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Mathematics Clubs

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The proof is invariably deductive. "Verification" by testing the result in special cases is not part of the proof.

It may be that ultimately propositions will be characterized by the type of proof on which they depend—according to their basis for validity—though this is closely connected with their form, the more completely the proposition is stated the more close is this connection. Whether or not Dr. Keyser's classification will be adopted just as it now stands, it seems fairly evident that some such classification is in the air. The role of deductive reasoning in thought is, I believe, due for a new type of recognition and attention. Whether we agree with Dr. Keyser on all points or not, he deserves our thanks and appreciation for producing "The Pastures of Wonder."

N. J. LENNES

Missoula, Montana, June 23, 1930.

MATHEMATICS CLUBS

All reports of club activities should be sent to Professor F. M. Weida, George Washington University, Washington, D. C.

CLUB TOPICS

MECHANICS—A DRAMATIC SKIT

By TOMLINSON FORT, Lehigh University

Dramatis Personae

- | | |
|--|-------------------|
| 1. Newtonian Mechanics, alias Brigham Young. | 5. Engineering |
| 2. Physics | 6. Wave Mechanics |
| 3. Chemistry | 7. Matrix Theory |
| 4. Astronomy | 8. Relativity |
| | 9. Geometry |

(The scene opens with an empty room. *Newtonian Mechanics* enters. He is a large man with rough dress, beard and deep masculine voice. Telephone rings. He goes to the phone.)

Newt. Mech.: Yes, Yes. This is Young. Yes Brigham Young—B-R-I-G-H-A-M Y-O-U-N-G, Brigham Young. What is that? No, not always. That's right. That's what they used to call me. Newtonian Mechanics, from my father Isaac Newton. (Irritably) Why did I change my name? Well I got religion, that's why. If it were'nt for that I couldn't manage this family of mine. How are they? (Angrily) Go to Paradox! (Hangs up, moves over to another chair. Sits down.) Well I've had a day of it. By the Ghost of Galileo, I'm tired. (Relaxes). (Sits up and rings bell.)

(Enter the wives: (1) Physics who has recently had her face lifted. She is very frivolous. Her dress is covered with waves and lightning flashes. (2) Chemistry. She has a many-colored dress decorated with crucibles etc., light peroxide hair. She is sarcastic and cynical. (3) Astronomy. She is dignified and of lofty demeanor. Her dress is covered with stars. (4) Engineering. She is elderly. Her dress is that of an ordinary scrub woman decorated with a few faded levers or other machines. Her hair is slicked back and her sleeves rolled up. She is homely and practical. Each has her name on her breast.)

Physics: (With giggles and to no one in particular) You know I think I look much younger since my face-lifting operation. I

Chemistry: (Interrupting) Really you do try to attract attention. Don't you?

(*Newtonian Mechanics* looks at them with resigned air. He takes out roll book and pencil.)

Newt. Mechs.: The wives will answer to roll call: Physics.

Physics: Present, b—u—t—.

Newt. Mechs.: (Roughly) Chemistry.

Chemistry: Here.

Newt. Mechs.: Astronomy.

Astronomy: (Resignedly) Why this eternal roll call. Have I not always been present, always inspired your best work? Do you not trust your old sweetheart? Come back to the enthusiasm of your youth. Do something for my perihelions.

Newt. Mechs.: Shut up! Engineering.

Engineering: You can count on me. If I were not here who would cook the dinner?

New. Mechs.: Well I'm ready for dinner now. Galileo knows I work hard enough for all of you.

Physics: (To herself). He has such beautiful hair.

Newt. Mechs.: You talk too much.

Physics: I must tell you of my electrons.

Newt. Mechs.: (Exasperated) For Newton's sake!

Chemistry: I don't feel so very well either."

Newt. Mechs.: Both of you take a dose of "law of motion oil" and go to bed. (Aside) That always fixes them.

(*Newt. Mechs.* gets up) I'll be back in a few minutes. No foolishness now. (Goes out).

Astronomy: (Sweetly) I can't help worrying about my perihelions. (*Physics* giggles. *Astronomy* assumes dignified look.)

