

5. *A. Linkage Showing the Laws of the Refraction of Light*: A. M. MAYER.
6. *On the Color Relations of the Atoms, Ions and Molecules*: M. CAREY LEA.
7. *Mechanical Interpretations of the Variations of Latitude*: R. S. WOODWARD. (Introduced by S. C. CHANDLER.)
8. *On a New Determination of the Nutation-Constant, and some allied topics*: S. C. CHANDLER.
9. *On the Secular Motion of a Free Magnetic Needle*: L. A. BAUER. (Introduced by C. ABBE.)
10. *On the Composition of Expired Air, and Its Effect Upon Animal Life*: J. S. BILLINGS.
11. *Systematic Catalogue of European Fishes*: TH. GILL.
12. *The Extinct Cetacea of North America*: E. D. COPE.
13. *On the Application of a Percentage Method in the Study of the Distribution of Oceanic Fishes.*  
*A. Definition of Eleven Faunas and Two Sub-faunas of Deep Sea Fishes.*  
*B. The Relationships and Origin of the Carribeo-Mexican and Mediterranean Sub-faunas*: G. BROWN GOODE.
14. *On the Two Isomeric Chlorides of Orthosulpho-benzoic Acid*: IRA REMSEN.
15. *On Some Compounds Containing two Halogen Atoms in Combination with Nitrogen*: IRA REMSEN.
16. *Presentation of the Watson Medal to Mr. Seth C. Chandler, for his Researches on the Variation of Latitudes, on Variable Stars, and for his other works in Astronomy.*
17. *Biographical Memoir of Dr. Lewis M. Rutherford*: B. A. GOULD.
18. *Relation of Jupiter's Orbit to the Mean Plane of Four Hundred and One Minor Planet Orbits*: H. A. NEWTON.
19. *Orbit of Miss Mitchell's Comet, 1847, VI*: H. A. NEWTON.

The officers elected were as follows: President, Prof. Wolcott Gibbs; Vice-president, Gen. F. A. Walker; Home Secretary, Prof. Asaph Hall; Foreign Secretary, Prof. A.

Agassiz; Treasurer, Dr. John S. Billings; additional members of the Council, Prof. George J. Brush, Prof. George L. Goodale, Dr. B. A. Gould, Prof. O. C. Marsh, Prof. Simon Newcomb and Prof. Ira Remsen.

The new members elected were Prof. W. L. Elkin, professor of astronomy in Yale Observatory; Prof. C. S. Sargent, professor of botany in Harvard University; Dr. W. H. Welch, professor of pathology in Johns Hopkins University, and Prof. C. O. Whitman, professor of biology in the University of Chicago. The foreign associates elected were Prof. Rudolph Leuckart, professor of zoölogy in the University of Leipsic; Prof. Julius von Sachs, professor of botany in the University of Würzburg, and Prof. Sophus Lie, professor of mathematics in the University of Leipsic.

The Barnard Medal was awarded to Lord Rayleigh for his discovery of argon, and the Watson Medal to Professor S. C. Chandler for his researches on the variation of latitude and other subjects.

The autumn meeting of the Academy will be held at Philadelphia, beginning October 29.

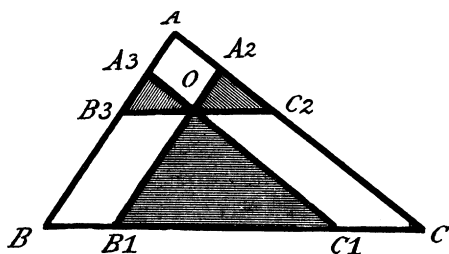
#### ARTHUR CAYLEY.

How Professor Cayley touched everything mathematical, and touched nothing which he did not adorn, may be illustrated by the following unpublished letters, which were the first expression of discoveries that have since taken their permanent place in our best text-books. They are both the outcome of the sudden and fruitful interest in *linkage*, dating from Sylvester's interview with Tchébychev, when, leaving behind him the diagram of the now celebrated Peaucellier's Cell, the illustrious Russian gave in parting the characteristic advice: "Take to kinematics; it will repay you; it is more fecund than geometry; it adds a fourth dimension to space."

