15. Explain the terms *salvo of ordnance, soundings, bearings of the harbor, barque, cutter, frigate,* and *abaft.*

16. Why did Sir Humphrey select the "cutter," and how did he show his courage and devotedness in making that selection?

17. Explain the terms "mineral men;" give the scientific name of the class, now in use, and give reasons, if there be any, to show that they were deceived in believing the ore they found to be silver?

18. Name the figure of speech used in comparing the amusements of the sailors to the singing of the dying swan, and show how it was and was *not* appropriate.

19. Describe the chief difficulties with which Sir Humphrey Gilbert had to contend; show what qualities of mind he displayed on the occasion, and what sustained him to the last?

20. Explain what he meant by saying "We are as near to heaven by sea as by land," and of what mental quality did this give evidence.

21. How should that quotation and the words of the watch, "The general is cast away," be vocally read to distinguish them from the general narrative?

22. What is the grammatical object of "cried" in the above extract, and the antecedent of "*which* was true?"

What parts of speech are "withal," "whereof," and "true," and their relation?

23. Parse "delight," "near," and "shore," lines 22, 23, p. 35.

24. Give the meaning of *chronicler, faculty, morris dancers, conceite, incredible* and *bottell.* Explain the origin of *Monday,* and show the difference in the meaning of the word *conceit* as used then and now.

25. Give synonyms for *equip, disaster, boisterous, outrageous, marine, reiterate, allurement.* Write out an abstract of this extract embracing only its leading features.

26. In the reign of which of the other Tudor monarchs were discoveries made, and by whom and where?

PICTON, March 11th, 1878.

MR. EDITOR,—*Dear Sir*:—I beg to propose, through the medium of your JOURNAL, the propriety of arranging for the holding of one or more *Teachers' Holiday Institutes* during the next summer vacation, either on one of the Thousand Islands of the St. Lawrence, or at some other suitable place of summer resort. In this way I think mutual improvement and recreation may be pleasantly combined. Who will second the motion? Yours, &c.,

G. D. PLATT.

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.

At what distance above the surface of the earth must a person be to see one-fourth of its surface?

Let AOB be a quadrant of a section of the sphere through its centre, PQ a small arc, QR perpendicular to PM. Then as P approaches indefinitely near to Q, the chord PQ ultimately becomes the tangent at Q, and angle $PQR = 90° - RQO = OQN$. Hence ultimately the triangles PQR, OQN, are similar, and $\frac{PQ}{RQ} = \frac{a}{QN}$, or $QN, PQ = a.RQ$, where a is the radius of the sphere. Also, ultimately, the surface generated by the revolution of PQ about MN is $2\pi QN \times PQ = 2\pi a \cdot RQ$, from above. And the entire arc AB, or any part of it, may be broken into indefinitely small elements like PQ, the surface generated by all of which $= \Sigma(2\pi a \cdot RQ) = 2\pi a\ \Sigma(RQ)$. Hence surface generated by $AC = 2\pi a \cdot OD$; and surface of hemisphere $= 2\pi a^2$. Let CT be the tangent at C. An eye at T will see the portion of the surface enclosed by tangents drawn from T; and, if this eye see one-fourth the surface $2\pi a \cdot OD = \pi a^2$, or $OD = \frac{1}{2}a$. Now $\frac{OT}{OC} = \frac{OC}{OD}$; $\therefore OT = \frac{a^2}{\frac{1}{2}a} = 2a$; and $BT = a =$ height of eye above the surface.

We are asked: "Is the following proposition true either particularly or generally: 'The areas of rectangles vary as the squares of their like dimensions.'" Ans.: It is true of similar rectangles. See Euc. Bk. VI., Prop. 20.

The following solution of the "wool" question in the last number of the JOURNAL has been communicated by Mr. J. A. Clarke, of Picton:

Let $x =$ No. of lbs. of wool retained by B,

$\therefore 30 - x =$ " " " " left for A.

But $1\frac{1}{4}$ lbs. in 10 lbs., or $\frac{1}{8}$ of the whole spun, is wasted ı spinning;

$\therefore \frac{7}{8}(30 - x) =$ No. of lbs. of yarn spun for A;

Wherefore $\frac{7}{8}(30 - x) \times 12\frac{1}{2} = 30x$,

Whence $x = 8\frac{2}{131}$, and $\frac{7}{8}(30 - x) = 19\frac{31}{131} =$ lbs. of yarn.

ANALYSIS.

Since $1\frac{1}{4}$ lbs. in 10 lbs. is wasted, $\frac{7}{8}$ of A's wool becomes yarn.

$\frac{7}{8}$ of A's wool @ $12\frac{1}{2}$c. $=$ B's wool at 30c;

or $\frac{7}{8} \times \frac{1}{8}$ of A's share of wool $= \frac{3}{10}$ B's share;

$\therefore \frac{7}{8} \times \frac{1}{8} \times \frac{1}{3}$ " " " " $= \frac{1}{10}$ " "

And $\frac{7}{8} \times \frac{1}{8} \times \frac{1}{3} \times \frac{10}{1} = \frac{70}{192}$ A's share $=$ B's share.

$\therefore$ A's share $+ \frac{70}{192}$ A's share $= 30$ lbs.

$$\frac{192 + 70}{192} = 30 \text{ lbs.}$$

$$\frac{1}{192} = \frac{30}{262}$$

$$\frac{70}{192} = \frac{30 \times 70}{262} = 8\frac{2}{131} \text{ lbs.}$$

A correct algebraic solution was also given by Mr. S. H. Parsons, of Montreal, who considered the statement "there being a waste of $1\frac{1}{4}$ lbs. of wool on every 10 manufactured," to mean that 10 lbs. of yarn were manufactured from $11\frac{1}{4}$ lbs. of wool. A correct algebraic solution was also given by G. S., of Kimble.

The following problems have been sent to us by subscribers:

1. A particle moves from rest under the action of a force varying inversely as the square of the particle's distance from a given point, determine completely the motion.

2. Given the three equations,

$$a_1x^2 + b_1x + c_1 = 0$$
$$a_2x^2 + b_2x + c_2 = 0$$
$$a_3x^2 + b_3x + c_3 = 0,$$

determine the conditions that they shall have a common root.

3. "If $f(a) = 0$, $f(x)$ is divisible by $x - a$,". Show that this theorem is not universally true.

4. Prove that

$$\tan^{-1}\frac{2}{1^2} + \tan^{-1}\frac{2}{2^2} + \tan^{-1}\frac{2}{3^2} + \ldots = \frac{3\pi}{4}.$$

J. C. GLASHAN.