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Emily Kathryn Waynt

C. V. NEWSOM

Members of Kappa Mu Epsilon are saddened by the word that Dr. Kathryn Wyant, founder and first president of our fraternity, passed from this life on July sixteenth of this year. The ideals of Kappa Mu Epsilon which all true members cherish are the ideals which dominated her life and action. At times she became a virtual crusader for the recognition of the "beauty of mathematics," and the fact that Kappa Mu Epsilon is today a large and strong organization is testimony to the firm foundation upon which she built the society.

Born in Ipava, Illinois, upon January sixteenth, 1897, Dr. Wyant showed unusual promise as a teacher even as a young girl. Before graduating from the University of Missouri in 1921, she taught mathematics with considerable success in the public schools of her own state. From 1921 to 1930, she was an instructor in mathematics at the University of Missouri. Her reputation as a teacher of engineering students brought her annual recognition upon Saint Patrick's Day. Other staff members frequently remarked upon Miss Wyant's ability to "get so much from her students." The University of Missouri awarded her the M.A. degree in 1922, and the Ph.D. degree in 1929.

In 1930, Dr. Wyant became professor of mathematics at the Northeastern State College at Tahlequah, Oklahoma. While at that institution she conceived the idea of a national fraternity in mathematics which would appeal essentially to the undergraduate student. Consequently, Oklahoma Alpha became a reality upon April eighteenth, 1931. Dr. Wyant participated actively in the selection of the name, the motto, and the insignia of the new organization, and during the three years that she was on the faculty of Northeastern State College, she carried on an extensive correspondence as

a part of her effort to expand the membership and the influence of the new fraternity.

In 1933, Dr. Wyant became head of the mathematics department at Athens College. A new section of the United States soon felt the enthusiasm of this dynamic missionary of mathematics. Already, however, Dr. Wyant's health was failing, and her days in the class room were soon over.

During the next few years, Dr. Wyant watched every step which Kappa Mu Epsilon took. She corresponded with the officers although her hand was too feeble for her to actually write the letters. Many remember her amazing trip with the aid of a nurse from Athens, Alabama, to Warrensburg, Missouri, in order that she might attend the last national convention.

With many difficult years ahead of us all, it is the fervent hope of each member of Kappa Mu Epsilon that the fraternity has inherited just a little of the fine and indomitable spirit of its founder.

The History and Use of Counting Boards

DOROTHY RAFTER¹
Albion College

The history of computation by counters can be traced back to the methods employed by the ancient Egyptians. Their form of writing made the manipulation of numbers so cumbersome and difficult that they were forced to seek some means of simplification before their arithmetic could progress. They found the solution to their problem in the use of a counting board on which small counters, representing numbers, were moved about according to certain laws.

The Greeks, experiencing much the same difficulty, adopted the Egyptian methods of computation by counters almost without change. The one notable difference was that the Greeks moved their counters from left to right, whereas the Egyptians moved theirs from right to left.

There were several types of counting boards in use during this period, namely:

- (1) a polished surface strewn with sand on which figures could be drawn with the fingers or with a stylus;
- (2) a polished tablet with nine vertical columns grouped in three's along which counters were moved;
- (3) a box strung with beaded wires; and
- (4) a tablet marked with nine or more horizontal lines on which counters were placed.

A counting board of this last type has been discovered at Salamis, Greece. It is an engraved block of marble, five feet by two and a half feet, and is divided into a large section with eleven parallel lines and a smaller section with five parallel lines.

¹ This is a student paper presented by Miss Rafter before the Michigan Section of the Mathematical Association of America, November 18, 1939.

After the decadence of Greek culture, the Hindus carried on some work in arithmetic, but very little is known of their use of counting boards. The Romans, with their interest in politics and in conquest, contributed very little to the advancement of mathematics; in fact, after the fall of the Roman Empire came the Dark Ages during which progress along mathematical lines was meager.

Not until the sixteenth century do we again pick up the thread of the history of counting boards. About 1543, Robert Recorde, a physician and scientist, wrote one of the first English arithmetic books. This volume contained an exposition upon the counting board and its use. It is from this treatise that the following information about the operation of one type of board is obtained.

Before the methods of computation on the counting board can be explained, it must be stated that there are two simple arithmetical tools which have been understood by man since the time of the Egyptians, and which are basic to the operation of the board. One is the principle of multiplication and division by two, and the other is the multiplication table.

The counting board has a system of parallel lines marked off on it, each line having a definite meaning corresponding to the idea of place value in the construction of a number (Figure 1). To be more precise, a counter on a line indicates one magnitude designated by that line; a counter in a space between the lines denotes five times the unit magnitude corresponding to the line below. Thus, a counter on the unit line and one in the space above would represent a sum total of six units; three counters on the tens line and one in the space above would denote eight tens; so the number represented in Figure 2 is 86. The counting board is marked off into several sections called rooms in which the various numbers involved in a computation are placed.

The first fundamental operation to be explained will be addition. For an example, let us add 2659 and 8342. In the first room, let us place 2659 (Figure 3) by putting four

counters on the units line and one in the space above, one counter in the space above the tens line, one counter on the hundreds line and one in the space above, and two counters on the thousands line. In a like manner, let us place 8342 in the second room (Figure 3). The first step in addition is to collect all the unit counters and place them in the next room. Since there are eleven, we will place one on the units line and one on the tens line (Figure 4). Next, we collect all the counters denoting tens of which there are nine, and with the one from the preceding step, we may place one counter on the hundreds line (Figure 5). Likewise collecting the hundreds counters, we have nine and then one from the preceding step; so we move a counter to the thousands line (Figure 6). Lastly, collecting the counters on the thousands line, we have ten, for which we place one counter on the ten thousands line (Figure 7). Now we may read our answer, 11,001.

Let us now proceed to subtraction. As an example of this process, 2892 will be subtracted from 8746. The first step is to place the subtrahend in the first room and the minuend in the second in a manner similar to that already employed in addition (Figure 8). In the subtraction process, the computer may start either with the lowest unit and work to the highest or with the highest unit and work to the lowest. Since, however, the latter method seemed to be the more acceptable in Recorde's arithmetic, that is the one which will be explained here. First, we will take two in the thousands position from eight, leaving six thousands (Figure 9). Going to the hundreds line, we must now take eight from seven. To perform this operation, we must borrow one from the line above, leaving one counter in the thousands space; then taking eight from seventeen, we have nine, which we represent on the hundreds line and space (Figure 10). Proceeding to the tens position, we must take nine from four. Again we borrow one from the line above, and subtracting, we obtain five tens (Figure 11). Finally on the units line, we subtract two from six and have four count-

ers left (Figure 12). Now we may read our answer, 5854.

The next operation to be demonstrated is multiplication. For an example, let us multiply 542 by 365. The multiplier is placed in the first room, and the multiplicand is written in the second (Figure 13). We begin by multiplying 500 by 365; this operation is performed by multiplying half of 365 (which is 182 if the fractional remainder is ignored) by 1000 to obtain 182,000. This number is placed in the third room. Then taking care of the half of a thousand which was disregarded in the last step, we move a counter into the proper space into the third room to represent the 500. All of this is summarized in Figure 14. Next, 365 is multiplied by 40 by saying that 4 times 300 is 1200; 4 times 60 is 240; and 4 times 5 is 20; this provides a total of 1460 tens, which appears in the fourth room (Figure 15). At this point, the two partial products so far obtained are added in the manner previously described; the total of 197,100 is represented in the fifth room (Figure 15). Now multiplying 365 by 2, we have 2 times 300 is 600; 2 times 60 is 120; and 2 times 5 is 10; this total of 730 units is placed in the sixth room (Figure 16). Upon adding the numbers in the fifth and sixth rooms, the desired answer, 197,830, is obtained.

The process of division will not be explained since it is merely the inverse of multiplication.

The counting board was found to be very useful in business transactions. For such computations, the counters were used on boards laid flat like table tops, and it is from this use that the present meaning of the word "counter" is derived.

