\times \\
 & a'+b'+c'+\ldots \\ \cline{2-2}
A'=-a''b'+a'b'' & A'b''+A'c''+\ldots \\
B'=-a'a'' & B'c''+B'd''+\ldots \\
C'=a'^2 & C'c'+C'd'+\ldots \\ \cline{2-2}
 & a'''+b'''+\ldots = \text{2nd rem.} \\ \cline{2-2}
 & -a'''-b'''-\ldots = \text{2nd rem. with signs changed.} \\ \cline{2-2}
 & -a'''+b'''+\ldots = \text{2nd rem. ready for next division.} \\
 & \quad\times \\
 & -a''-b''-\ldots \\ \cline{2-2}
A''=a'''b''-a''b''' & A''b'''+\ldots \\
B''=a''a''' & B''c'''+\ldots \\
C''=a''^2 & -C''b''-\ldots \\ \cline{2-2}
 & a'''+\ldots = \text{3rd rem.} \\ \cline{2-2}
 & -a'''-\ldots = \text{3rd rem. with signs changed.} \\ \cline{2-2}
 & \&c., \&c.
\end{array}$$

In the above the cross indicates the mode of formation of the first term in the multiplier. By recalling the ordinary process of division from which the above is derived, we see that $(a'b-ab')$