Engineering: (Disgustedly) Smokestacks! (She begins to straighten things.)

Physics: (To *Chemistry*) But my dear you should see my new doctor. He has the most wonderful hair, all blonde and as if it had been marcelled. He thought that I was a debutante. He really did.

Chemistry: (Aside) Great Priestley, I wonder how I ever got into this family. Priestley knows old *Newtonian Mechanics* never did anything for me. (To *Physics*) Darling I should like to see this young man of yours.

(Door bell rings)

Physics: (Excitedly) I told him to call.

Engineering: Come in.

(Enter two up to the minute young men; both wear glasses and carry medical cases.)

Physics: How do you do? (To others) Allow me to present *Dr. Wave Mechanics*.

Chemistry and Astronomy: So glad to know you.

Engineering: (Slowly) Good evening.

Wave Mechs.: How do you do? Allow me to present *Dr. Matrix Theory*.

Matrix Theory: Pleased to meet you, I'm sure.

(*Physics* powders her nose; *Chemistry* uses bright red lipstick.)

Physics: My electrons, Doctor, don't you think an examination will be necessary?

Engineering: (Disgustedly) Smokestacks! (Goes to work at something.)

Wave Mechs.: (Paying no attention to *Engineering*) My beautiful young lady: I'm afraid so, and such a building-up process as you'll get. Come to our sanatorium.

Physics: (Aside to *Astronomy*) Notice his hair. Did you ever see such eyes?

Astronomy: My dear; remember our husband.

Physics: (To *Wave Mechanics*) Do you know our husband, *Newtonian Mechanics*?

Wave Mechanics: He is all wrong.

Matrix Theory: No, simply incompetent, but a trusting old soul.

Physics: He is old-fashioned but good-hearted. He married me when I was just a child. You know he is much older.

Matrix Theory: You should see our chief surgeon, *Mathematics!* There's a man for you! You should watch him operate. And our head nurse, *Mrs. Quantum.* It's really she that gives us our work to do.

Engineering: (Disgustedly) Smokestacks! I'll call *Newtonian Mechanics.* He will throw you upstarts out.

Physics: Please!

Chemistry: Possibly they can do *Physics* good. I'm all upset myself. Old *Newtonian Mechanics* never does anything for me. I sympathize with *Physics.*

Wave Mechs.: *Physics,* come with me. I'll look to your electrons myself, even your free electrons. You may have whatever you want. *Physics,* I love you.

Physics: I must pack my things.

Wave Mechs.: You need nothing. *Mrs. Quantum* will supply all.

Physics: I must have *Laws of Motion.*

Wave Mechs.: Leave them.

Physics: Let me take *Conservation of Matter.*

Wave Mechs.: No.

Physics: Boo hoo! Boo hoo! Please let me take *Conservation of Energy.* It is such a beautiful garment and can be worn on so many occasions. It is most economical.

Wave Mechs.: The most pernicious of them all. No! Come.

Physics: Please!

Astronomy: But she will be coming back soon. She is the wife of *Newtonian Mechanics.*

Wave Mechs.: No.

Physics: Boo hoo. Just a little *Conservation of Energy.*

Wave Mechs.: No.

Matrix Theory: Define energy and he will listen to you.

Physics: Boo hoo.

Chemistry: Define *Energy!* Who ever heard of such a thing?

Engineering: That's easy. My baby, *Work,* can do more than that. (All laugh.)

All: Isn't she old-fashioned? Ha Ha, Ha Ha.

(*Matrix Theory* and *Wave Mechanics* go out followed by *Physics.*)

(Enter *Newtonian Mechanics.*)

Newt. Mechs.: Where's *Physics?*

All: (in chorus) Gone.

Newt. Mechs.: Where?

Astronomy: With a handsome stranger.

Engineering: (with disgust) Smokestacks! Deserted her husband in the Lord for an upstart who called himself *Wave Mechanics* and another one who said he was *Matrix Theory.* Scandalous, I call it.

Astronomy: She loves him.