I will transcribe the letters exactly, not

only because the recent death of Tchébychev, followed in less than two months by that of Cayley, gives them now a special pertinence, but because it is of interest to compare one with what is given on 'tram motion' in Kempe's 'How to Draw a Straight Line,' and the other with its reproduction by no less a master than Clifford on pages 149, 150 of his *Dynamic*, whence I add figure 2.

“Robert’s theorem of 3-bar motion takes the following elegant form : Take a triangle

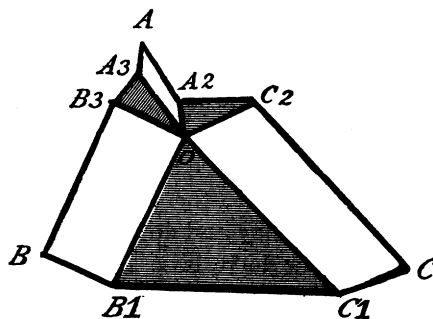


ABC and a point O and through O draw lines parallel to the sides as in the figure, the 3 shaded  $\triangle$ 's are of course similar to ABC. Now imagine a linkage composed of the shaded  $\triangle$ 's and the bars  $AA_2$ ,  $AA_3$ ,  $BB_3$ ,  $BB_1$ ,  $CC_1$ ,  $CC_2$  pivoted together at A, B, C,  $A_2$ ,  $A_3$ ,  $B_3$ ,  $B_1$ ,  $C_2$ ,  $C_1$ , O ; then, however, the figure is moved [of course  $A_3$ ,  $B_3$  do not continue in the line AB, etc.], the triangle ABC *will remain similar to the shaded triangles* ; and if in any position of the figure we fix the points A, B, C, then the point O will be movable in a curve, viz.: we have the *same* curve described by O considered as the vertex of  $OA_3 B_3$ , where the two radii are  $AA_3$ ,  $BB_3$ —by O considered as the vertex of  $OA_2 C_2$ , etc.—and by O considered as the vertex of  $OB, C_1$ , etc.”

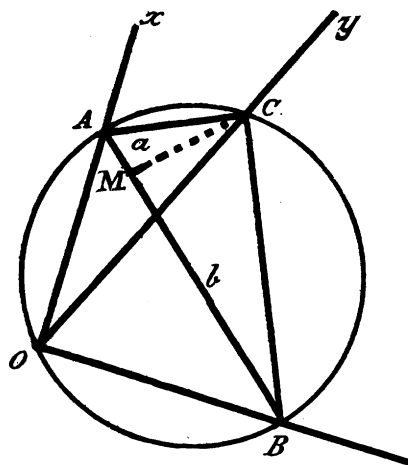
CAMBRIDGE, Feb. 22, 1876.

“The porism is *very* pretty ; it was new to me, though I think it ought not to have been so. Look at the theorem thus: Imagine a plane, two points thereof, A, C moving in fixed lines Ox, Oy. Describe the circle OAC, which consider as a circle fixed

in the plane and movable with it. Then the theorem is that any point B of this circle moves in a line OB through O. In particular B may be the opposite extremity of the diameter through A, and we have



then the points A,B moving on the lines Ox' and OB at right angles to each other, viz.: the general case of a plane moving two points thereof on two fixed lines is reduced to this well-known particular case. And the theorem comes to this, that dividing



the rod AB at pleasure into two parts AM, MB, and drawing MC at right angles, and a mean proportional, the locus of C is a right line through O, which is of course easily proved." Yours very sincerely,

A. CAYLEY.

CAMBRIDGE, May 5.

GEORGE BRUCE HALSTED.

AUSTIN, TEXAS, Feb. 15, 1895.