The earliest calculating machine was invented by Pascal in 1641, less than one hundred years after Recorde's description of the counting board was written. The machine was designed to perform only addition. Three models of this machine are kept in the Museum of Arts and Sciences in Paris. In 1694, Leibnitz conceived the idea of attaching to a machine of this sort a device for repeating addition so as to accomplish multiplication. In 1887, Bollee exhibited

at the universal exhibition in Paris a machine which multiplied by the use of the principle of the multiplication table.

Today, mechanical devices for computation are in wide usage, and are acknowledged as being indispensable in the business and scientific world. It is interesting to note, however, that in some parts of China, Russia, and Japan counting boards, such as those described in this article, are still being used.

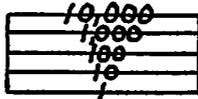


Fig. 1

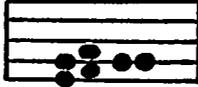


Fig. 2



Fig. 3

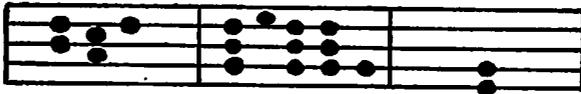


Fig. 4

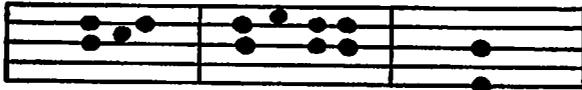


Fig. 5



Fig. 6



Fig. 7



Fig. 8

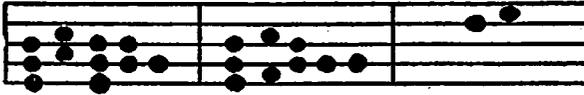


Fig. 9



Fig. 10



Fig. 11



Fig. 12



Fig. 13



Fig. 14

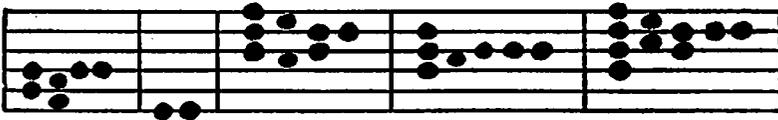


Fig. 15



Fig. 16

A Kappa Mu Epsilon Project

Last spring several chapters of Kappa Mu Epsilon made contributions to assist Señor Bernardo I. Baidaff in the publication of the *Boletín Matemático*, one of the few mathematical journals published in South America. Señor Baidaff has experienced some difficulty in financing the publication. Dr. C. V. Newsom, editor of the PENTAGON, sent a letter to Señor Baidaff containing a bank draft for the amount contributed. By an odd coincidence, the letter arrived in Buenos Aires on the twenty-fifth of May, an important date in the history of Argentina since on May 25, 1915, the "A. B. C. Pact" was signed. In the *Boletín Matemático* for May, 1942, Señor Baidaff devoted several pages to an expression of his gratitude for the unexpected gift. He wrote in part:

I take this extraordinary occasion to express to my friend Newsom and to other friends in that country my most sincere and deep gratitude.

Members of Kappa Mu Epsilon can take the next step by subscribing to Dr. Baidaff's fine journal. The predominant language employed in the magazine is Spanish, and many mathematicians will welcome the opportunity to become acquainted with that language.

The Number System of Three Southwestern Indian Tribes

H. C. WHITENER ¹

The development of mathematical systems among the Indians of the southwestern part of the United States has reached only an elementary state. In fact, counting is frequently still accomplished by the primitive "finger method." Only the simple operations upon numbers are understood. Few of the systems used by Indians provide for more than addition and subtraction. Even when the process of multiplication appears to be known, its use is limited. There is no development of the idea of division although all tribes do have the fraction $\frac{1}{2}$.

The Navajos and Apaches use a number system constructed upon a decimal base, while the pueblo tribes are divided into two groups, one using a decimal system, the other a system built upon the base five. At times, members of this last group count upon the fingers of both hands. An examination of typical number systems might be of interest.

The number system employed by the pueblo tribe living in the "Sky City" of Acoma is displayed below:

- | | |
|--------------------------------|----------------------------|
| 1. ish'ke | 11. katsi ish'ke tsitra |
| 2. dyu, or dyumi | 12. katsi dyu tsitra |
| 3. chami | 13. katsi chami tsitra |
| 4. tyana | 14. katsi tyana tsitra |
| 5. taama | 15. katsi taama tsitra |
| 6. sh'chisa | 16. katsi sh'chisa tsitra |
| 7. maetyana | 17. katsi maetyana tsitra |
| 8. kokomishu | 18. katsi kokomishu tsitra |
| 9. mayuka | 19. katsi mayuka tsitra |
| 10. katsi | 20. dyu ya katsi |
| 21. dyu ya katsi ish'ke tsitra | |
| 22. dyu ya katsi dyu tsitra | |

¹ H. C. Whitener is a well known student of the Indian languages. He recently translated much of the New Testament into several Indian languages under the auspices of the American Bible Society.

23. dyu ya katsi chami tsitra
 30. chami ya katsi
 31. chami ya katsi ish'ke tsitra
 32. chami ya katsi dyu tsitra
 40. tyana wa katsi
 (Note the euphonic change of *ya* to *wa*.)
 41. tyana wa katsi ish'ke tsitra
 50. taama wa katsi
 60. sh'chisa wa katsi
 70. maetyana wa katsi
 80. kokomishu wa katsi
 90. mayuka wa katsi
 100. katsi wa katsi
 101. katsi wa katsi ish'ke tsitra
 110. katsi wa katsi si dyu katsi (tsitra)
 111. katsi wa katsi si dyu katsi ish'ke tsitra
 120. katsi wa katsi si dyu dyu ya katsi
 121. katsi wa katsi si dyu dyu ya katsi ish'ke tsitra
 200. dyu ya katsi wa katsi
 300. chami ya katsi wa katsi
 400. tyana wa katsi wa katsi
 500. taama wa katsi wa katsi

Most of the pueblo tribes now use *mīl*, of Spanish origin, to mean a thousand, and, although the Acoma tribe would understand *katsi wa katsi wa katsi*, to mean the same thing, it is not in common usage.

The numbers employed by the Indians of Zuni pueblo are given below. Close scrutiny of the system will reveal that, in a sense, it is a hybrid of bases five and ten.

- | | |
|--|----------------|
| 1. topin'te | 6. topa-lekya |
| 2. kwili | 7. kwili-lekya |
| 3. hai | 8. hai-lekya |
| 4. awite | 9. tena-lekya |
| 5. ap'te | 10. as'temhla |
| 11. as'temhla n' topa (or topin'te) yahlto | |
| 12. as'temhla n' kwili yahlto | |
| 13. as'temhla n' hai yahlto | |
| 14. as'temhla n' awite n' yahlto | |
| 15. as'temhla n' ap'te n' yahlto | |

16. as'temhla n' topa-lekya yahlto
17. as'temhla n' kwili-lekya yahlto
18. as'temhla n' hai-lekya yahlto
19. as'temhla n' tena-lekya yahlto
20. kwilikya n' as'temhla
21. kwilikya n' as'temhla n' topa (or topin'te)
yahlto
22. kwilikya n' as'temhla n' kwili yahlto
23. kwilikya n' as'temhla n' hai yahlto
24. kwilikya n' as'temhla n' awite n' yahlto
25. kwilikya n' as'temhla n' ap'te n' yahlto
26. kwilikya n' as'temhla n' topa-lekya yahlto
27. kwilikya n' as'temhla n' kwili-lekya yahlto
28. kwilikya n' as'temhla n' hai-lekya yahlto
29. kwilikya n' as'temhla n' tena-lekya yahlto
30. haikya n' as'temhla
40. awite nakya n' as'temhla
50. ap'te nakya n' as'temhla
60. topa-lekya ma as'temhla
70. kwili-lekya ma as'temhla
80. hai-lekya ma as'temhla
90. tena-lekya ma as'temhla
100. asi-as'temhla
101. asi as'temhla n' topa yahlto
102. asi-as'temhla n' kwili yahlto
110. asi-as'temhla n' as'temhla yahlto
111. asi-as'temhla n' as'temhla n'topin'te yahlto
120. asi-as'temhla n' kwilikya n' as'temhla
121. asi-as'temhla n' kwilikya n' as'temhla n'
topin'te yahlto
130. asi-as'temhla n' haikya n' as'temhla
200. kwilikya n' asi-as'temhla
300. haikya n' asi-as'temhla
400. awitenakya n' asi-as'temhla
500. ap'tenakya n' asi-as'temhla
600. topa-lekya m' asi-as'temhla
700. kwili-lekya m' asi-as'temhla
800. hai-lekya m' asi-as'temhla
900. tena-lekya m' asi-as'temhla
1000. topin'te mihl
1001. mihl tea n' topin'te yahlto