Chemistry: Yes and they promised to fix her electrons; Doctors, you know, and their head nurse is to look after all her little quanta.

Engineering: (with disgust) Smokestacks! If she ever has any.

Chemistry: She'll get description anyhow, and description is more than I get in this family.

Newt. Mechs.: The ungrateful woman! But I have the rest of you.

(Nervously) Answer to roll call.

(All answer, Here, but *Physics.*)

Newt. Mechs.: Let's have dinner. (The bell rings twice, *Astronomy* shivers, the door opens and a handsome stranger is there.

Newt. Mechs.: Who are you?

Relativity: A distant cousin of yours, *Relativity* by name, to help you with your work.

Newt. Mechs.: Welcome stranger. Wives, make room for *Relativity.* Here, Cousin. We must help *Engineering* with the dinner. Bring in the chairs.

Engineering: Smokestacks!

(*Newtonian Mechanics* and *Relativity* seize a chair together. *Relativity* drops it.)

Relativity: Oh my Universe. (Grabs his back) Sir, this is not the way. I stand here, you there, I on Mars, you on distant Neptune. I take a clock, you a vibrating atom.

Astronomy: Wonderful!

Newt. Mechs.: Nonsense!

Engineering: Smokestacks!

Relativity: We must have a plan for any chair, anywhere, without a care.

Newt. Mechs. and Engineering: Get to work or get out.

Relativity: Well cousin, you scorn my generality. No romance, no poetry, all triviality. You cannot even manage a perihelion. Adieu!

Engineering: Smokestacks! Get out. (Raises broom).

Astronomy: Hold, I must go with you.

All: What?

Chemistry: You his favorite wife, you his boasted sweetheart, Ha, Ha, Ha.

Astronomy: I must go. My perihelions.

Newt. Mechs.: (stutters, waves arms) S S

Relativity: Come. (Exit *Relativity* and *Astronomy*)

Chemistry: Well *Newt.* old boy, what do you think of that? Two gone. This family of saints is in a bad way. Ha, Ha, Ha.

Newt. Mechs.: By the ghost of Galileo! By my father *Newton!*

(*Engineering* begins to sweep violently)

Chemistry: Ha, Ha, Ha I'm tired of it. I'm going too. What have you ever done for me? Ha, Ha, Ha, you didn't know that your servant, *Calculus*, was my lover. Ha, Ha, Ha, Thought to hold us all, Ha, Ha, Ha. I have a new lover too, another servant of yours, *Differential Equations*. I'm going to *Differential Equations*. Ha, Ha. To *Differential Equations*, To *Differential Equations*! (Goes out)

(*Engineering* and *Newtonian Mechanics* stand looking at each other. *Mechanics* is unable to speak. He waves his arms and stutters.)

Engineering: It's all right, *Newt.*, I'm glad to get rid of them. Now you'll come back to the Baptist Church and stick by me your one and only lawful wife, *Engineering*. Be strictly mathematical and we shall live long and prosper.

(Loud knocking at door)

Newt. Mechs.: Oh (Shivers)

(Knocking repeated)

Engineering: Come in. (Knocking repeated. She goes to door and opens it.)

(Powerful stranger presents himself.)

Engineering: Who are you?

Geometry: I am called *Geometry*, I am the sheriff. See my badge. (He displays a badge marked with a large circle)

Newt. Mechs.: Oh (Covers his face with his hands) Oh

Engineering: What do you want? A certain geometry, *Elementary* by name, used to serve us well.

Geometry: That was my infant self. I have come for *Mechanics*. (boastfully) See how big I am.

Newt. Mechs.: Woe! Woe! Woe!

Geometry: (to *Newtonian Mechanics*) I shall put you in my pocket. I shall consume you alive. (Declaims) Yes, Yes, *Geometry* will swallow up *Mechanics*. Live *Geometry*, down with *Mechanics*.

Newt. Mechs.: (Weeps out loud) Oh

Geometry: Ha, you sniveling creature. Get in my pocket. In with you, old working man. You infinitesimal. In with you, I say.

