

II. Mathematical Department.

To the Editor of the Journal of Education.

SIR,—The following question I found in an old American arithmetic, under the head of miscellaneous questions on mensuration, and would much like to see a solution by some of your readers:—

"Where shall a pole 60 ft. high be broken off, so that the top may rest on the ground 20 ft. from the stump?" Let answers be sent to Mr. A. Doyle, Ottawa, for the *Journal*.

Yours, &c.,
CLERICUS.

Everett, 1874.

To the Editor of the Journal of Education.

SIR,—Having recently come into possession of a number of an old mathematical work, I imagined it would be of interest to some of your readers in the *Journal of Education* to see how Algebra was taught by our forefathers. In pursuance of this idea, I have copied, adding and correcting where necessary, one of the theorems which I think will be new, at least in its present form, to many. Hoping that this communication may bring out other specimens of old and interesting methods, I remain, yours truly,

WM. RIDDELL,
Head Master H. P. S.

Bombelli's rule for the reduction of equations of the fourth degree to equations of the third degree.

Take the general equation, $x^4 + ax^3 + bx^2 + cx + d = 0$, (A) in which "a," "b," "c," and "d" represent any possible number, S; and suppose this equation to be the same as

$$(x^2 + \frac{1}{2}ax + p)^2 - (qx + r)^2 = 0, (B.)$$

Now it is only necessary to find proper values for "p," "q," and "r," to obtain the required equation. By squaring and arranging this new equation (B) we shall have

$$\begin{array}{r|l} x^4 + ax^3 + \frac{1}{4}a^2x^2 & x^2 + ap \\ \frac{1}{2}apx & -2qr \\ -q^2 & - \end{array} \quad x + p^2 - r^2 = 0 \quad (C.)$$

The first two terms in (C) are the same as in (A); the third makes $b = \frac{1}{4}a^2 + 2p - q^2$ (1); the 4th, $c = ap - 2qr$, or, $2qr = ap - c$ (2); and the 5th, $d = p^2 - r^2$, or $r^2 = p^2 - d$ (3.)

In (1), (2), and (3), we have three equations from which to find "p," "q," and "r." Now multiply (1) by 4, and arranging we get, $4q^2 = a^2 + 8p - 4b$. (4.)

Multiply (4) by (3), and, $4q^2r^2 = 8p^3 + (a^2 - 4b)p^2 - 8dp - d(a^2 - 4b)$. (5.)

Squaring (2), we obtain $4q^2r^2 = a^2p^2 - 2ape + c^2$. (6.)

Hence $8p^3 + (a^2 - 4b)p - 8dpc - d(a^2 - 4b) = a^2p^2 - 2ape + c^2$, and arranging, $8p^3 - 4bp^2 + (2ac - 8d)p - d(a^2 - 4b) - c^2 = 0$. (D.) which is a cubic equation, and will give the value of "p" by the rule of Cardan or other authors.

Having found "p" we can easily obtain the values of "q" and "r," as by arranging and taking the square root of (1),

$$q = \sqrt{\frac{1}{4}a^2 - b + 2p}; \text{ and (2) gives } r = \frac{1}{2}q(ap - c.)$$

The value of "p," "q," and "r" being found, (A) will reduce (B.) Taking (B)

$$(x^2 + \frac{1}{2}ax + p)^2 - (qx + r)^2 = 0, \text{ or arranging and extracting root, } x^2 + \frac{1}{2}ax + p = \pm(qx + r) \quad (7) \text{ which by further reduction gives}$$

either $x^2 = x(q - \frac{1}{2}a) - p + r$, from which come two roots, or $x^2 = x(q + \frac{1}{2}a) - p - r$, from which come two other roots.

This easy and lucid method ascribed to Bombelli (circ. 1545), but more properly belonging to Ferrari (1524) will be found singularly free from difficult processes, and will compete favourably with the one more recently discovered by Leonard Euler (circ. 1747.)

III. Biographical Sketches.

MISS AGNES STRICKLAND.