- 2000. kwili mihl
- 3000. hai mihl
- 4000. awite n' mihl
- 5000. ap'te n' mihl
- 6000. topakya mihl
- 7000. kwili-lekya mihl
- 8000. hai-lekya mihl
- 9000. tena-lekya mihl

- 10,000. as'temhla mihl
- 10,001. as'temhla mihl tea n' topinte yahltó

A study of the Navajo's number system reveals the contrast between their language and the language of the Pueblo Indians. The "words" of the Navajo language are really compounds of monosyllables; while the Pueblo Indians employ polysyllabic words. The first ten numbers of the Navajos appear to possess basic meanings having to do with counting upon the fingers, but the origin of many syllables is vague. The interesting Navajo system is displayed below:

- | | |
|------------------|-------------------------------------|
| 1. t'a h-lai | 15. a sh'dla a da |
| 2. nak'i | 16. ha s' tan a da |
| 3. tha | 17. tso s' ts' id tsa da |
| 4. din | 18. tsebi tsa da |
| 5. a sh'dla | 19. na ha s' te' i tsa da |
| 6. ha s' tan | 20. na din |
| 7. tso s'ts'id | 21. na din hla, or, do ba an hla |
| 8. tsebi | 22. na din nak'i |
| 9. naha s' te' i | 23. na din tha |
| 10. nez na | |
| 11. h-la tsa da | 30. tha din |
| 12. nak'i tsa da | 31. tha din do ba an t' a hlai |
| 13. tha tsa da | 32. tha din do ba an na k' i |
| 14. din tsa da | 33. tha din do ba an tha |
| | |
| | 40. diz din, or, din si din |
| | 50. a sh' dla din |
| | 60. ha s'tha din |
| | 70. tso s' tsid din |
| | 80. tsebi din |
| | 90. na ha s' tei |
| | |
| | 100. nez na din |
| | 101. nez na din do ba an t' a hla i |

- 200. na k' i di nez na din
- 300. tha di nez na din
- 400. din di nez na din
- 500. a sh' dla di nez na din
- 600. ha s' ta di nez na din
- 700. tso s'tsid di nez na din
- 800. tsebi di nez na din
- 900. na ha s' te' i di nez na din

For 1,000, some Navajos use the Spanish, *mil*, but it is probable that most of them would understand *nez na di nez na*, although a thousand is so great a quantity as to be almost incomprehensible to them.

The Mathematical Scrapbook

Next to the originator of a good sentence is the first quoter of it.—Emerson.

Since antiquity, mathematics has been regarded as the most indispensable school for philosophic thought and in its highest spheres the research of the mathematician is indeed most closely related to pure speculation. Mathematics is the most perfect union between exact knowledge and theoretical thought.—E. Curties.

= ∇ =

Algebra is generous; she often gives more than is asked of her.—D'Alembert.

= ∇ =

Geometrical truths are in a way asymptotes to physical truths, that is to say, the latter approach the former indefinitely near without ever reaching them exactly.—D'Alembert.

= ∇ =

Scientific subjects do not progress necessarily on the lines of direct usefulness. Very many applications of the theories of pure mathematics have come many years, sometimes centuries, after the actual discoveries themselves. The weapons were at hand, but the men were not able to use them.—A. R. Forsyth.

= ∇ =

Mathematics is one of the oldest of the sciences; it is also one of the most active, for its strength is the vigour of perpetual youth.—A. R. Forsyth.

= ∇ =

The intrinsic character of mathematical research and knowledge is based essentially on three properties: first, on its conservative attitude towards the old truths and discoveries of mathematics; secondly, on its progressive mode of development, due to the incessant acquisition of new knowledge on the basis of the old; and thirdly, on its self-

sufficiency and its consequent absolute independence.—H. Schubert.

= ∇ =

Every mathematical book that is worth reading must be read “backwards and forwards,” if I may use the expression. I would modify Lagrange’s advice a little and say, “Go on, but often return to strengthen your faith.” When you come on a hard or dreary passage, pass it over; and come back to it after you have seen its importance or found the need for it further on.—George Chrystal.

= ∇ =

I have hardly ever known a mathematician who was capable of reasoning.—Plato.

The mathematician has reached the highest rung on the ladder of human thought.—Ellis.

= ∇ =

There was a young student of Trinity
Who found the square root of infinity,
But in writing his digits
He soon got the fidgets,
Dropped science and took up divinity.

= ∇ =

Mathematics takes us into the region of absolute necessity, to which not only the actual world, but every possible world, must conform.—B. Russell.

= ∇ =

Every science has a mathematical part, a branch of work which the mathematician is called in to do. We say, “Here, mathematician, suppose such and such to be the case. Never you mind whether it is really so or not: but tell us, supposing it to be so, what will be the consequence?”

The business of the mathematician is to frame an arbitrary hypothesis, which must be perfectly distinct at the outset, so far, at least, as concerns those features of it upon which mathematical reasoning can turn, and then to deduce from this hypothesis such necessary consequences as can be drawn by diagrammatical reasoning.

Mathematics makes no external observations, nor asserts anything as a real fact. When the mathematician deals with facts, they become for him mere hypotheses; for with their truth he refuses to concern himself.

I consider that the business of drawing demonstrative conclusions from assumed premises, in cases so difficult as to call for the services of a specialist, is the sole business of the mathematician.

Mathematics is the study of what is true of hypothetical states of things. That is its essence and definition.—C. S. Peirce.

= ∇ =

This war is dominantly one of ideas. It can be successfully waged only by the complete use of brains and technological knowledge combined with mechanical instruments of war. Peace-time methods impose artificial limitations upon production of new scientists which in view of the continuing urgency must be removed. Independence of thought and action form a requisite part of any such program—each man represents a newly modified model as he leaves the academic production line. On that production line must be applied the most skilful teaching which science has ever had. Formulae which have been rigidly adhered to must be re-evaluated and discarded if they can not be fitted to new conditions. Each man on the instruction assembly line must treat his product with respect to its own particular idiosyncrasies—the assembly line expert will not exercise his own. Standards and inspections must be rigid with a degree of flexibility at all other points. It is here that real teachers are needed, and it is here that the common methods of rote instruction must give away.—John S. Nicholas, National Research Council Representative on the National Roster of Scientific and Specialized Personnel.

= ∇ =

I evaluate the pure mathematical needs of the various Army and Navy services as follows, if we eliminate the

requirements of those exceptional officers whose work can be designated as military research.

First, the lowly but important infantry, motorized or not. Even this branch of the Army places demands on mathematics. All enlisted men in the infantry find use for arithmetic and intuitional geometry. The officers, non-commissioned officers and privates first-class should have familiarity with elementary geometry to permit map reading, map construction, appreciation of contour designations on maps, the use of coordinate systems. These men also should be able to appreciate the complicated mechanical drawings and the internal workings of the rifles, light anti-aircraft guns, and other material assigned to the infantry. In brief, for these men I would specify elementary algebra and geometry as frequently taught in training for industry. In addition the officers should have some acquaintance with the notions of probability and probable error as met in elementary statistics.

Second, the Coast Artillery Corps. This exceedingly mathematical branch includes all artillery for seacoast defense, all high altitude anti-aircraft artillery, and all mobile artillery of heavy caliber. The officers of this corps have to perform the duties of surveyors on some occasions, and they deal with very complex optical instruments, motorized machinery, and complicated guns. These men should have very strong training in mathematics—in fact they should be engineering graduates as the most desirable stipulation. But, as a minimum, they must know mathematics through computational plane trigonometry, and elementary spherical trigonometry, and some background in solid geometry. They should also have an acquaintance with the notions of probability and probable error as met in elementary statistics, in order to appreciate the theory of gunfire. All enlisted men should have a background of geometric and algebraic knowledge equivalent to the training suitable for skilled workers in industry. In addition, about 25 per cent of the

enlisted men should be as well qualified mathematically as the officers.