Engineering: Now, *Master Geometry*, you are a big fine fellow there is no doubt about that. How you have grown! But away with you; put on your elementary aspects; leave *Mechanics* with me. The world cannot get on without me and I need this old classical fellow. (Aside) Cheer up

Newt., it's all right. (To *Geometry* again) I'll take him to *Physics* lots of times. I'll promise, We old folks need a girl like that. Maybe she'll come back week ends. These girls will run after handsome strangers. We'll behave ourselves. *Mathematics* will regulate our every move. Be a generous fellow, *Geometry*. Leave us alone now.

Newt. Mechs.: Oh leave us alone, leave us alone, Oh, Oh, Oh

Geometry: Well, *Madam Engineering*, if you want the old fellow you may keep him. Possibly all of us can use him some. I'm quite sure that *Astronomy* and *Physics* can. As for me; I'll keep coming back and shall polish him up from time to time. He'll get on well enough but after a while you'll find that I have him completely rewritten in geometric language, and that (declaims) verily *Geometry* has swallowed up *Mechanics*. If you expect to use him then you, yourself, must know my higher dimensions. You too must come to *Geometry*, *Madam Engineering*, and I'll not wear my elementary aspects. No indeed there'll be no limit to the dimensions I'll wear. Adieu *Madam Engineering*.

Geometry: (To *Newtonian Mechanics*) Au revoir, old fellow. Good luck, but I'll be back. I'll have you in my pocket, do you understand, but for the present au revoir, auf wiedersehen. (Exit) (*Engineering* and *Newtonian Mechanics* fall into each others arms weeping.)

CLUB ACTIVITIES

Albion College Mathematics Club, Albion, Michigan.

Officers: President, Allene Day; Vice-President, Grace Ulbright; Secretary-Treasurer, Alberta Wocholz.

The programs for the year 1929-1930 were as follows:

October: Roll call—geometric figures in everyday life; A report of "The Cultural Value of Mathematics," by Aubrey J. Kempner.

November: Roll call—famous mathematicians and their work. Two reports, "Mathematics in the junior high schools" and "The value of the history of mathematics in teaching."

December: A lecture by Dr. L. A. Hopkins, secretary of the College of Engineering and Architecture of the University of Michigan. Open to the student body.

January: Roll call—geometric theorems. A report, "Graded algebraic abilities in teaching"; and a contest conducted on an "Ancient duodecimal system."

February: A special report and discussion on "The plotting of the cubic."

March: Roll call—algebraic and geometric formulas. Two reports, "Mathematics in England and Germany" and "Mathematics in everyday life."

April: Roll call—geometric figures in nature. A report, "Watching the meteors."

May: Professor Evarts of Kalamazoo College gave a talk on "Uncomputative mathematics."

(Report by Alberta Wocholz)

Napierian Club of De Pauw University, Greencastle, Indiana.

Officers for the year 1929-1930 were: President, Charles Stunkel ('30); Vice-President, Josephine Newkirk ('30); Secretary, Margery Joslin ('30); Treasurer, Roy Holwager, ('30).

The following programs were given at the regular monthly meetings:

October 3, 1929. Election of new members.

October 10. "History of the Napierian Club and the life of John Napier" by Josephine Newkirk.

November 14. "Scales of notation" by Richard Jay; Book review of "Flatland" by Margery Joslin.

December 12. "Vector analysis" by Professor R. W. Babcock.

January 9, 1930. "Problems of a high-school teacher" by Christine Dietrick.

February 13. "History of algebra" by Mary McCord; "Probability in gambling" by Howard Fetters.

March 13. "The system of homogeneous coordinates" by Professor W. C. Arnold.

April 10. "Discussion of the new planet" by Roy Holwager; "Discussion of the coming eclipse of the moon and that of the sun" by Horace Barnett; Observations from McKim Observatory.

May 8. "Mathematics in music" by Professor H. E. H. Greenleaf; Election of new officers.

(Report by Margery Joslin)

Irrational Club of the University of Wyoming, Laramie, Wyo.