It is seldom that out of a family of six daughters, five have displayed the highest literary ability. Yet so it has been with the family of Strickland, of Beydon Hall, Suffolk. Yesterday it was our mournful duty to record the death of perhaps the most brilliant of the brilliant array of talent, Miss Agnes Strickland, the second daughter. Her sisters Mrs. Moodie and Mrs. Traill are well-known to Canada, and are authoresses of conspicuous ability. So

also was the eldest of the family, Miss Elizabeth Strickland. The deceased lady was born about the year 1806, and at the age of twenty commenced to publish her first works, which were poems in conjunction with her sister, now Mrs. Moodie. The title of her first publication was *Patriotic Songs*. This was followed by *Worcester Field*, the *Seven Ages of Woman*, *Demetrius and Floral Sketches*, at intervals. The prose works of this gifted lady have been more numerous and on them chiefly rests her great fame. The *Rival Crusoes*, the *Pilgrims of Walsingham*, *Tales from History*, *Alda, Lives of the Seven Bishops*, *Lives of the Bachelor Kings*, *Lives of Queens of Scotland*, and *English Princesses*, and *Lives of the Queens of England*. This last may be regarded as the great work of the deceased authoress, and no library would be regarded as complete without it. The greatest labour must have been bestowed on this work. Not a collection of papers, private or public, appears to have been passed over, and the volumes contain reprints of documents not found elsewhere in print. The text of Miss Strickland's history bears the imprint upon it of a gentle, kindly disposition, and frequently we are led in contemplating the historic characters under her guidance, into a different train of thought than is usually suggested by the perusal of similar works. But her record is truthful, and of the most intense interest. The loss to the literary world by the removal of this able writer is very great.—*Leader*.

COL. WM. KETCHESON

Was born on the 25th September, 1791. From earliest life he took an active part in public affairs, and at an early age was found enrolled among his country's defenders. For those services he received in 1809, a commission as Ensign in the "First Hastings Militia," then under the command of Col. John Ferguson. He took a conspicuous and valued part in repelling the invaders during the war of 1812, and at the close of that war was rewarded with a commission of Lieutenant; in 1815 he received his Captaincy, in 1832 his Majority, and in 1838 he was appointed Colonel of "the Fourth Regiment of Hastings Militia." After having taken his full share in the hardships entailed on the Militia by the Rebels of 1837, and when the country enjoyed peace, he retired retaining his rank. He was honoured with many other Government appointments, amongst which were the Commission of the Peace in 1834, and in 1836, Commissioner of the Court of Requests. All these appointments he filled with credit to himself, and to the satisfaction of those who appointed him. Colonel Ketcheson took a deep interest in anything that concerned the welfare of Canada, and especially the County in which he lived; and whether in the Township or County Council, or at meetings called to consider any public question, his advice was always sought and highly appreciated. He was a man of sterling integrity, whose life was guided by principles and not by expediency; meet him where you would he was always the same, his word of encouragement and material assistance when required has cheered and helped many a desponding one. He held many official positions in connection with the Wesleyan Church, and was highly esteemed by the ministry and members of that and other churches, "for his work's sake."—*Belleville Intelligencer*.

ROBERT SMITH, ESQ.

Mr. Smith came out to Upper Canada, along with his parents and three brothers in the year 1832, from Annan, in the County of Dumfries, Scotland, settling first in the Township of Tilbury, where the parents died. Robert then moved in 1840 to the Township of Harwich, where he took up land on Indian Creek, as also did his two brothers, Edward and James, his third brother, John, doing likewise in the Township of Romney. Their energy, knowledge of farming, &c., brought them all prosperity, especially so in the case of the subject of our notice, whose homestead is an agricultural model for these parts. At the time of his death, Mr. Smith was 62 years of age.—*Chatham Planet*.

T. B. STOKES, ESQ., M.D.

The deceased gentleman had been in poor health for some time, and although he was out very recently the event was not at all unexpected. Dr. Stokes emigrated from England to this country some forty years ago, and settled on a farm in Goderich Township, where he resided until a few years ago when removed into town. He was Clerk of the Township Council and Secretary of the Goderich School Board, both offices he filled to the satisfaction of the public. He was kindly in his disposition and the soul of honour in his intercourse with mankind, his good qualities of heart endearing him to all who became acquainted with him. His memory will be respected by many a resident of Goderich town and township.—*Goderich Star*.