Third, the field artillery, or light artillery. We can make the same minimum stipulations for mathematical training as in the Coast Artillery with the omission of mention of spherical trigonometry, and with somewhat less insistence on the need for mathematics in the case of enlisted men.

Fourth, the signal corps. The officers should be electrical engineers and the enlisted men should have the mathematical training suitable for skilled men in industry.

Fifth, the Ordnance Dept. It needs various specialists, both officers and enlisted men, with highly mathematical backgrounds such as possessed by engineering graduates or college majors in mathematics.

Sixth, Flying officers in the air-force of the Army and Navy, and all other officers in the Navy. They require at least the same minimum training as officers of the Coast Artillery, because of the necessity for studying navigation, aerodynamics, meteorology, and numerous other technical subjects. In fact, it bewilders a civilian who has seen the workings of a warship, to conceive of any Navy officer who is not a trained engineer. These officers of the air-force and Navy should have substantial courses in solid geometry and spherical trigonometry, far beyond what is satisfactory for the artillery service.

Seventh, the ground force of the air-force. It requires a large number of graduate engineers, men with college mathematics and physics especially for the meteorology section, and a large force of men with mathematical backgrounds suitable for skilled industry.

Eighth, enlisted men in the Navy. All of them should have the mathematics suitable for skilled workers in industry. A substantial number of the enlisted men should be as well qualified as stipulated in the description of *minimum* mathematics for the officers.—Marston Morse, Chairman of

the War Preparedness Committee of the American Mathematical Society and the Mathematical Association of America.

= ∇ =

The whole art of teaching is only the art of awakening the natural curiosity of young minds for the purpose of satisfying it afterwards.—Anatole France.

= ∇ =

Let $f(x)$ be a polynomial of degree n having the n distinct roots a_1, a_2, \dots, a_n . Then it can be shown that:

$$\sum_{i=1}^n \frac{f''(a_i)}{f'(a_i)} = 0.$$

Can you demonstrate this?

= ∇ =

A geometrical theorem important in the mathematical theory of artillery fire is known as Miquel's Theorem. The theorem pertains to a triangle which we shall designate as $a'b'c'$. On $b'c'$ select a point a , on $c'a'$ a point b , and on $a'b'$ a point c . Each of the three sets of points, $a'bc$, $ab'c$, and abc' , has a unique circle associated with it which may be determined as follows. If neither b nor c coincides with a' , the three points $a'bc$ form a triangle whose circumcircle is the desired circle. If b coincides with a' but c does not, the desired circle is the one through c tangent to $c'a'$ at a' . If both b and c coincide with a' , the desired circle is the point circle a' .

Miquel's Theorem then states: *The three circles $a'bc$, $ab'c$, abc' have a point in common.*

The proof involves only elementary mathematics.

= ∇ =

Buffon considered the problem of tossing a needle upon the floor, the length of the needle being shorter than the width of the lumber used in the floor. He was able to show that π could be computed by observing the manner in which

the needle fell on the floor over a large number of tosses. In fact, he demonstrated that

$$\pi = 2L/pw,$$

where L is the length of the needle, w is the width of the flooring, and p is the probability that the needle will fall across a crack between two strips of flooring. Of course, the probability p must be obtained empirically after observing the result of making numerous tosses of the needle.

= ▽ =

If all of the people in St. Louis were to congregate in one place and get intensely drunk, and if they then tried to find their way home by trial and error, the probability that no one would reach his own house is approximately $1/e$.

= ▽ =

There are just three proper fractions with denominators less than 100, which may be reduced to lowest terms by illegally cancelling a digit. They are as follows:

$$26/65 = 2/5, \text{ by cancelling the 6's.}$$

$$16/64 = 1/4, \text{ by cancelling the 6's.}$$

$$19/95 = 1/5, \text{ by cancelling the 9's.}$$

= ▽ =

FALLACIES

1. To prove: $1 = 2$.

Let us begin with the equality,

$$1 - 3 = 4 - 6.$$

Adding $9/4$ to each member of the equation, we obtain:

$$1 - 3 + 9/4 = 4 - 6 + 9/4.$$

Then each side of the equation is a perfect square, so

$$(1 - 3/2)^2 = (2 - 3/2)^2.$$

Taking the square root of each member, we obtain:

$$1 - 3/2 = 2 - 3/2.$$

Adding $3/2$ to each member, we have

$$1 = 2. \text{ q.e.d.}$$

2. To prove $5 = 9$.

Let us begin with the equation,

$$10x - 35 = 18x - 63.$$

Factoring each member, we have

$$5(2x - 7) = 9(2x - 7).$$

Dividing each member by $(2x - 7)$, we obtain:

$$5 = 9. \text{ q.e.d.}$$

3. To prove: $0 = 1$.

Consider $\int dx/x$. Let us integrate by parts. If $u = 1/x$, then $du = -dx/x^2$; if $dv = dx$, then $v = x$.

We have, then,

$$\int dx/x = x/x + \int x dx/x^2 = 1 + \int dx/x.$$

Subtracting $\int dx/x$ from each member, we obtain

$$0 = 1. \text{ q.e.d.}$$

$$= \Delta =$$

NUTS

Three sailors, Timothy Small-fry, Titus Half-pint, and Thomas Napoleon Tuggles (affectionately known as T. N. T.), were shipwrecked on the desert isle of Nobodythere. In order to provide food for themselves, they decided to pick coconuts. A kind hearted monkey, watching their awkward attempts to climb the palm trees, offered his assistance in the project. The three men and the monkey worked until it grew dark. With a last wistful glance at the pile of coconuts, each man, exhausted by his efforts, fell asleep upon the grass.

Shortly before dawn, Timothy awoke and looked at the pile of coconuts. Realizing that he was the smallest man of the three, he began to fear that the other two might conspire against him to deprive him of his just share. He decided that he should take out his share of the coconuts before the others awoke. Creeping stealthily to the pile, Timothy began dealing the coconuts out into three stacks. When he had divided the whole pile into three equal shares, he had

one coconut left over. Timothy rolled this one into the bushes for the monkey. With a furtive glance over his shoulder, the little man hid his share and then rolled the other two stacks back together. Going back to his tuft of grass and lying down, he was soon fast asleep.

Not many minutes passed before Titus stirred in his sleep, and then he sat bolt upright with the awful realization that, if he waited until morning to get his share of the fruit, Timothy and T. N. T. might agree to rob him of his part. Hastily, but quietly, he made his way to the pile left by Timothy. After he had divided this heap into three equal stacks, he also had one coconut left over, and this he contributed to the monkey. Titus then hid his share, rolled the remaining coconuts together, and retired to sleep again in peace.

A little later, T. N. T. awoke and began thinking about the pile of fruit. Since he was such a big man, he knew he would need all of his third to keep himself alive. Just to make perfectly sure that Timothy and Titus, puny though they were, did not cheat him, he decided to take out his share of the fruit at once. The brawny fellow hurried to the stack of coconuts. It seemed to him that the pile was smaller than it had been when he had gone to sleep, but he attributed the seeming change to the darkness, for he did not consider either Timothy or Titus wily enough to have had a thought similar to his own. Carefully he separated the coconuts into three equal piles, and found that he had one coconut left. Just as the others had done, T. N. T. rolled this one into the bushes for the monkey, hid his own share, rolled the other two stacks together, and went back to sleep.

At dawn, when all were awake, the three sailors went together to the considerably diminished pile of coconuts. No one said anything about the obvious decrease in size of the pile because each believed his own act to be the cause. The guilty looks of the three were thus mutually unnoticed. Working together, it did not take them long to divide the small pile equally between them. In fact, the number of

coconuts in the pile was divisible by three, so all the men were satisfied.

Whether or not the men survived on their diet of coconuts is not known, but the total number of coconuts picked by the three men and the monkey can be evaluated. Can you construct a formula which will provide all the numbers which satisfy the conditions of the problem?