The officers for the year 1929-1930 were: President, Robert Hill; Vice-President, Imogene Montgomery; Secretary-Treasurer, Rowene Danielson; Faculty Advisor, Greta Neubauer.

The programs of the club for the year 1929-1930 were as follows:

October 9, 1929. Election of officers. Fall party.

November 7. "Development of the nine point circle" by Miss Montgomery.

November 21. "Mathematical cross-word puzzle" by club officers; "Graphical solutions for the complex roots of simultaneous quadratic equations" by Professor C. F. Barr.

December 5. "Life history of René Descartes" by Mr. Call; "Relation of mathematics and architecture" by Mr. Hitchcock.

January 16, 1930. "Logarithms" by Miss Neubauer; "Mechanical demonstrations of logs and cosines" by Robert Hill.

January 30. "Mathematics in music" by Mrs. Shaw; "The Irrational Club Song" by Mr. Barr.

February 21. "The Simpson line" by Miss Achenbach; "The problem of Apollonius" by Mrs. Shaw; "The locus of the point of similitude of two similar triangles, similarly placed, during rotation of equal amounts about dissimilar points" by Miss Montgomery and Miss Wortheim;

A mechanical device showing the locus of points of similitude was demonstrated by Mr. Mize.

March 7. "History of the slide rule" by Miss Neubauer; "The slide rule" by Professor Goodrich.

March 21. "Determining pi by tossing matches" by Mr. Warner.

April 10. "Astronomy and mathematics" by the astronomy class.

May 8. "History of pi" by Rowene Danielson; "History of the equals sign" by Ada Burke; "History of e and of logarithms" by Grace Reid.

May 26. Annual beefsteak fry held in the mountains of the Laramie Range.

(Report by Rowene Danielson)

Mathematics Club of the College of the City of Detroit, Detroit, Michigan.

Any student of mathematics, or for that matter any student interested in mathematics at the College of the City of Detroit, may become a member of the club by simply coming to the meetings. The organization is rather loose, hence the president's job is a responsible one. Although no time is specified for meetings they have generally been held at least once a month, at the discretion of the president. The feature of each meeting is a paper, relating to some branch of mathematics, presented by a student. The widely varying nature of these papers is made apparent in the following paragraphs.

The first meeting of the year 1929-30 was held in October, and at that time Clarence Wylie was elected president. Immediately following the election, Mr. Wylie presented a paper on "Three dimensional plane geometry," in which he treated the imaginary element in plane analytics as a third dimension using i as a revolving operator.

Early in December, Gordon Wilcox presented a paper on "Conditions for exact division," in which he treated the relations between the digits of a number and the remainder or lack of remainder when divided. Here Mr. Wilcox introduced an interesting application of certain series.

At the April meeting the writer presented a paper on "Determinants," in which the algebra and elementary properties of this useful device were dealt with. Later in April Clarence Wylie discussed "Elementary analytic projective geometry"; he took up such topics as the principle of duality, homogeneous coordinates, and transformations involving the line at infinity.

Early in May, Miss Jean Persons, a graduate of the college teaching in the Detroit Public Schools, spoke on "Geometrical constructions by paper folding." Later in the same month Kenneth E. Stecker presented a paper on the "Approximate division of a circumference." This was the final meeting of the year.

(Report by Glen Brookes)

The Undergraduate Mathematics Club of the University of Iowa, Iowa City, Iowa.

Because of the untimely death of the president of the club, Mr. Wilbur B. Elliff, the first meeting of the club was not held until the second semester. At that time the following officers were elected for the remainder of 1929-30 and also for 1930-31: Professor L. E. Ward, Faculty Adviser; Mr. Carl H. Fischer, President; Miss Thelma Coate, Secretary-Treasurer.

The program for the semester was as follows:

February 20, 1930. "Methods of extracting square roots" by Professor L. E. Ward.

March 14. "A method of approximating to the n th root of a number" by Mr. Milton S. Weinberger.

March 27. "Meteoric phenomena" by Mr. Lloyd O. Ritland.

April 11. "Confocal conics" by Miss Gerturde Rickey

(Report by Thelma Coate)

The Mathematics Club of the University of Georgia.

