In addition to so designing the suspension that there is very little loss of energy in it, it is necessary to keep the instrument in a vacuum.

The form of the instrument is such that the capacities can be approximately computed. Hence, it is possible to develop the mathematical theory of its behavior. This has been done and the conclusions reached have been checked by experiment. The important conclusions are as follows:

1. The frequency at which maximum deflection is obtained depends upon the potential of the vane. As the potential of the vane is increased, the frequency at which maximum deflection is obtained is decreased.
2. The deflection for a given voltage is inversely proportional to the damping.
3. As the damping is decreased, the tuning becomes sharper.
4. The power required to give unit deflection when the applied emf is in resonance with the instrument decreases in the same ratio as the damping.

Experimentally it has been found that the instrument will detect a current as low as 10-11 ampere.

NOTE ON TRIANGLES WHOSE SIDES ARE WHOLE NUMBERS.

By Norman Anning,
Clayburn, B. C.

90°-Triangle.

$$1+i^2=0.$$
$$(x+iy)\ (x-iy)=x^2+y^2.$$
$$(x+iy)^2\ (x-iy)^2=(x^2+y^2)^2.$$
$$[(x^2-y^2)+i(2xy)][(x^2-y^2)-i(2xy)]=(x^2+y^2)^2.$$
$$(x^2-y^2)^2+(2xy)^2=(x^2+y^2)^2.$$

The numbers, x^2-y^2, $2xy$, and x^2+y^2 are sides of a 90°-triangle. Distinct solutions are given when x and y are relatively prime and not congruent, modulo 2. Every prime of form $4k+1$ will be the longest side of one such triangle. In a complete list of distinct solutions any composite number, all of whose factors are of the form $4k+1$, will appear more than once as longest side, provided that its factors are not all alike.

Examples:

$$3^2+4^2=5^2.$$
$$5^2+12^2=13^2.$$
$$15^2+8^2=17^2.$$
$$16^2+63^2=65^2.$$
$$33^2+56^2=65^2.$$
$$119^2+120^2=169^2.$$
$$\frac{119+120}{169}\text{ is a convergent to }\sqrt{2}.$$

120°-Triangle.

$$1+w+w^2=0.$$
$$(x-wy)\ (x-w^2y)=(x^2+xy+y^2).$$
$$(x-wy)^2\ (x-w^2y)^2=(x^2+xy+y^2)^2.$$
$$[(x^2-y^2)-w(2xy+y^2)][(x^2-y^2)-w^2(2xy+y^2)]=(x^2+xy+y^2)^2.$$
$$(x^2-y^2)^2+(x^2-y^2)\ (2xy+y^2)+(2xy+y^2)^2=(x^2+xy+y^2)^2.$$

The numbers, x^2-y^2, $2xy+y^2$, and x^2+xy+y^2 are sides of a 120°-triangle Distinct solutions are given when x and y are relatively prime and not congruent, modulo 3. Every prime of form $6k+1$ will be the longest side of one such triangle. In a complete list of distinct solutions any composite number, all of whose factors are of the form $6k+1$, will appear more than once as longest side, provided that its factors are not all alike.

Examples:

$$\begin{aligned}
3^2 &+ 3\cdot5 + 5^2 = 7^2.\\
7^2 &+ 7\cdot8 + 8^2 = 13^2.\\
5^2 &+ 5\cdot16 + 16^2 = 19^2.\\
11^2 &+ 11\cdot85 + 85^2 = 91^2.\\
19^2 &+ 19\cdot80 + 80^2 = 91^2.\\
104^2 &+ 104\cdot105 + 105^2 = 181^2.
\end{aligned}$$

$\frac{181+181}{104+105}$ is a convergent to $\sqrt{3}$.

Each solution for the 120°-triangle yields two solutions for the 60°-triangle, viz:

$$(x^2-y^2),\ (2xy+x^2),\ (x^2+xy+y^2) \text{ and}$$
$$(2xy+x^2),\ (2xy+y^2),\ (x^2+xy+y^2).$$

Ex. from (3, 5, 7) comes (3, 8, 7) and (5, 8, 7).

KANSAS ASSOCIATION OF MATHEMATICS TEACHERS.

The fourteenth regular meeting of the Association was held Friday, November 12, 1915, in conjunction with the Kansas State Teachers' Association. The meeting of the mathematics teachers was preceded by a luncheon at which time about sixty teachers renewed old friendships and formed new ones. It was decided that a luncheon should form part of the program for the 1916 meeting. After the luncheon the meeting opened with a business session. Prof. U. G. Mitchell made the report for the committee appointed last year to examine geometry texts submitted for state adoption. The committee gave Wentworth-Smith *Plane and Solid Geometry* as its first choice and Ford and Ammerman's *Plane and Solid Geometry* as second choice. The officers for the ensuing year are:

President—Mrs. Mary W. Newson, Topeka.
Vice-President—Emma Hyde, Kansas City, Kan.
Secretary-Treasurer—Eleanora Harris, Hutchinson.

The first number on the program was a report of the recent meeting of the Missouri Society of Teachers of Mathematics and Science. This report was given by Miss Emma Hyde. Miss Elizabeth G. Flagg read a paper, "A Different Point of View." Her paper was based on work taken by her in California the past summer. The last half of the program was given over to the reports of the Committees on Junior and Senior High School Courses. The reports were discussed by the members of the Association but no definite action was taken other than that the chair was asked to name a committee to consider the subject further.

CLOSE ESTIMATING.

A geologist of the United States Geological Survey once estimated 3,000 feet as the necessary depth to drill in a certain locality to find water, with the result of less than one per cent of error, a flow measuring half a million gallons a day having been struck at a depth of 2,987 feet. In another branch of the work of the Survey, that of estimating at the close of the calendar year the production of the various minerals during that year, even this percentage of error is being reduced. The Survey's estimate on January 1, 1915, of the production of iron ore was 41,440,000 long tons; the actual figures received from all the companies are now seen to be 41,439,761 long tons, a difference of only 239 tons.