Kappa Mu Epsilon News

Chapter 1. OKLAHOMA ALPHA, Northeastern State College, Tahlequah, Oklahoma.

President Eratosthenes -----Mr. Leon Pense
Vice-President Napier -----Miss Marion Bogan
Secretary Bernoulli -----Miss Henrietta Stolper
Treasurer Leibnitz -----Miss Cleo Gray
Secretary Descartes ----Miss Mary Katherine Stewart
Faculty Sponsor -----Mr. L. P. Woods

Several former members of Oklahoma Alpha Chapter now hold teaching positions. H. N. Carter is teaching mathematics in Tulsa, Oklahoma. J. N. Haggard is professor of mathematics at Connor's State College, Warner, Oklahoma. O. D. Crane, Harmon Reeder, and Leo Harmon are all teaching radio in Lexington, Kentucky. W. W. Donnan, acting president of Bacon College, Muskogee, Oklahoma, is now doing graduate work at the University of Oklahoma.

A great number of former students are now in various branches of the service. Noble Bryan, a Boeing engineer, is in the Navy teaching mathematics. Jack Brown, Lieutenant in the Navy, has been assigned to the U. S. S. Cleveland. Bill Mitchell is an officer in the Navy. Dr. Larry Southworth is in the Naval Academy at Annapolis. Dan McDonald, a meteorologist, was in Trinidad when the chapter last received news of him. Albert Goodall is an officer in the U. S. Army Radio Service.

Lieutenant Richard M. Wood has been reported lost in action. At the time he was lost, he was a bombardier somewhere in the Pacific. Oklahoma Alpha wishes to pay the highest of tribute to this fine young man.

Oklahoma Alpha recognizes its debt of gratitude to Dr. Katherine Wyant for effecting the national organization of Kappa Mu Epsilon from the campus of Northeastern State

College in Tahlequah, Oklahoma. The chapter members wish to express their sincere appreciation for her untiring efforts in behalf of Kappa Mu Epsilon. The national organization, and especially the Oklahoma Alpha Chapter, experiences a great loss in the death of Dr. Wyant.

Chapter 2. IOWA ALPHA, Iowa State Teachers College, Cedar Falls, Iowa.

President Pascal	_____	Mr. Milton Moon
Vice-President Archimedes	_____	Miss Dorothy Clark
Secretary Leibnitz	_____	Miss Lucile Houston
Treasurer Gauss	_____	Mr. Charles Bennett
Secretary Descartes	_____	Mr. H. Van Engen
Faculty Sponsor	_____	Mr. H. Van Engen

Besides holding quarterly meetings for informal and formal initiations during the 1941-42 academic year, Iowa Alpha met to discuss the following topics: "The Use of Simultaneous Linear Equations in Code Systems," led by Dr. H. C. Trimble of the Department of Mathematics; "Frequency Modulation in Radio," led by Mr. Robert Skar, Jr. I. S. T. C.; and "Meteorology," led by Dr. E. J. Cable of the Science Department. The active membership of this chapter is the smallest that it has been in its entire history. The war effort can definitely be held accountable for this decrease.

Chapter 3. KANSAS ALPHA. Kansas State Teachers College, Pittsburg, Kansas.

President Archimedes	_____	Mr. W. Harvey Lanier
Vice-President Plato	_____	Mr. Billie Sherwood
Secretary Lagrange	_____	Miss Helen Kriegsman
Treasurer Thales	_____	Miss Martha Ruth Howard
Secretary Descartes	_____	Mr. W. H. Hill
Faculty Sponsor	_____	Mr. J. A. G. Shirk

Professor R. W. Hart of the Mathematics Department received a commission in the Navy on August 25, 1942. He

is now stationed at Northwestern University where he is an instructor in the Midshipman School.

Chapter 4. MISSOURI ALPHA, Southwestern Teachers College, Springfield, Missouri.

President Archimedes	-----	Miss Reba Christine Radley
Vice-President Galileo	-----	Miss Helen Anderson
Secretary Ahmes	-----	Miss Geraldine Holm
Treasurer Napier	-----	Mr. W. J. Compton
Secretary Descartes	-----	Mr. Carl V. Fronabarger
Faculty Sponsor	-----	Mr. L. E. Pummill

Missouri Alpha met the last week in September to elect officers and to discuss activities for the coming year. Reba Christine Radley, president for the term 1941-42, was elected to fill the vacancy in the office of president for 1942-43, created when Robert Karch, the president elect, joined the Army Air Corps. The chapter is proud of the high percentage of Kappa Mu Epsilon members among those students graduating with high distinction. All but one of the entire number of high honor graduates in the spring were members of Kappa Mu Epsilon. These students were as follows: Isabella Burdick, who is now teaching at Willard, Missouri; John Ellis, who is at Annapolis, Maryland in training for a reserve commission; Mrs. Georgia York Calton who is now at Joplin, Missouri; and Harold Skelton, who is in officers' training in the Navy; Martha Lou Morris, who graduated with high distinction in the summer of 1942, is teaching at Stoutland, Missouri.

Chapter 5. MISSISSIPPI ALPHA, Mississippi State College for Women, Columbus, Mississippi.

President Gauss	-----	Miss Love McKinstry
Vice-President Stevin	-----	Miss Willie Love Trotter
Secretary-Treasurer Desargues	-----	Miss Alice Hamer
Secretary Descartes	-----	Mr. R. L. Grossnickle

Faculty Sponsor ----- Mr. R. L. Grossnickle
Historian Sanford ----- Miss Emily Gilmore

Annie Dorman, who was president of Mississippi Alpha last year and who graduated Magna Cum Laude, is now studying at Louisiana State University on a fellowship. Jessie Grossnickle, Magna Cum Laude graduate of 1940, is teaching at Texas State College for Women. Pat Kelly graduated with honors last spring, and now is working for the government in the Engineering Department. Several former members of this chapter hold positions in the Statistical and Cryptological Departments of the Federal Government. Mathematics and science courses at Mississippi State College for Women have an increased enrollment over last year.

Chapter 6. MISSISSIPPI BETA, Mississippi State College, State College, Mississippi.

Chapter 7. NEBRASKA ALPHA, Nebraska State Teachers College, Wayne, Nebraska.

President Leibnitz ----- Miss Margie Morgan
Vice-President Archimedes ----- Mr. Orin Currie
Secretary Galileo ----- Mr. Dean Jensen
Treasurer Einstein ----- Mr. Robert Westphal
Secretary Descartes ----- Miss E. Marie Hove
Faculty Sponsor ----- Miss E. Marie Hove
Historian Pascal ----- Mr. Dean Sandahl

For the past year, the programs of Nebraska Alpha have centered around mathematics as related to the war. Two former members, now in the service, spoke to the group. Ensign Jim Ahern spoke on engineering, and Ensign Donald Peterson told of his work in the Navy Air Force.

Robert Dale, Eugene Everson, Donald Strahan, and Russell Vlaanderen are cadets in the Army Air Force studying meteorology at the University of Chicago. Ensign Jim Ahern, having finished the Deisel Engineering Course at

Cornell University, is now at the Submarine School at New London, Connecticut. Ensign Donald Peterson is instructor at the Naval Air Base, Corpus Christi, Texas. Lieutenant Gerald Wright, upon completion of his work at Scott Field, was sent to Harvard for advanced work in radio, and now is studying radio at the Massachusetts Institute of Technology. Ensign Eugene Huntmer was graduated from Annapolis in June, and is now with the Pacific Fleet. Ensign Quentin Whitmore is now attached to the Air Arm of the Pacific Fleet; he returned to Wayne, Nebraska for a few days in October, and while here he spoke at a meeting sponsored by Kappa Mu Epsilon. Lieutenant Merlin Pad-dock was promoted from lieutenant junior grade to lieutenant at Pearl Harbor; he has been transferred to flight training in the Navy, and is again in the United States. Corporal Robert Henderson has received a transfer from the Infantry to the Air Corps, and will study at Chanute Field to become an Air Corps engineer.