This informal club has no regularly appointed officers, no membership requirements, and no dues. By common consent it meets twice a month, and is attended by the faculties of the University of Georgia, State Teachers College, and Lucy Cobb Institute, together with the graduate students in mathematics. Those attending take turns as speakers. The programs for the year 1929-1930 were historical in character and D. E. Smith's *Source Book in Mathematics* served as inspiration and outline.

(Report by David F. Barrow)

The Mathematics Club of the Cooper Union Institute of Technology, New York, N. Y.

The officers for the year 1929-30 were. President, Leo Rubinowitz ('30); Vice-President, G. D. Champlin ('30); Secretary, David Rabinovich ('31); Treasurer, W. T. Eddy ('32); Assistant Secretary, J. J. Murphy ('31). The club has a paid membership of 170, the yearly dues being 25 cents.

The programs for the year were as follows:

Nov. 12, 1929. "Probability and its applications" by Mr. E. C. Molina, research engineer, American Telephone & Telegraph Co.

Dec. 3. "Application of the catenary to railway electrification" by G. D. Champlin ('30).

Dec. 17. "Elements of the theory of integers" by Fitzgerald Bramwell ('33.)

Jan. 14, 1930. "Bernoulli numbers" by Leo Rubinowitz ('30.)

Jan. 28. "The bearings of mathematics" by Professor C. J. Keyser, Columbia University.

Feb. 18. "Fundamental ideas of projective geometry" by Joseph Stitelman ('32).

Mar. 11. "The slide rule and its uses" by Professor W. E. Breckenridge, Stuyvesant High School.

Mar. 25. "Euler's problem" by Robert Wolins, '31; "The Russian peasant multiplication system" by L. A. Kenworthy ('31).

April 15. "Curious properties of numbers" by Professor H. W. Reddick. Election of officers.

(Report by C. H. Lehmann)

Bryn Mawr Mathematics Club of Bryn Mawr, Pennsylvania.

The program of the Bryn Mawr Mathematics Club for the year 1929-1930 was as follows: October 16, 1929. "The definition of trigonometric functions by means other than geometric" by Dr. D. V. Widder.

November 5. "The motion of an electrically charged particle in a magnetic field, as developed by Dr. Richard Gans on the principles of vector analysis" by Ruth Unangst ('30), and "The Life of Evariste Galois" by Elizabeth Baker ('30).

Announcement was made at this meeting of a \$10 prize to be awarded for the best undergraduate club report of the year.

November 26. "Regular polygons" by Dr. Anna Pell Wheeler, Bryn Mawr College.

December 18. "The history and computation of π " by Pauline Huger ('32), and "Homogeneous point coordinates" by Anne Lea Nicholson ('30).

January 7, 1930. "Groups—the theory being built up from facts observed of the group four" by Dr. Thomas, University of Pennsylvania.

February 11. "Isolation of the real roots of an equation of degree n —Sturm's functions and Bowditch's" by Miss Lucile Anderson, Bryn Mawr College ('30).

March 18. "Inversions" by Constance Cole ('30), and "Fundamental propositions of algebra" by Agnes Hannay.

April 15. "Historical problems of the calculus of variations especially the brachistochrone of the Bernoulli brothers" by Gretchen Mueller ('32), and "Applications of the calculus of variations," by Mary Peters ('30).

May 13. "Postulates of a miniature geometry—indicating what a sizable geometry could be inferred without a continuity assumption" by Dr. Marguerite Lehr, Bryn Mawr College. Dr. Widder awarded the prize, referred to above (Nov. 5), to Miss Agnes Hannay for her report on "Fundamental propositions of algebra."

The officers for the year 1929–1930 were: Miss Agnes Hannay, President; Miss Janet Wise, Vice-President and Treasurer; Miss Ruth Unangst, Secretary.

The officers elected for 1930–1931 are: Miss Gretchen Mueller, President; Miss Ruth Unangst, Vice-President and Treasurer; Miss Pauline Huger, Secretary.