Chapter 8. ILLINOIS ALPHA, Illinois State Normal University, Normal, Illinois.

President Gauss	Miss Mary M. Underwood
Vice-President Pascal	Mr. Robert De Barr
Secretary Ahmes	Miss Mildred Bauer
Treasurer Napier	Mr. Harold Gambrel
Secretary Descartes	Mr. C. N. Mills
Faculty Sponsor	Miss Edith Irene Atkin
Social Chairman Lilavati	Miss Amber Grauer
Historian Cajori	Mr. Robert Weeks

Of the one hundred fifteen men who are alumni members of Illinois Alpha, the organization has a record of forty-four who are in some branch of the United States armed forces, or who are serving as civilian instructors in army schools, or who are engaged in research work for the government war program. Several other former members are working in defense plants and have been deferred by their draft boards because their work is essential to the war effort.

Two women alumnae are civilian instructors in army radio schools. Harold Gambrel, who was to have been treasurer for 1942-'43, and Robert Weeks, who was to have been historian, have both left Illinois State Normal to join the army.

Committees are at work making preparations for the annual home-coming breakfast, to be held on October 17.

Chapter 9. KANSAS BETA, Kansas State Teachers College, Emporia, Kansas.

- President Pascal ----- Mr. Wilbur W. Shoof
- Vice-President Gauss ----- Mr. Ralph W. Hubbard
- Secretary Eratosthenes ----- Miss Mary L. Townsend
- Treasurer Bhaskara ----- Miss Virginia L. Atkinson
- Secretary Descartes ----- Mr. Charles B. Tucker
- Faculty Sponsor ----- Miss Lenore Stenzel

The following members of Kansas Beta are either in civil service or in the military forces:

- | | |
|-----------------|---------------|
| Dalton Anderson | Edwin Provost |
| Harold Bird | Keller Reeble |
| Dale Garton | John Roby |
| Merton Hoch | Wayne Thomas |
| Virgil Kinnamon | John Writt |

Those engaged in research at various universities and industrial plants are as follows:

- Vernon Boger ----- Goodrich Company
- Aldro Bryan ----- Northwestern University
- Frank Faulkner ----- Brown University
- John Malik ----- University of Michigan
- Harold McFarland ----- University of Wisconsin
- Worth Seagondollar ----- University of Wisconsin
- Glenn Sheppard ----- Radio Corporation of America
- Hoyt Warren ----- Radio Corporation of America
- John Zimmerman ----- University of Illinois

Chapter 10. ALABAMA ALPHA, Athens College, Athens, Alabama.

President Carmichael	Miss Opal Ivaree Whillen
Vice-President Dickson	Miss Thelma Avis Long
Secretary Hedrick	Miss Hazel Ruth Harrison
Treasurer Veblen	Miss Annis Leanna Gunter
Secretary Descartes	Miss Mary E. Renich
Faculty Sponsor Wyant	Mr. W. R. Hale

During the summer quarter of 1942, Dr. W. R. Hale accepted the position as head of the Department of Mathematics at Athens College. He is to be initiated into Kappa Mu Epsilon sometime in October, and he has consented to act as faculty sponsor of the group. As our active membership has suffered a great decrease on account of the war effort, there are only five students who will be eligible for active membership at the close of the present quarter.

Alabama Alpha has the sad news for all members of Kappa Mu Epsilon that Dr. Kathryn Wyant, founder of Kappa Mu Epsilon, passed away in Athens upon Thursday evening, July 16, at 9:55.

Chapter 11. NEW MEXICO ALPHA, University of New Mexico, Albuquerque, New Mexico.

President Benjamin Peirce	Miss Ruth Ford
Vice-President E. H. Moore	Mr. Nick Abourezk
Secretary Cajori	Miss Merle Mitchell
Treasurer Bocher	Mr. Charles B. Barker
Secretary Descartes	Miss Eupha Buck
Faculty Sponsor	Miss Eupha Buck

Steve Reynolds, who was initiated into New Mexico Alpha in 1937, is now assistant professor of mechanical engineering at his Alma Mater. Maynard Meuli, class of 1938, was in the Philippine Islands with the 200th Coast Artillery. Vincent Brunelli, class of 1941, is a lieutenant in the United States Marine Corps; at the time of receiving

his commission, he ranked highest among 1700 men. John Coy, president of New Mexico Alpha last year, is in training at Scott Field, Illinois, as radio instructor for the Army Air Corps. Anna Vallevik, class of 1940, is assistant instructor in the chemistry department at U. N. M. Lincoln Koch, class of 1936, is stationed at Norfolk, Virginia, as an instructor in the Naval Air Force. According to a news release from Westinghouse Electric and Manufacturing Company, Pittsburgh, Penn., Albert Ford, Jr., and John F. Nicholas, both graduates of May, 1942, have reported to the company as members of their graduate student course. Merle Mitchell, 1942 graduate of Southern Methodist University, is now a fellow in the mathematics department at the University of New Mexico. Esther Barnhart, who was to have served as secretary for the term 1942-43, has a teaching position in Mountainair, New Mexico.

Chapter 12. ILLINOIS BETA, Eastern Illinois State Teachers College, Charleston, Illinois.

President	Thales	-----	Mr. Cecil Werner
Vice-President	Appolonius	-----	Miss Martha Husted
Secretary	Khayyam	-----	Miss Florence Rich
Treasurer	Archimedes	-----	Mr. Richard Bidle
Secertary	Descartes	-----	Mr. H. F. Heller
Faculty Sponsor		-----	Mr. E. H. Taylor
Reporter		-----	Mr. Eugene Evell

Lieutenant Harry Wood, graduate of 1940, visited the campus recently after some exciting experiences in the Pacific. His plane was forced down on a tropical island on the day his carrier, the Lexington, was sunk. With the aid of the natives, he managed to work his way back to civilization. The promotion from ensign to lieutenant followed.

Chapter 13. ALABAMA BETA, Alabama State Teachers College, Florence, Alabama.

President	Pascal	-----	Mr. Lilbourne Hall
Vice-President	Leibnitz	-----	Mr. Thomas Sherer

Secretary DeMoivre	Miss Bernice Posey
Treasurer Euler	Miss Dorothy Burgess
Secretary Descartes	Miss Orpha Ann Culmer
Faculty Sponsor	Miss Orpha Ann Culmer

Edna Jeter and Corinne Richeson, who have been teaching since graduation, now hold government positions in Washington. Hiawatha B. Walker, who recently left for Fort McPherson, is acting corporal for a party of sixty-seven men.

Clarence B. Collie, Jr., class of 1939, was working toward his master's degree in mathematics at Peabody College, Nashville, Tennessee, when he entered the military service. He was staff sergeant at Fort McPherson for about eighteen months before he was transferred to Norfolk, Virginia. There he received a commission as lieutenant, and later was appointed an instructor in mathematics at West Point.

Charles C. Barr and Bob B. Nolan are temporarily at Nashville in the Army Air Corps. John Kennedy entered the Military Academy at West Point in July, 1942. D. M. Humphries Jr. is in naval training at the University of Notre Dame. Ensign Taeton Thomas, after three years' training at Annapolis, is now on submarine duty.

Chapter 14. LOUISIANA ALPHA, Louisiana State University, University, Louisiana.

President Gauss	Mr. Harold Black
Vice-President Poincare	Mr. Carson D. Jeffries
Secretary Fermat	Miss Floyce Yates
Treasurer Galois	Mr. Jeff D. Burkett
Historian Cajori	Miss Otha C. Roddy
Secretary Descartes	Mr. Houston T. Karnes
Faculty Sponsor	Miss Marelena White

The Louisiana Alpha Chapter has been giving two annual awards. An award for \$15 goes to the graduating senior who has been superior in mathematics, according to the rules set up in our by-laws. The other award, a slide rule,

goes to the freshman making the highest percentage on a special K. M. E. examination. The senior award this year went to Charles W. Durieux, and the freshman award went to Jorge Mout Lazarrigue, a young student from Chile.

According to a news release from Westinghouse Electric and Manufacturing Company, Thaddeus Ray Cary Jr. has reported as a member of the Company's graduate student course.

Chapter 15. ALABAMA GAMMA, Alabama College, Montevallo, Alabama.

President Archimedes	Mr. Burke Land
Vice-President Apollonius	Miss Cleo Reed
Secretary Bernoulli	Miss Olina Hines
Treasurer Marie Agnesi	Miss Doris Kilgo
Secretary Descartes	Miss Rosa Lea Jackson
Faculty Sponsor	Miss Rosa Lea Jackson

The general theme for the activities of Alabama Gamma Chapter for the present school year is to be "Mathematics and the War." This group has a resident membership of eleven, with one pledge to be initiated at the October meeting.

Chapter 16. OHIO ALPHA, Bowling Green State University, Bowling Green, Ohio.

President Archimedes	Mr. Burton Finlay
Vice-President Leibnitz	Mr. Duane Kidwell
Secretary Vieta	Miss Mary D. Percy
Treasurer Napier	Mr. Howard Sammentinger
Secretary Descartes	Mr. Harry R. Mathias
Faculty Sponsor	Mr. F. C. Ogg

George John, president of Ohio Alpha Chapter last year, is now assistant in chemistry at Ohio State University. Charles Rankowski, a former member, is a research chemist at Thompson Products Company in Cleveland, Ohio. Earl McFarren, a former member, is assistant professor in

chemistry at Iowa State University. Robert Dibling has entered Annapolis. Eddie Cox has transferred from the Alabama Alpha Chapter to the Ohio Alpha.

Chapter 17. MICHIGAN ALPHA, Albion College, Albion, Michigan.

President Townsend	-----	Mr. Clare Stanford
Vice-President Slaughter	-----	Mr. James Hollingsworth
Secretary-Treasurer Agnesi	-----	Miss Elizabeth Davis
Secretary Descartes	-----	Mr. Edmund E. Ingalls
Faculty Sponsor	-----	Mr. E. Roscoe Sleight

Chapter 18. MISSOURI BETA, Central Missouri State Teachers College, Warrensburg, Missouri.

President Laplace	-----	Mr. Robert Wilde
Vice-President Pascal	-----	Mr. Irvin Lee Sparks
Secretary Gauss	-----	Miss Velda Keeney
Treasurer Galois	-----	Mr. Arthur Anderson
Secretary Descartes	-----	Mr. Fred W. Urban
Faculty Sponsor	-----	Mr. Fred W. Urban
Historian	-----	Mr. Edwin Basham

Missouri Beta Chapter wishes to pay tribute to the great number of its members who are now in the service of their country. Mr. Paul A. De Vore, faculty sponsor of this chapter in 1941, is in the Navy and expects soon to see service over seas.

Chapter 19. SOUTH CAROLINA ALPHA, Coker College, Hartsville, South Carolina.

President Leibnitz	-----	Miss Margaret Ellen Greyard
Vice-President Pascal	-----	Miss Ann Ludlam
Secretary Thales	-----	Miss Betty Singleton
Treasurer Gauss	-----	Miss Addie McIntosh
Secretary Descartes	-----	Miss Caroline M. Reaves
Faculty Sponsor	-----	Miss Caroline M. Reaves

During the coming year, it is the aim of South Carolina Alpha Chapter to direct its activities as a unit toward defense work.

Martha Coker, a former president of this group, is now employed as an assistant statistician in Washington, D. C.

Chapter 20. TEXAS ALPHA, Texas Technological College, Lubbock, Texas.

- President Lobatchewsky ----- Mr. John Ely
- Vice-President Agnesi ----- Miss Mary Sparks
- Secretary Noether ----- Miss Clara Jane Whaley
- Treasurer Cayley ----- Mr. Elmer Jameson
- Secretary Descartes ----- Miss Lida B. May
- Faculty Sponsor ----- Mr. Paul W. Gilbert
- Reporter Einstein ----- Mr. Roger K. Owen

Mrs. Annie N. Rowland, charter member of Texas Alpha, has been appointed instructor in the mathematics department of Texas Technological College for the session 1942-43. Mr. Allen Smith, a graduate of 1942 and treasurer of Texas Alpha during the 1941-42 session, is now teaching mathematics in Lake Arthur High School, Lake Arthur, New Mexico. Miss Nancy Ann Miller, another graduate of 1942 and acting president of Texas Alpha for 1941-42, was awarded a scholarship to Brown University in Providence, Rhode Island, to work on her master's degree in mathematics. Dr. Emmett Hazelwood, charter member of this chapter and former associate professor of mathematics at Texas Tech, is a first lieutenant in the Air Corps and is stationed at Washington, D. C. Dr. Raymond K. Wakerling, former faculty sponsor, has resigned his position to accept an offer at Fresno Teachers College in Fresno, California. Mr. Lee Michie, charter member of Texas Alpha, has been reported missing in action in Java where he was a bomber pilot.

Chapter 21. TEXAS BETA, Southern Methodist University, Dallas, Texas.

- President Galois ----- Miss Marian Weaver

Vice-President Abel	Miss Jane Taylor
Secretary Fermat	Miss Mary Moseley
Treasurer Pascal	Mr. Billy Parham
Secretary Descartes	Mr. Paul K. Rees

Dr. K. L. Palmquist, formerly faculty sponsor of Texas Beta, is a civilian instructor in the Naval Air Corps. Miss Dorothy Langwith is employed by the Fidelity Union Life Insurance Company in Dallas. Miss Julia Smith, president of Texas Beta in 1940-41, received her M. A. from the University of Iowa in August, 1942, and is now employed in the actuarial department of Lincoln National Life Insurance Company in Fort Wayne, Indiana. Mr. Gerald Davenport has been promoted to the rank of lieutenant in the Army Air Corps. Miss Merle Mitchell is now a graduate fellow at the University of New Mexico.

Chapter 22. KANSAS GAMMA, Mount St. Scholastica College, Atchison, Kansas.

President Proclus	Miss Margaret Molloy
Vice-President Cauchy	Miss Mary Margaret Downs
Secretary Leibnitz	Miss Virginia Meyers
Treasurer Bernoulli	Miss Jane Schweizer
Secretary Descartes	Sister Helen Sullivan, O. S. B.
Faculty Sponsor	Sister Helen Sullivan, O. S. B.

Several former members of Kansas Gamma are now in the teaching profession. Lucille Laughlin, class of 1939, has a teaching position in Randolph, Iowa, and Mary Agnes Schirmer, class of 1930, is teaching in Patterson, New Jersey, and doing graduate work at Columbia University. Mary Catherine Donahoe, class of 1940, is teaching mathematics in DeKalb, Illinois, and Muriel Thomas, class of 1942, teaches in Basehor, Kansas.

Alumnae in other professions are Marjorie Dorney, class of 1939, employed in the U. S. Weather Bureau in Washington, D. C.; Miriam Powers, service representative for the Illinois Bell Telephone Company in Chicago; Sarah

Alice Woodhouse, class of 1941, designer and accountant in Kansas City; Mary Flaherty, class of 1942, employed in the Signal Corps Office in Chicago.

Mary Donna Hughes has entered the Benedictine Sisterhood at Cullman, Alabama. Margaret Mary Kennedy, secretary of Kansas Gamma, 1941-'42, is prefect of the college sodality for the current year. Mary Margaret Downs, vice-president in 1942-'43, is also president of the Chemurgic Club.

Kansas Gamma plans to center its study and discussion this year around the one general topic, "Renewed Interest in Mathematics as Brought on by Wartime Necessity."

Chapter 23. IOWA BETA, Drake University, Des Moines, Iowa.

President Alchwarizmi	_____	Mr. Bob Lambert
Vice-President Aryabhata	_____	Mr. Robert Hansen
Secretary Brahmagupta	_____	Miss Julia Rahm
Treasurer Leonardo	_____	Mr. Alex Smotkin
Secretary Descartes	_____	Miss Floy Woodyard
Faculty Sponsor	_____	Mr. I. F. Neff

Members of Iowa Beta in various branches of the service are as follows: Norman Landis, 1941, who is in the Army Air Corps Technical School at Scotts Field, Illinois; Bernard Smith, 1940, who is an ensign in the Navy; Leo Unger, who received his captain's commission in the Marines; Frank Oslo, 1940, who is an ensign in the Navy.

Earl Carlson, class of 1941, is teaching physics at the West High Defense School in Des Moines, Iowa. Robert McClelland, 1941, is an interviewer at the engineer's replacement training center at Fort Leonard Wood. Robert Lambert is the chief instructor of the aviation cadets in Des Moines, Iowa.

Robert Goss, class of 1941, is teaching mathematics at Iowa State College at Ames, Iowa. Others who are now teaching are Earle Canfield and Myrtle Christensen. Ed

Benson is an inspector in an aeroplane factory. Julia Rahm is the student assistant in the mathematics department at Drake University.

Chapter 24. NEW JERSEY ALPHA, Upsala College, East Orange, New Jersey.

President Thales	Miss Phyllis Gustafson
Vice-President Appollonius	Mr. Edward Cohen
Secretary Abel	Miss Marjorie Nicol
Treasurer Fibonacci	Miss Lillian Misel
Historian Gauss	Mr. M. A. Nordgaard
Faculty Sponsor	Mr. M. A. Nordgaard

From the New Jersey Alpha Chapter, Bernard Morrow, Clifford Baab, and Arnold Gouss are the latest to have joined the United States military forces. Edward Cohen has been engaged to teach in an Aeronautical School in St. Louis.

On Friday evening, May 22, 1942, the chapter held its annual banquet and initiation. Mr. Edward Molina, research engineer in the Bell Telephone Laboratories, gave the address. The following were initiated: Elizabeth Ebel, Arnold Gouss, Marjorie Wolfe, Zelda Meisel, and Joseph Prieto.

Chapter 25. OHIO BETA, College of Wooster, Wooster, Ohio.

President Laplace	Miss Dorothy Rickards
Vice-President Abel	Mr. Albert P. Linell
Secretary Gauss	Miss Ruth Rawson
Secretary Descartes	Mr. Melcher P. Fobes
Faculty Sponsor	Mr. Charles O. Williamson
Treasurer Leibnitz	Mr. William Buchholtz

Chapter 26. TENNESSEE ALPHA, Tennessee Polytechnic Institute, Cookeville, Tennessee.

President Leibnitz	Miss Margaret Plumlee
Vice-President Euler	Mr. Charles Tabor
Secretary Napier	Miss Mildred Murphy

Treasurer Kepler ----- Mr. Howard Herndon
Secretary Descartes ----- Mr. R. H. Moorman
Faculty Sponsor ----- Mr. R. O. Hutchinson

At the last meeting of the 1941-42 term, Tennessee Alpha initiated the following: Martha Andrews, Wilma Leonard, Charles Cagle, and Mildred Murphy. Although a great number of the members have not returned to school this fall, the following members are in attendance: Dr. Robert Hutchinson, Dr. Richard Moorman, Margaret Plumlee, William Fitzgerald, Howard Herndon, Robert Johnson, Charles Tabor, Charles Cagle, and Wilma Leonard. Former members now engaged in war work are as follows: Albert Bryan, lieutenant in the Army; William Jarrell, at West Point; Kent Walthall, Thurman Webb, and James Fitzgerald, all in defense work; Robert Tate and John Killian, both engineers; Donald Painter, James Foster, and Harold Duncan, working with the T. V. A. Joe Lane is doing graduate work in physics at the University of Kentucky, and Martha Andrews is teaching science in the high school at Tullahoma, Tennessee.

Chapter 27. NEW YORK ALPHA, Hofstra College, Hempstead, New York.

President Gauss ----- Mr. Mario Juncosa
Vice-President Pascal ----- Mr. Paul Camp
Secretary Fermat ----- Miss Edith Huffman
Treasurer Laplace ----- Mr. Robert Beyer
Secretary Descartes ----- Mr. Albert Capuro
Faculty Sponsor ----- Mr. Loyal F. Ollmann
Historian Jordan ----- Miss Phyllis Reynolds

Although New York Alpha was only installed on April 4, 1942, its alumni are to be found all over the country. Dr. G. Calvin Brous is teaching chemistry at the University of Oklahoma; Mr. George Burham is with the American Institute of Physics in New York; Dr. Henry J. Riblet is a research associate at the Massachusetts Institute of Tech-

nology; Robert Beyer, treasurer elect of New York Alpha, is an assistant in physics at Cornell; Louis Bauer is an assistant in physics at Brown University; Walter Holt is doing graduate work at the University of Michigan; Edna Meyer is a junior engineer in radio at Fort Monmouth; Dr. Leslie B. Poland is with the Analine Chemical Company in New Jersey; Mr. Edgar E. Wrege is an engineer working for the government in magnesium research in Texas. Robert Ackerson is in the Army and Robert Sherwood is serving as a meteorologist in the Army. Dr. Loyal T. Ollmann has spoken to the chapter on the subject, "Cardinal Numbers," and Louis Bairer on "The Motion of a Projectile."

Chapter 28. MICHIGAN BETA, Central Michigan College of Education, Mount Pleasant, Michigan.

President Appolonius	-----	Mr. Richard Sweeney
Vice-President Menelaus	-----	Miss Jennie Master
Secretary Laplace	-----	Miss Eleanor Mucynski
Treasurer Tartaglia	-----	Mr. James Barr
Secretary Descartes	-----	Miss Nikoline Bye
Faculty Sponsors	-----	Mr. C. C. Richtmeyer
		Mr. J. W. Foust

Michigan Beta, although one of the most recently installed chapters of Kappa Mu Epsilon, has begun its career by sponsoring the Michigan Undergraduate Mathematics Conference. This meeting was held on May 9, 1942, on the campus of Central Michigan College. The program of the day included a morning and an afternoon discussion period, a business meeting, and a luncheon. Five student papers were presented as follows: "Summing a Series by Differentiation and Integration" by Miss Lorna Betz of Albion College, "A Problem in Related Areas" by Miss Betty J. Dick of Michigan State College, "On the Problem of Steinhilber" by Mr. Richard Frankel of the University of Michigan, "A Maximum-Minimum Problem" by Mr. James G. Renno of Michigan State College, and "A Mechanical Demonstration of Principles and Applications of Mathe-

matics" by a delegation from the Edison Institute. The conference for next year will be held, if possible, at Michigan State College.

KAPPA MU EPSILON WELCOMES A NEW CHAPTER

Chapter 29. ILLINOIS GAMMA, Chicago Teachers College, Chicago, Illinois.

President Archimedes	Mr. James B. Brook
Vice-President Euler	Mr. John T. Wiegard
Secretary Galileo	Miss Arletta Mae Loomis
Treasurer Kepler	Mr. John F. Clancy
Secretary Descartes	Mr. J. J. Urbancek
Faculty Sponsor	Mr. J. J. Urbancek

On Friday, June 19, 1942, Professor H. Van Engen, Treasurer Newton of Kappa Mu Epsilon, installed Illinois Gamma of Kappa Mu Epsilon at Chicago Teachers College. The installation ceremonies took place at 3:00 in the College Club rooms, and were followed by a tea given for the charter members of the chapter. Members of the administrative staff of Chicago Teachers College were also invited.

The moving spirit behind the organization of the Illinois Gamma chapter was Professor Johnson, head of the Department of Mathematics, and Professor Urbancek, also of the Department of Mathematics. Undoubtedly, the new chapter of forty-four charter members will be a valuable addition to our fraternity. The national officers as well as the other chapters, welcome Illinois Gamma to the national organization of Kappa Mu Epsilon.

It might be interesting for the membership of Kappa Mu Epsilon to know the type of work which was done by the mathematics club at the Chicago Teachers College during the year previous to its installation as Illinois Gamma. The following talks were presented before the club: "The Fourth Dimension" by Dr. John T. Johnson, "The Place of Mathematics in Art" by Dr. Henry G. Geilen, "Other Number

Systems” by Mr. Marx E. Holt, “Mathematical Recreations” by Professor J. J. Urbancek, “Mathematics in Social Science” by Dr. Jules M. Karlin, and “Codes, Signals, and a Mathematical Analysis of Them,” and “Probability,” both by Professor Ralph Mansfield.