The club is composed of graduates, and undergraduates who have had or who are taking the second year mathematics course. Meetings were held from about 4:00 to 6:00 o'clock, the reports and discussions being followed by tea, food, and choice puzzles.

(Report by Ruth Unangst)

The Mathematics Club of the University of Alberta, Edmonton, Alberta, Canada.

The programs for the year 1929–1930 were as follows:

October 22, 1929. "Present day tendencies in secondary mathematics" by A. J. Cook and E. W. Sheldon.

November 6. "Units" by E. S. Keeping.

November 19. "Infinity" by Louise Miller.

December 3. "Congruences" by A. J. Cook.

January 14, 1930. "Superposition" by E. D. M. Williams.

January 28. "The vogue of statistics" by E. W. Sheldon.

February 11. "Mechanisms" by J. S. Beggs.

February 25. "Difficulties in secondary mathematics" by D. L. Shortliffe.

March 7. "Relativity and geometry" by I. F. Morrison.

(Report by E. W. Sheldon)

The Mathematics Club of Brown University, Providence, R.I.

The following programs were given in 1929–1930:

October 29, 1929. "The Martian counts on his fingers" by Lulu Amelia Vorleck (graduate); "Coconuts, sailors, and a monkey" by John Bernard Chaffee ('31.)

December 3. "Moving in four dimension" by John Otis Prouty ('31); "Nomograms" by David Moskovitz (graduate).

January 14, 1930. "Measuring the distances of the stars" by Clinton Harvey Currier, associate professor of mathematics, Brown University.

February 18. "Mathematics of the pyramid builders" by Mary Taylor ('30); "The golden section and Fibonacci series" by Harold Irving Brown ('30).

March 18. "Newton and the calculus" by Donald Leigh Fowler, Jr. ('31); "Leibniz and the calculus" by Enis Eva DeMagistris ('31).

April 22. "A mathematical cinderella" by Heinrich Wilhelm Brinkmann, assistant professor of mathematics, Harvard University.

May. Picnic.

Committee on Program: Professor Bennett; Mr. Thurston; Lulu Amelia Vorleck (graduate); Mary Taylor ('30); John Otis Prouty ('31); Donald Leigh Fowler, Jr. ('31).

Committee on Arrangements: Mr. Krall; Ruth Barden Eddy ('32); Mary Elizabeth Brooks ('31); James Benjamin Brown ('31); Delbert Swan Wicks, Jr. ('32).

PROBLEMS AND SOLUTIONS

EDITED by B. F. FINKEL, OTTO DUNKEL, and H. L. OLSON

Send all communications about Problems and Solutions to B. F. Finkel, Springfield, Mo. All manuscript should be typewritten, with double spacing, and with margins at least one inch wide.

PROBLEMS FOR SOLUTION

N.B. Problems containing results believed to be new, or extensions of old results are especially sought. The editorial work would be greatly facilitated if, on sending in problems proposers would also enclose any solutions or information that will assist the editors in checking the statements. In general, problems in well-known textbooks or results found in readily accessible sources, will not be proposed as problems for solution in the MONTHLY. In so far as possible, however, the editors will be glad to assist members of the Association in the solution of such problems.

3469. *Proposed by V. M. Spunar, Chicago, Illinois.*

A constant length, PQ , is measured along the tangent at any point, P , on a curve; give a geometrical construction for the center of curvature of the locus of the point Q . Also if PQ' be measured equal to PQ in the opposite direction along the tangent, prove that the point P and the centers of curvature of the loci of Q and Q' lie in a straight line.

3470. *Proposed by F. L. Wren, George Peabody College for Teachers.*

If the hypotenuse of a right triangle be divided into n equal parts and the vertex of the right angle be joined to these points of equal division, then, if d_i be the length of the lines so drawn, we have

$$\sum_{i=1}^{n-1} d_i^2 = \frac{(n-1)(2n-1)}{6n} h^2,$$

where h is the length of the hypotenuse.

3471. *Proposed by W. R. Ransom, Tufts College.*

In assigning dormitory rooms, a college gives preference to pairs of students in this order: