COUNTING IN DOZENS

1	2	3	4	5	6	7	8	9	X	Ɛ	10
one	two	three	four	five	six	seven	eight	nine	dek	el	do

Our common number system is decimal - based on ten. The dozen system uses twelve as the base, which is written *10*, and is called *do*, for dozen. The quantity *one gross* is written *100*, and is called *gro*. *1000* is called *mo*, representing the meg-gross, or great-gross.

In our customary counting, the places in our numbers represent successive powers of ten; that is, in 365, the 5 applies to units, the 6 applies to tens and the 3 applies to tens-of-tens, or hundreds. Place value is even more important in dozenal counting. For example, *265* represents *5* units, *6* dozen, and *2* dozen-dozen, or gross. This number would be called *2 gro 6 do 5*, and by a coincidence, represents the same quantity normally expressed as 365.

Place value is the whole key to dozenal arithmetic. Observe the following additions, remembering that we add up to a dozen before carrying one.

94	136	Five ft. nine in.	5.9'
31	694	Three ft. two in.	3.2'
96	3Ɛ2	Two ft. eight in.	2.8'
19Ɛ	1000	Eleven ft. seven in.	Ɛ.7'

You will not have to learn the dozenal multiplication tables since you already know the 12-times table. Mentally convert the quantities into dozens, and set them down. For example, 7 times 9 is 63, *which is* 5 dozen and 3; so set down *53*. Using this "*which is*" step, you will be able to multiply and divide dozenal numbers without referring to the dozenal multiplication table.

Conversion of small quantities is obvious. By simple inspection, if you are 35 years old, dozenally you are only *2Ɛ*, which is two dozen and eleven. For larger numbers, keep dividing by 12, and the successive remainders are the desired dozenal numbers.

```
12 ) 365
 12 ) 30  + 5
  12 ) 2  + 6
       0  + 2      Answer: 265
```

Dozenal numbers may be converted to decimal numbers by setting down the units figure, adding to it 12 times the second figure, plus 12^2 (or 144) times the third figure, plus 12^3 (or 1728) times the fourth figure, and so on as far as needed. Or, to use a method corresponding to the illustration, keep dividing by *X*, and the successive remainders are the desired decimal number.

Fractions may be similarly converted by using successive multiplications, instead of divisions, by 12 or *X*.

Numerical Progression

1	One		
10	Do	.1	Edo
100	Gro	.01	Egro
1,000	Mo	.001	Emo
10,000	Do-mo	.000,1	Edo-mo
100,000	Gro-mo	.000,01	Egro-mo
1,000,000	Bi-mo	.000,001	Ebi-mo
1,000,000,000	Tri-mo	and so on.	

Multiplication Table

1	2	3	4	5	6	7	8	9	X	Ɛ
2	4	6	8	X	10	12	14	16	18	1X
3	6	9	10	13	16	19	20	23	26	29
4	8	10	14	18	20	24	28	30	34	38
5	X	13	18	21	26	2Ɛ	34	39	42	47
6	10	16	20	26	30	36	40	46	50	56
7	12	19	24	2Ɛ	36	41	48	53	5X	65
8	14	20	28	34	40	48	54	60	68	74
9	16	23	30	39	46	53	60	69	76	83
X	18	26	34	42	50	5X	68	76	84	92
Ɛ	1X	29	38	47	56	65	74	83	92	X1

The Duodecimal Bulletin

Whole Number 24

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August 1958 (*1172*)

THE DUODECIMAL SOCIETY OF AMERICA

20 Carlton Place ~ ~ ~ ~ ~ Staten Island 4, N. Y.

THE DUODECIMAL SOCIETY OF AMERICA

is a voluntary nonprofit organization for the conduct of research and education of the public in the use of Base Twelve in numeration, mathematics, weights and measures, and other branches of pure and applied science.

Full membership with voting privileges requires the passing of elementary tests in the performance of twelve-base arithmetic. The lessons and examinations are free to those whose entrance applications are accepted. Remittance of \$6, covering initiation fee (\$3) and one year's dues (\$3), must accompany applications.

The Duodecimal Bulletin is the official publication of the Duodecimal Society of America, Inc., 20 Carlton Place, Staten Island 4, New York. F. Emerson Andrews, Chairman of the Board of Directors. Kingsland Camp, President. Ralph H. Beard, Editor. Separate subscriptions \$2.00 a year, 50¢ a copy.

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The Duodecimal Bulletin

All figures in italics are duodecimal.

THE ANNUAL MEETING

This year's Annual Meeting was held at the Gramercy Park Hotel, as customary, on the 22nd of May, 1958. The meeting was preceded by the meeting of the Board of Directors in the afternoon, by the reception of our guests at the Cocktail Hour, and by the Directors Dinner.

President Camp called the meeting to order at 8:30 and asked Secretary Beard to report on the year's activities. His report covered events up to the date of the meeting, as there was no especial reason for a distinct separation.

This has been our busiest year, with 2100 mailings of literature on individual requests, and with bulk mailings of 2500 to teachers colleges and to institutes of mathematics.

These figures do not include our Esperanto mail, which has now tapered to about one request per day, - but this total now exceeds 500. The Society owes special thanks to Conrad Fisher, General Secretary of the Esperanto League for North America, (ELNA), who originated and provided the initial Esperanto publicity.

We have also been accorded hearty and active cooperation by the Esperanto Association of North America, (EANA), whose General Secretary, G. Alan Connor and Mrs. Doris Connor are our guests and will later talk to us about Esperanto. Some of our members are members of both these organizations, and some are members of one or the other. Both Mr. Connor and Mr. Fisher have been helpful in the development of acceptable Esperanto forms for duodecimal terms. Our member, Edw. W. Pharo, Jr., is Treasurer of ELNA.

One factor in the Esperanto response is surprising. About 65 of our Esperanto letters have been from people in English-speaking countries, - especially Great Britain, Canada, and the U.S. From among them we have 5 new members and can expect more. To several of the British inquirers we have suggested that it should be possible to form a British duodecimal society. We now have about a dozen active correspondents there, and many of the pioneers of duodecimals have been British.

Personal replies in Esperanto have been written to all such inquirers, followed later by copies of our Esperanto folder, whose contents are the article Antipatio al Aritmetiko, and material like that used on the back cover of this Bulletin, in Esperanto.

Jean Essig has continued his active dissemination of the duodecimal idea in France, and has delivered five talks to important commercial groups there. And in this country, there have been four or five talks by our members in their several localities.

There have been two issues of the Duodecimal Bulletin, this year, and their contents have been warmly commended. We also distributed to our members copies of the issue of Amerika Esperantisto which contained our duodecimal article, and copies of our new Esperanto folder. Editor Jamison Handy, Jr., published an issue of Dozenal Doings covering the 1957 meeting of the Board of Directors and the Annual Meeting, which should be specially praised for the excellence of its form and the promptness of its issue. It was a fine accomplishment.

We wish to report with pride the work of Tom B. Linton, Garden Grove, Calif., in producing the circular duodecimal slide rule. He has provided us with 5 of these rules for display at this meeting, and for sale to those interested. Tom Linton's fine technical skill and arduous labors in bringing the duodecimal slide rule into actuality deserve special commendation. They mark another milestone in duodecimal history.

Our present membership stands at 103, listing 67 members, 9 student members, (total 76 members), and 14 aspirants, 13 student aspirants, (total 27 aspirants), a gain of 7 for the year. This represents the enrollment of 14 new members and the loss of 7 through resignation, loss of contact, etc. The Secretary has re-assumed the functions of the Member Qualification Committee because of the valued close contact with the new members which the lessons and tests provide.

It has been an important and productive year, and carries us into another with even greater promise. . . . .

Treasurer Humphrey presented his detailed report of our finances. Expenses of $1570 for the year 1957 exceeded income of $1138 by $432, and do not include the cost of the Duodecimal Bulletin, Vol. *11* No. 2, ($477), which was billed in 1958.

Donations of $962 are near their highest total, but our printing and mailing costs have been larger than ever, and will increase. Only superlatives can express the Society's appreciation of the generous support given by our donors,

and by those who perform the official duties of the Society, and bear their costs.

The increased activities of the Society confront us with an urgent need to enlarge our revenues. It would be regrettable to limit the Society's natural growth for financial reasons. Our budgets amount to about $20 per member, and we could not expect our membership to continue to grow if our dues were in that range. Yet our requirements are not grandiose. We need to induce 2 dozen of our members to increase their annual donations by 2 do dollars a year. We are that close to the black.

We need more money, but our situation is not critical. We must prevent it from becoming critical. . . . . .

Special thanks are due Treasurer Humphrey for his devoted service and his fine accounting.

Leopold Schorsch, Chairman of the Nominating Committee, has written us that he is unable to attend this meeting because of some surgical re-servicing, but that the Nominating Committee recommended as the Directors of the Class of 1961:-

Kingsland Camp, President,
H. C. Robert, Jr., ex-President,
Lewis Carl Seelbach, Librarian, and
Tom B. Linton, producer of the slide rule.

And for the Nominating Committee for 1959, they recommended:-

Frederick Condit, Chairman,
Charles Lipkin, and Velizar Godjevatz.

President Camp asked for any comments, or nominations from the floor. There being none, the nominations were declared closed, and the Secretary was instructed to cast one ballot for these nominees, as customary.

The actions of the Board at today's meeting were reviewed. It had been proposed that our grades of membership, and their dues, should be revised. This has now been deferred to next year at the request of our Treasurer. A mistake in the listing of the Society's official name is being cleared up by the Treasury Department, and no changes should be made while this is in process.

Preparation of the Manual of the Dozen System is under way, and will probably be completed this year. It is urgently needed, as we have no duodecimal book available for sale, and we are forced to lend copies of New Numbers to our new members, and to require that they be returned upon completion of their tests. An Esperanto translation of An Excursion in Numbers, Mr. Andrews' popular introductory article, should be issued for the stimulation of the growing interest in that field. These basic needs should be satisfied as promptly as possible.

The initial work on the production of the circular duodecimal slide rule is now completed, with the production of enough copies of the prototype for sale to meet the initial demand. They are displayed here for your inspection and purchase. Instructions for the operation of the rules are supplied with each. Their price has been set at $10 each, as that will defray the out-of-pocket expense of their production, and permit carrying forward the progressive refinement of the rule without special financing.

Warmest commendation was expressed for the work of Mr. Linton in planning and producing this rule. In the first year of his membership in the Society, Tom Linton has carried his project, - the construction of our most important tool, - from the concept of its design to its birth and factual existence. This accomplishment deserves the highest praise. It is to be remembered that this was done at his own expense, and without any financial aid from the Society. He has applied for copyright in the name of the Society, and now plans a series of rules, progressively incorporating the important modifications and refinements that have been suggested. The rule can be produced quite reasonably, and it is proposed that it shall be the finest of its kind. Orders for the rules will be handled at headquarters and a centralized record of owners, suggestions, and accessory data will be maintained.

The concept and eventual foundation of the Akademio de la Dozeno was discussed. The establishment of this consultive, technical, and certifying authority will be necessary in the near future, and every member of the Society is asked to help in shaping this important body into its proper form. Its faculty is to consist of recognized leaders of thought and vision in the technical areas involved. The growth and acceptance of duodecimals will largely depend on our ability to enlist the minds and efforts of these able scholars.

This review completed the formal business of the meeting, and President Camp presented G. Alan Connor, General Secretary of the Esperanto Association of North America.

Mr. Connor gave us a resume of the world-wide acceptance of Esperanto, of its fine record in original literature and in translations of the important literary works of all nations, - of the impressive array of national Esperanto associations, and their many conventions, national and international, conducted in Esperanto. It is in actual spoken use in conversation and in public addresses that Esperanto is without any comparable competitor among the international tongues. But it is true as well, that it is outstanding in world acceptance from any other viewpoint.

Mr. Connor then acted as translator and master of ceremonies, as his wife, Doris Tappan Connor gave the meeting its first lesson in speaking Esperanto, - using only Esperanto for her instructions. This was hugely enjoyed and her charm and gayety dissolved the audience in laughter again and again. All were delighted by their ease in forming sentences in Esperanto through this brief lesson.

Comment and conversation became rife, and President Camp declared the meeting adjourned for the sociable discussions and refreshments that make our meetings so enjoyable.

THE ANNUAL AWARD

When the Duodecimal Society of America was incorporated on July 20th, 1944, one of the first actions of the Board of Directors was the establishment of the Annual Award, to be conferred each year upon that person who has made the outstanding contribution to the progress and development of duodecimals and of the Society.

The Annual Award for 1944 was conferred upon F. Emerson Andrews as a Pioneer in the use of Base Twelve, and as the author of many articles on duodecimals, in addition to the outstanding work, NEW NUMBERS.

For 1945, the Award was bestowed on George S. Terry, for his many papers on duodecimals, for his imposing work, DUODECIMAL ARITHMETIC, for the popular brochure, THE DOZEN SYSTEM, and for his generosity in establishing the Endowment Fund of the Society.

The Award for 1946 went to F. Howard Seely, for his notable achievement in devising a formula permitting machine conversion of decimal and duodecimal quantities, for his excellent work in developing the lessons and examinations for the Society, and in recognition of his long and devoted service to the progress of duodecimals and of the Society.

In 1947, Ralph H. Beard was honored for his significant contributions to duodecimal literature, especially in the field of weights and measures, and for his invaluable services to the Society, as its Secretary and Treasurer, and as founder and Editor of its Bulletin.

In 1948, Harry C. Robert, Jr., was given the Annual Award for his many excellent papers on the mathematics of duodecimals, with especial citation of his discoveries in that part of the Theory of Numbers dealing with the Square Sums of Consecutive Squares.

No Awards were made for 1949 and 1950, but the Annual Award for 1951 was conferred upon J. Halcro Johnston, in recognition of his work, THE REVERSE NOTATION, published in England, which described this unique development in numerical notation as employed with the Twelve Base.

From 1952 through 1955, no Awards were made, but last year, the Annual Award for 1956 was designated for Jean Essig, Inspector General of Finances for France, for his outstanding contribution to a wider understanding of the Twelve Base, and toward integration of the world's numbers and measures. Particular citation was made for his work, DOUZE, NOTRE DIX FUTUR, the first extensive treatment of this subject in the French language.

Now, the Society has chosen to confer the Annual Award for 1957 upon Herbert Kay Humphrey in recognition of his work on the machine conversion of decimals and duodecimals, and his many duodecimal papers. Particular citation is made of his devoted service to the Society since the year of its founding, especially as its Treasurer for the past twelve years.

It is notably fitting that the Award should go to Kay Humphrey, who joined the Society in the year of its incorporation and of its first Annual Award.

He was one of our first Aspirants, and took his lessons and tests under the guidance of F. Howard Seely, who developed and established them.

It was Howard Seely who first discovered a formula that would permit the machine conversion of decimals and duodecimals. But Kay Humphrey developed the application which made such conversions possible on the tapes of an ordinary office adding machine. His method was published in the Duodecimal Bulletin for April, 1946, Vol. 2, No. 1.

In 1948 he accepted appointment to the Finance Committee under the chairmanship of George S. Terry, and in 1949 he was elected to the Board of Directors as Treasurer. Previously, our finances had been in charge of our Secretary-Treasurer, who had only casual acquaintance with the keeping of accounts. Mr. Humphrey had long been Chairman of the Board of the Winnetka Trust and Savings Bank, and our financial records were promptly put into proper professional form, and have been so maintained in these many years of his continued service in that office.

Kay Humphrey once said that "there must have been an abacus in my play pen," and his many duodecimal explorations strongly support that assumption. Almost from the start he made his own choice of characters, using a lowercase d for dek, and k for ell, which he calls "kell". And he devised his own duodecimal insigne of 4 interlaced triangles and 3 squares, which appears on his own official stationery.

He always introduces a warm note of personal regard into his correspondence, so that it is even a pleasure to have him write us about our dues. The Society is delighted to recognize his devoted services by this citation, and to reserve for him his own special place in its history. Hence:

The Annual Award of

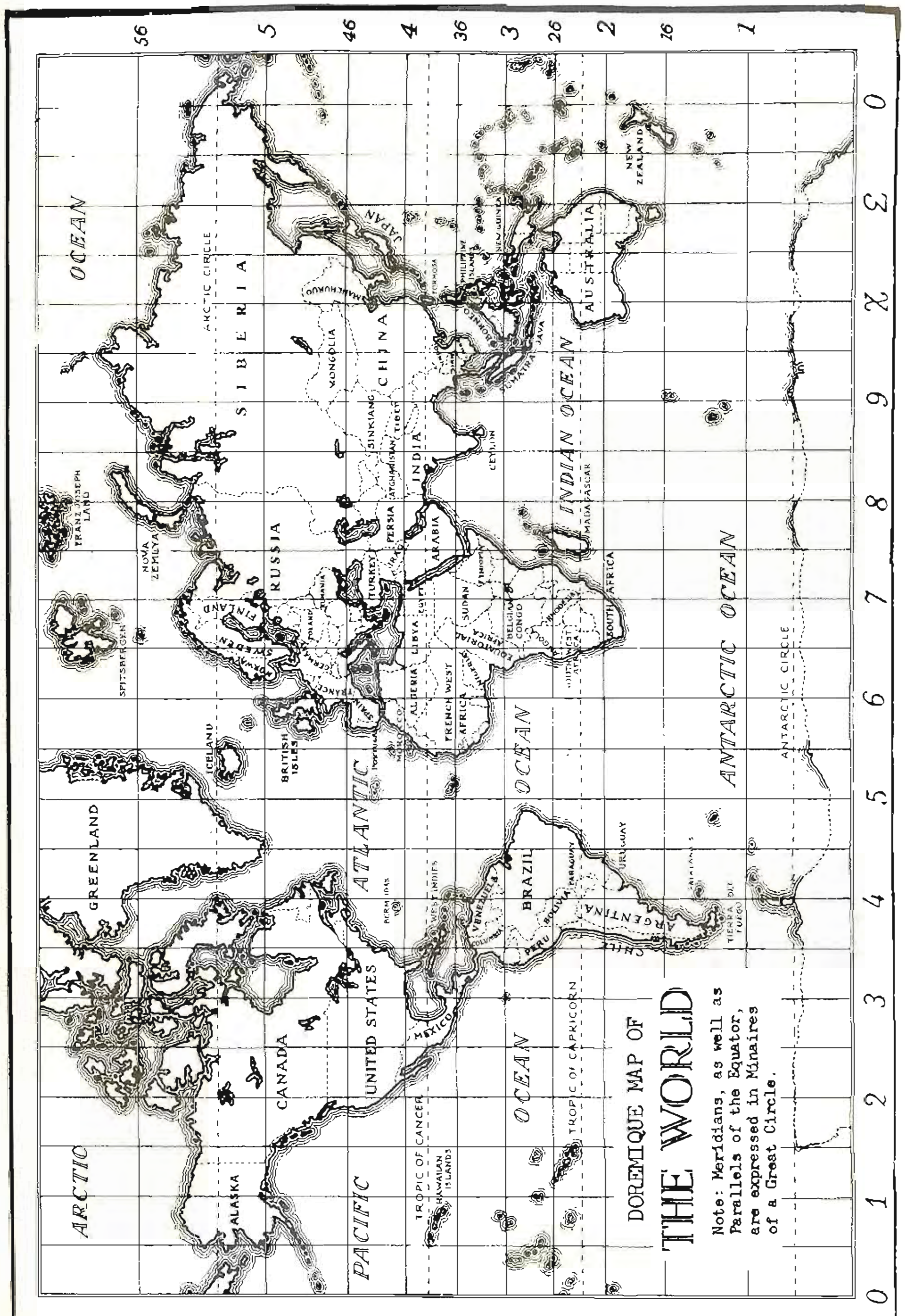
The Duodecimal Society of America

for the year 1957

is conferred upon

HERBERT KAY HUMPHREY

in recognition of his original work on the mechanical conversion of decimals and duodecimals, and his many duodecimal papers. Particular citation is made of his devoted service to the Society since the year of its founding, especially as its Treasurer for the past twelve years.



DOREMIQUE MAP OF THE WORLD

Note: Meridians, as well as Parallels of the Equator, are expressed in Minaires of a Great Circle.

DOREMIC SYSTEM OF ANGULAR MEASUREMENT

by H. C. Churchman

The U.S. standard foot has been described by law as the equal of 12/39.37 parts of the length of one meter. A more practical definition would be the equal of 30.48 centimeters. The English and the U.S. nautical miles have differed, decimally speaking, about two-tenths of a foot. But if the true nautical mile, which is an arc of sixty seconds, were equal to 6083.1 U.S. standard feet in length, as sometimes claimed, then the total length of a great circle would equal 131,394,960 such feet. The length of a polar great circle is less than that; the length of the equatorial great circle is more. There very well may be a great circle of that particular length, since there are an infinite variety of great circles and lengths around the earth. We might keep that total foot length in mind for purposes of comparison in just a moment.

In the Doremic nomenclature[1] of the duodecimal system, the unit of angular measurement of a great circle is the "Naire". Let us think of it as a new geophysical mile, a Naire mile or arc, in reckoning distances, and simply as the Naire to describe angles now measured by degree, minute, or second. A naire mile is the length of a naire arc on an assumed great circle of the earth.

The writer was lured to devise a Naire mile by an Iowa boyhood chum, Colonel Harlan Miller, USAFR, globetrotter, who has realistically and publicly urged the development now of a single Armed Forces mile for land, air, and water. This writer is unprepared to state, and no one seriously claims that one of the services, in abandoning "miles per hour" and in adopting "knots", has taken a step in the wrong direction, but, on the contrary, does assert that it has not gone far enough to furnish the three services a common understanding.

The same observation might be made regarding India's determination to adopt a decimal monetary system---it could be a step in the right direction, toward simple denominate numbers---it might go much farther as base twelve becomes better understood.[2] The man in the street, today, is quite ignorant of the dozen radix---I might say, to our disgrace, vastly ignorant. We must begin to educate him not later than eighth or ninth grade of formal schooling, and earlier if

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(1) Duodecimal Bulletin, May 1955, Do-Re-Mi Nomenclature.
(2) National Debt, May 1956, Mathematics Teacher, 1201-16th St., Washington 6, D.C.

possible, in a regular course of duodecimal arithmetic. Until he becomes acquainted with it, he is quite insulated from the power and the beauty of simple arithmetic and his progress in the field of mathematics is cruelly stifled by his own resistance to all arithmetic.

Properties of New Geophysical Mile

The length of a naire mile is arbitrarily fixed at 6336 U.S. standard feet, each foot equal to 30.48 centimeters. A naire mile is one of 20736 parts of an assumed great circle around the earth. Chosen by this writer, among other reasons, partly because it is a dozen times one-tenth of a U.S. statute mile, it is at the same time an aliquot duodecimal part of the theoretical length of one of the mammoth number of great circles about our earth. Furthermore, 528 feet may be divided into twelve aliquot parts. These facts point to a possibility that the length of the English land mile was originally set up by mathematicians having not only a fair idea of the length of the earth's equator, as well as meridians, but a sound conception of duodecimal arithmetic.

In noting a somewhat similar relationship in measurements, please observe that the British Imperial gallon is only (by a thimbleful) slightly larger than a dozen times one-tenth of a U.S. standard gallon. Ten British Imperial gallons (2772.74 cu.in.), equal to the volume and weight of one hundred pounds avoirdupois of distilled water at a given temperature and barometric pressure, generously equal twelve U.S. standard gallons of bulk liquid, the U.S. popular or "vulgar" standard dogal of 2772 cubic inches.(3)

A naire mile holds the advantage that, its components being jointly related to the U.S. standard foot and inch as established by the U.S. National Bureau of Standards and by the standard meter in the archives of France, it need not be modified when more accurate measurements might tend to prove 6336 feet to be an inaccurate aliquot part of some particular great circle. A naire mile is assumed to be in all respects the same, and equally useful, in measurements on land, and in water, and in the air.

Furthermore, in present terms of measurement, a dozen-dozen-dozen-dozen naire miles or arcs equal 131,383,296 U.S. standard feet. And if 21600 nautical miles are equal to 131,394,960 U.S. standard feet (see first paragraph), the

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(3) Duodecimal Bulletin, July 1956, Measures and Weights, Doremic.

diversity between their total sums, after circumscribing the earth, is less than two naire miles. The tolerance for survey errors between any two actual measurements of a great circle will, perhaps, exceed two naire miles or arcs.

Ten million meters were originally intended to equal a quarter-meridian, but this figure now is admittedly inexact. The French standard meter possesses no greater inherent stability than any other denominate dimension. But, like the English foot, its empirical value is great. In any event, because the earth is not a perfect sphere, four true quarter-meridians in meters would not have equalled the length of the earth's equator. In this paper we are thinking in terms not of a meridian or an equatorial great circle but of a great circle somewhere between them.

So that a dozen minaire miles (see table of angles) shall equal the theoretical length of a great circle of the earth twice crossing the terrestrial equator in somewhat ecliptic fashion, one quarter of a great circle is assumed, in this paper, to equal nearly 10,012 kilometers in length or exactly 32,845,824 U.S. standard feet, and a naire mile is only slightly more than 1931.2 meters. This assumed distance gives the naire mile exactly 6336 U.S. standard feet and the nautical mile a length of precisely 6082.551 U.S. standard feet. For common estimates, the nautical mile is assumed now to equal 6080 English or U.S. feet.

The learned French mathematician, Abbé Gabriel Mouton, in 1670, suggested as a length unit one minute of the earth's circumference, what is now a nautical mile. Although he applied Latin terminology to decimal divisions, in keeping with his epoch, he was thinking in terms of a great circle as a base for units of length and not merely a quarter-meridian.

The Table of Angles, in Doremic nomenclature of the duodecimal system, lays before us the simple, dozenal divisions of a great circle, without in any manner relying upon the historical degrees, minutes, and seconds of angle. It is not difficult to picture the advantages of being guided by any known angle and by dozenal multiples and subdivisions of that unit alone. A simple denominate number system of angular measurement, to get away from our compound denominate number scheme now universally employed, is one of mankind's prime necessities in this international geophysical year.

At this point, let us note that our land or statute mile in English-speaking countries is 5280 feet in length. And building up from the foot unit or yard, no one, perhaps, would have yesterday claimed it to be equal to some aliquot

TABLE OF ANGLES

Angle (∠) Symbol for Doremic Theoretical Measurement of a Great Circle of the Earth

Division		Doremic Value		Decimal Value		Present		Decimal Distances
1 dominaire,	shown	∠10000;0	equals	20736	naire or	360°	or	131,383,296 U.S. feet
1 minaire,	"	∠1000;0	"	1728	"	30°		10,948,608 "
1 renaire,		∠100;0		144		2½°		912,384 "
1 donaire,		∠10;0		12		12½'		76,032 "
1 naire,		∠1;0		1		62½"		6,336 "
1 edonaire,		∠0;1		1/12		5-5/24"		528 "
1 erenaire,		∠0;01		1/144		125/288"		44 "
1 eminaire,		∠0;001		1/1728		125/3456"		44 inches
1 edominaire,		∠0;0001		1/20736		125/41472"		44 lines

part of a great circle. Yet, we find it equal to ten times the length of one edonaire (decimally, 10 x 528 feet). The U.S. statute mile, therefore, might be described as ten edonaire or one dekedonaire (pronounced dek e' do naire).

By both decimal and duodecimal comparisons, the U.S. statute mile is five-sixths of a Naire mile. Therefore, decimally speaking, 72 statute miles in the United States equal 5 donaire miles, and 6 statute miles equal 5 naire miles. An area 5 naire miles square is equal to the usual Congressional Township composed of 36 square miles, familiar in the United States of America historical public lands survey. We should mine this area much deeper. We might find English-speaking peoples, and others, more deeply saturated with duodecimal arithmetic than when we first came to believe. Heretofore uncovered artifacts of our present decimal system of measurements are quite revealing.

Paris Hemisphere

One, for obvious reasons, will seldom travel, on a non-stop trip, a greater distance than one-half of any great circle. And six minaire (shown *∠6000;0)* miles might be slightly over one-half of the length of some great circles, and slightly under one-half of others, to the extent that the earth varies from a true sphere. This is equally true whether we measure by nautical or naire miles, or by kilometers.

Three minaire (shown *∠3000;0*) miles are equal to a quarter dominaire. Approximacely seven-eighths of the earth's land mass lies in an area circumscribed by a quarter dominaire

of flight distance from a theoretical "pole" which stands within a few donaire miles of Paris.

The City of Paris is near the pole of its own strategic hemisphere. Boxing the compass duodecimally at that pole, even as the avenues radiate from the Arc de Triomphe, if you will fly straight ahead three minaire miles along a great circle, in one direction at one time, as if on a particular rib of a parasol, your destination lies within the Paris hemisphere comprising not only about 7/8 part of the earth's land surface, but, perhaps, eleven-twelfths of the population of this globe on which we live. The twelve avenues which form the Place de l'Etoile, laid out possibly two thousand years ago, might indicate how ancient is the principle of duodecimal division of a circle among the French.

In 1927, Charles A. Lindbergh, in "The Spirit of St. Louis", flew on one of these spans, as if drawn by a lodestone, from St. Louis, in the United States of America, to Paris. Perhaps Paris will see more of The Spirit of St. Louis. Within the lifetime of persons now living, this Parisian "pole" might find itself surrounded by a dozen airports, tied into a large, horizontal star, into ONLY ONE of which international ports one may arrive from a certain direction or prescribed "naire"---and the plane on which one arrives will return by the same route. Between these airports, one may shuttle by helicopter or subway trains through Paris to the proper airport if one's flight plan lies beyond, but all routes might terminate at Paris.

Interestingly enough, the Table of Angles, when applied to a globe, gives silent proof that Paris is one of the natural jet-age terminals of the earth, just as Chicago became one of the principal natural centers for railroads and Suez for shipping. New lifelines continually arise in commerce as the old, by time or human caprice, are rendered obsolete. The hope of Columbus is only today approaching its realization---to find a more direct route to the still tremendously important Indies and Cathay. And, curiously, DUODECIMALS are moving in to replace decimals in this same era of time-shrinking distances.

It is self-evident, if one assumes only a rational viewpoint, that no nation in peacetime should attempt to control the air above seven naire miles. Treaties and statutes to protect wildlife must not infringe on the international "wild blue yonder"---should not, in fact, be interpreted to extend into the stratosphere. On your globe of the world, note potential air routes fanning out from Paris in the following directions, only a few of the many when open skies (like open seas) become a reality and a recognized international principle.

a. Paris-London-Reykjavik-Vancouver.
b. Paris-Dublin-Julianehaab-Los Angeles.
c. Paris-New York-Washington-Mexico City.
d. Paris-Azores-Martinique-Guayaquil.
e. Paris-Rio de Janeiro-Buenos Aires.
f. Paris-Valencia-Monrovia.
g. Paris-Equatorial Africa-South Africa.
h. Paris-Libya-Sudan-Madagascar.
i. Paris-Baghdad-Ceylon-Northwest Cape-Melbourne.
j. Paris-Uzbek-Saigon.
k. Paris-Aral Sea-Hong Kong.
l. Paris-Berlin-Leningrad-Samarovsk-Lake Baikal-Tokyo.

Other jet-age terminals of the earth, it goes without saying, will arise. Among others, Buenos Aires-Marie Byrdland-Melbourne. And as we ride out on a great circle from one to another, hills will be brought low and the crooked ways made straight. The naire angle may guide our pilots; and a naire mile might measure the distance of their flight in relation to the earth.

Time and Angle Comparison

Minor arcs of great circles indicate the shortest span between any two points on the earth's surface. That, perhaps, is the only real excuse for basing a Naire mile on some fraction of a great circle, in place of the earth's or the moon's axis---an arc instead of a straight line. The most cautious person might predict a Naire arc is not altogether unlikely to become, eventually, the universal unit of measurement for land, air, and water distances. Maps and grids, to be uniform for all branches of governmental service, civil and military, might be identified with a certain minaire meridian and proper parallel.

The common nautical mile has not been found suitable for simple interchange with (it is an awkward 5/33 part greater than) the statute mile. The statute mile and the edonaire arc are decimally interchangeable; simply move the decimal point one place to your right to transpose from statute miles to a decimal number of edonaire arcs. A map distance of 6 statute miles to the inch is the same as sixty edonaire, which is equal to 5 naire arcs to the inch. And 14.5 statute miles to the inch (city maps in one atlas) are equal to one hundred forty-five edonaire arcs to the inch. The vehicular

tunnel under Hampton Roads, Virginia, is said to be a length of 6864 feet, which equals one naire and one edonaire (*/1;1*) arcs exactly. In other words, decimally, it is thirteen edonaire arcs in linear measurement, or 1.3 statute miles long.

The smallest unit of measurement of distance shown by existing automobile speedometers in the U.S.A. is the edonaire arc, one-tenth of a statute mile, equal to 528 U.S. standard feet. A dozen edonaire arcs equal one naire mile. Hence,aa naire mile in the U.S. might be said to be already a "fait accompli". There, of course, can be no doubt about the edonaire---it now is measured on millions of automobile in America, including military vehicles, every day. And, in Doremic nomenclature, the edonaire arc is precisely one "eremi" part of a great circle. (See table correlating time and angle.)

An airman, at a glance, might visualize the boundaries of a township or an equal area (thirty-six square statute miles or twenty-five square naire miles) while flying above the central plains states; and any Army chauffeur, on his automobile speedometer, can measure out forty, fifty, or sixty edonaire, or a longer trip of 1728 edonaire arcs (172.8 land miles or 1 renaire of distance---equal to 1/144 part of a great circle around the earth).

Time may, and perhaps should, be considered as a division of a circle in precisely the same way angle measurements are a part of a circle.[4] The unit of time measurement is one complete circle; the unit of angle measurement is the naire, which is one dozen-dozen-dozen-dozenth (decimally 1/20736) part of a circle. A time and angle comparison will demonstrate this fact.

TABLE

A Correlation of Time (d) and Angle (/) Measurements in Doremic Nomenclature of Dozenal Base

Division	Doremic(d)Time		Decimal	Division	Doremic (/)Angle		Decimal
1 die	*d1;0*	equal to	24 hrs =	1 dominaire	*/10000;0*	or	360°
1 edo die	*d0;1*	"	2 hrs	1 minaire	*/1000;0*		30°
1 ere die	*d0;01*		10 min	1 renaire	*/100;0*		2½°
1 emi die	*d0;001*		50 sec	1 donaire	*/10;0*		12½'
1 edomi die	*d0;0001*		4-1/6 sec	1 naire	*/1;0*		62½"
1 eremi die	*d0;00001*		fat 1/3 sec	1 edonaire	*/0;1*		5-5/24"
1 mimi die	*d0;000001*		near 1/35 sec	1 erenaire	*/0;01*		125/288"

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(4) Duodecimal Bulletin, December 1957, Doremic System of Time Measurement.

It is quite simple to transpose from the dominaire to the die. Just move the duodecimal or humphrey (;) point of a dominaire four places to your left and change the symbol from angle (∠) to time (d). It is just as simple in reverse, as well as in the lower subdivisions.

Since one die (when thinking in terms of a great circle) equals one naire multiplied domi (shown *10000;0*, i.e., a dozen-dozen-dozen-dozen) times, whence we derive the term "dominaire", it is plain that we duodecimally divide the dominaire into its edomi parts by moving the duodecimal point four places to our left, to achieve one naire (*∠1;0*). From the table of correlation, it appears that one naire (*∠1;0*) is that part of a great circle represented by one edomi (*d0;0001*) part of any circle. For, if we move the duodecimal point in one naire (*∠1;0*) four places to our left, we get *d0;0001*, or one edomi part of a circle.

Such divisions can be accomplished without first converting hours to minutes and minutes to seconds of time, and without converting degrees to minutes and minutes to seconds of angle.

Knaire Rate of Travel

If one travels a Naire mile in one edomi, or flash (4.166666... seconds of decimal time), he travels, proportionately, one minaire per edo, six renaire per hour, one renaire in ten minutes, or twelve naire miles in fifty seconds of present time measurement. In decimal terms, that would equal 912,384 feet in ten minutes or 91,238.4 feet in one minute of time.

If he travels at the rate of 91,238.4 feet in one minute of time, and if we divide that distance by 5280 feet contained in one U.S. statute mile, we find the speed to be 17.28 miles a minute, or 1036.8 miles per hour. The sun, at or near the equator, would appear to travel at approximately 1036.8 miles per hour, if the earth's circumference there were 24,883.2 U.S. statute miles in length; some existing calculations give the whole equator only 18½ additional statute miles (24,901.7 miles) in length.

The base of Doremique Map of The World, which first appeared in "The Dozen System, by George S. Terry, MCMXLI," is shown (p. 8) with permission of George S. Terry and Longmans, Green and Co., London, New York, and Toronto, publishers. All copyrights now covering it are fully reserved by them.

In transportation, the term "knaire" may be defined as the momentary rate of travel of an object in naire miles in relation to the earth in ten minutes of decimal measured time. Thus, if one travels at the rate of 912,384 feet in ten minutes, he is said to be doing 144 knaire, or moving in relation to the earth at the rate of 144 naire miles in ten minutes. This, of course, is equal to one naire mile in one flash or edomi.

The knot is clearly unsatisfactory for future air travel; especially as we move from the speed of trade winds to the speed of sound. The only question is where shall we find a simple substitute, related alike to land and air and water distances? We might find an answer in the knaire.

Shooting a Star in Do-Re-Mi Language

Let K represent the point on the earth's surface pierced by a line from the center of a given star to the center of the earth. Then, let us assume a simple case where the altitude of a given star at a particular moment is 30° or one minaire. Since three minaire are equal to 90° we may determine the distance from ship to K merely by subtracting one minaire from three minaire, i.e. *∠3000;0* minus *∠1000;0* equals *∠2000;0*. Therefore, the ship is two minaire miles from K, or two dozen-dozen-dozen naire miles distant.

Now, assume a second star, whose altitude is 60° or *∠2000;0*. Then *∠3000;0* minus *∠2000;0* equals *∠1000;0*, which places the distance from ship to K of the second star at one minaire, or one dozen-dozen-dozen naire miles. The bearing of the second star should differ from the first, at ship, by at least *∠1000;0*, and not exceeding *∠5000;0*, for greater accuracy of final result. Choose only bright stars with altitude not less than 4 renaire, although 6 renaire are better, i.e., *∠600;0* minimum altitude, and not substantially greater than *∠2000;0* altitude.

From a Naire Almanac giving the location of K on a Doremique map at the moment each star is shot, an arc of two minaire miles distant from the first K will intersect an arc of one minaire miles distant from K of the second star, and the point of intersection, conforming to the scale of the map, should locate the position of our ship at the moment of shooting. This oversimplification does give one an idea of the principles involved, where Naire miles and angles are substituted for degrees, minutes, and seconds and nautical miles; but the actual process of navigation today is tremendously more involved.

If, however, a Naire Almanac, not in degrees and minutes but by the naire only, should locate the K of certain stars by days and moments (1728 positions per diem) on a Doremique globe or map, then one might interpolate between moments, or, looking ahead six, eight, ten, or two dozen flashes, first write down the moment when one will be ready and at that given moment shoot the Doremic angle of the selected star.

Naire Meridians and Parallels

Decimally speaking, when one day is ended and a new day is just beginning (midnight) on Wrangell Island, the old day, obviously, is about 11/12ths completed at Canberra, 10/12ths at Nanking, 9/12ths at Calcutta, 8/12ths in Persia, 7/12ths at Leningrad, 6/12ths (6 edo) in London, 5/12ths in the Azores, 4/12ths in Argentina, 3/12ths (3 edo) in St. Louis, Missouri, 2/12ths (2 edo) in Los Angeles, California, and 1/12th (1 edo) in Alaska or Honolulu.

Accordingly, as we look at the meridians on a Doremique map or globe we can tell at a glance the difference in time between one zone and another. For instance, the time differential between London and St. Louis is 3 edo. So, when it is midnight in London, it is only 9 edo (18 hours) in St. Louis, Mo.

Clearly, before navigation by a Naire mile and angle can become profitable and speedy in the transportation business, a Naire Almanac is necessary, indicating the K of stars in terms of naire meridians east of the 180° of longitude, and naire parallels north of the navigational South pole, with the equator, itself, assumed to equal the *∠3000;0* parallel. Nothing need be said of east or west nor north or south.

Greenwich zero longitude of the present decimal reckoning in degrees and minutes is 6 minaire meridian. Greenwich Mean Time of noon is 6 edo[4]. At precisely 6 edo G.M.T. another day is born into this world on Wrangell Island---and a new astronomical day begins at Greenwich. All Doremitarians, in giving the readings of meridian and parallel, cite first the meridian minaire, renaire, donaire, naire, and edonaire east of the 180° of longitude, followed by the minaire, renaire, donaire, naire and edonaire north of the navigational South pole. The process, not unhappily, agrees with the U.S. Army map reading technique as applied to grids: READ RIGHT UP. But all numbers are duodecimal based.

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(4) Duodecimal Bulletin, December 1957, Doremic System of Time Measurement.

Thus, the Bermudas would appear to lie, quite roughly, at three minaire, eleven (onze) renaire, to the right (east) of zero (180° longitude), and four minaire, one renaire, north of a navigational South Pole, on the Doremique Map of the World.[5] Greater detail might fix their center at *3𝒳10;591-40𝒳ℰ;𝒳4ℰ*. Only a survey would enable one to reach that accuracy in pinpointing the flag staff on Government House in Hamilton, Bermuda, and no claim is made that the foregoing pinpoint is anywhere near the staff.

In intership or informal communication, a large or small (but equal) number of farthest left digits of the meridian and parallel numbers are thrown together, thus: *3𝒳140𝒳*, or, in more detail, *3𝒳10540𝒳ℰℰ*, so as to appear as one single number, the latter to be read, slowly, without pause, as location three, ten, one, oh, five, four, oh, ten, eleven, eleven. The solution, we note, lies in treating the left-hand digit of two equal parts of the number of digits as the minaire digit; utilizing, of course, the dozenal symbols of dek (𝒳) and el (ℰ) for ten (dix) and eleven (onze); and tying the first minaire to the Doremique horizontal line, and the second to the side or vertical line.

The navigational South Pole is assumed to be a parallel exactly 3 minaire south of the Equator, since the 3 minaire parallel and the Equator must coincide as an empirical necessity. Every parallel greater than *∠3000;0* lies north of the equator; all lesser, south of the equator.

Construction of a Naire Almanac calls for the efforts of skilled and dedicated experts in navigation and astronomy. This paper does no more than point the way into the uncharted areas of a simple denominate duodecimal number method of pinpointing any spot on the globe. It is only one solution, but it does avoid compound denominate numbers. Missile targets might be described by edonaire, erenaire, or even eminaire meridian and parallel. The latter would pinpoint a location within 44 inches.

As the Naire angle deals only in one simple denomination, and since divisions of the dominaire (360°) can be accomplished without first converting to a common denominator, some waste of time and great waste of money can be avoided by a considered, prompt development of a Naire Almanac.

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(5) The base of Doremique Map of The World, which first appeared in "The Dozen System, by George S. Terry, MCMXLI", is shown here with permission of George S. Terry and Longmans, Green and Co., London, New York, and Toronto, publishers. All copyrights now covering it are fully reserved by them.

Lapse of the use of East, West, North, South, Longitude, and Latitude, might greatly simplify world map reading and location pinpointing. Certainly every SOS (whether originating on land or sea) must be specific and brief. And the Air Force (and Army and Navy flyers, speaking the same language) must know where the pin points, to bring swift relief.

Kilometers are readily convertible into statute miles (both scales usually appear on European army maps), and statute miles can be readily converted into the edonaire, erenaire, or the eminaire dimension. Decimally speaking, one hundred statute miles equal one thousand edonaire miles or arcs. One statute mile equals ten edonaire arcs or 120 erenaire arcs, or 1440 eminaire arcs.(6) One need forget nothing he has learned of the decimal system. Doremitarians have never developed a sense of "apartheid" toward the metric areas of the world. In fact all metric and non-metric areas should be fully conversant with both decimal and duodecimal languages and utterly opposed to a "caste" system of ten base arithmetic.

The principle of multiplying units or subdividing the parts of a great circle by twelve radix can be excelled by no other within immediate reach. Good books on duodecimal arithmetic are obtainable.

END

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(6) If the distance traversed by Sir Vivian Fuchs in *1171;00-1172;00* across Antarctica from Shackleton Station to Scott Base was 2150 statute miles, he traveled 21,500 edonaire arcs, omitting side thrusts, or *∠1053;8* miles.

REDIVIVUS RECKONING
by Charles S. Bagley*

Before the automobile pushed Dobbin off the highway, traffic control was effected by two commands: "get up" and "whoa." Today vast amounts of technical computations are accomplished by two similar responses: "go" and "no go." This has led to widespread adoption of two hitherto unused or little-known numerical systems: the binary and the octal. The binary number system is used by electronic digital computers (the so-called "giant brains") because it is easier to design circuits that are either on or off than it is those of a larger variety of conditions. Since the binary numbers, used by the machine with great facility, are very cumbersome to human minds, it is necessary to have an "interpreter" to converse with the computer. This interpreter is an octal system desk calculator and people using it soon become quite proficient in octal computation.

The fact that the computer brain is capable of but two responses does not in any way limit its capacity to make rapid and complicated calculations. On the contrary, it can add, subtract, multiply, divide, and perform a variety of other mathematical processes at unbelievable rates of many thousands per second.

The widespread use of electronic calculators and the phenomenal results obtained with them may point a way to a more satisfactory number system for everyday use. The fact that computers can perform hitherto impossible volumes of calculations and human minds can work efficiently in number systems other than the traditional decimal, refutes the superstition that ten is the only desirable radix.

For digital computers, the binary code is superior to other known systems. Nevertheless, it would be entirely unsatisfactory for a housewife obtaining change for her weekly grocery purchases, a rancher counting his livestock, an accountant keeping books, or a broker taking his daily averages.

No one will deny that our ten-base system has certain advantages, however, they have been achieved largely thru the

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Editorial Note: At the time this article was written, Mr. Bagley had no knowledge of the existence of our Society, nor of the works of our members. It is the result of independent thinking, without other sources of reference. For this reason, the article is particularly valuable in the new terms and units devised, and it is presented in its original form.

adaptation to this base of our daily requirements in weights, measures, and money. But it would seem that the atomic age can ill-afford to continue with "giddap" and "whoa" when a truly facile and efficient numbering system can transform us into a "go" and "no-go" basis comparable to the electronic computer.

Depending on the character and condition of the horse, his response time might vary from a split-second to several minutes, or he might not respond at all requiring some other means of persuasion. Not so with electronic computers whose response time is measured in millionths of seconds and its operations in millions per minute. Can we effect comparable advances in our everyday figuring methods? Some people believe that we can thru the simple dozenal or duodecimal system.

Exclusive familiarity with a ten-base system causes our mental processes to instinctively avoid the use of such common decimal fractions as thirds, fourths and sixths, preferring to use only tenths, little realizing that there is a system where it is just as simple to take a half of a third or a third of a fourth "decimally" as it is to take one tenth of a number by moving the decimal point.

To begin with, let us use money as an illustration. It is astonishing what results can be secured with the simple expedient of adding one cent to our nickel. With six cents in our nickel we have twelve cents or two nickels in a dime. Three dimes make a quarter and six dimes or twelve nickels - one half dollar. The dollar would equal any of the following: two dozen nickels; one dozen dimes; one dozen-dozen cents. With this system we can take one third of a quarter equals one dime; or one half of a quarter equals three nickels; one third of a half equals two dimes. If a quarter is two bits then one bit equals three nickels. The dollar would still be expressed in its conventional form: *$1.00*, however, a dollar and a quarter would be *$1.30*; a dollar and a half, *$1.60*; and a dollar and six bits, *$1.90*. It simply means putting more cents into the dollar which would seem to be quite desirable in view of present inflationary trends.

Adoption of this system by the Congress of the United States would have the outward effect of reducing the public debt from $274,000,000,000. to "*$45,000,000,000.*" (FY 1955 value)

Essential to an understanding of the new system is a new terminology,(1) which can be learned in a few minutes; a new multiplication table;(2) new addition and subtraction facts;(3) new standards of weights and measures;(4) and new standards of time.(5)

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(1) Fig. 2 and Fig. 3.

Learning to count, think, and calculate in the new system is both amusing and rewarding. It carries one back to early school days and childish struggles with the third "R". Nevertheless its extreme practicality and obvious field of technical application is sufficient to excite the interest of the most mature mind. It is called the Dozenal System.

The integers thru nine are identical to those in common use but to take the digital places of ten and eleven the capital letter "J" and the ampersand "&" are added. Twelve becomes 1θ but we do not call it twelve. The bar is placed in the zero to distinguish it from zero in the decimal system. We say: one, two, three, four, five, six, seven, eight, nine, deci (pronounced dessi with e as in met and very short i), alif (a is short and accent is on the i as in if), and tan (rhymes with man). Our general concept of zero does not change for zero has no value alone, but only in connection with other integers. By adding a cipher to any figure we multiply the significant value by twelve, not ten, but we must not call it twelve or ten lest we fall back into our old consuetude.

Learning to count in the dozenal system involves the following simple changes: (6)in the teens change ee to a; in the ty's change y to a; add monotan for *11*; duotan for *12*; thirtan for *13*; fourtan for *14* etc., decitan for *1J*; aliftan for *1&*; and twenta for *2θ*; twentades (not twentadeci) for *2J*; desta for *Jθ*; and alifta for *&θ*. Now it is only necessary to add tan for ten; candred for hundred; dozend for thousand; zilion for million; diliard for billion and we have learned to count to one diliard in the dozenal system which is equivalent to 5,159,780 352 in the decimal system. Ordinal conversions are accomplished in the conventional manner, i.e. tanth, candredth, dozendth, zilionth etc. Plurals likewise are formed by adding s as usual. For example *.θθθ6* is written for six tandozendths. As already pointed out, a hyphen or bar is placed in the new naught to distinguish it from zero in another system. Similarly a bar placed across the stem of any integer in a number indicates that it is a dozenal number. Thus 7526 (old) and *7526* (new) or 64091 (old) and *64θ91* (new).

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(2) Fig. 1.
(3) "(we carry one or borrow one when we reach a dozen.)"
(4) Fig. 4, 5 and 8.
(5) Fig. 6.
(6) For complete counting system see Fig. 2 and 3.

It is not usually necessary to bar the stem of more than one digit in a number. This expedient makes it possible to distinguish dozenal from decimal numbers without modification of standard keyboards.

MULTIPLICATION TABLE

Dozenal

1	2	3	4	5	6	7	8	9	J	&	10
2	4	6	8	J	10	12	14	16	18	1J	20
3	6	9	10	13	16	19	20	23	26	29	30
4	8	10	14	18	20	24	28	30	34	38	40
5	J	13	18	21	26	2&	34	39	42	47	50
6	10	16	20	26	30	36	40	46	50	56	60
7	12	19	24	2&	36	41	48	53	5J	65	70
8	14	20	28	34	40	48	54	60	68	74	80
9	16	23	30	39	46	53	60	69	76	83	90
J	18	26	34	42	50	5J	68	76	84	92	J0
&	1J	29	38	47	56	65	74	83	92	J1	&0
10	20	30	40	50	60	70	80	90	J0	&0	100

FIG. 1.

To illustrate how easy it is to perform calculations in the dozenal system the following elementary problems may be carried out. Frequent reference to the tables will assist in following the steps, however, a word of caution is to try and think in the dozenal system rather than in terms of conversion of each value from the decimal system.

DIVISION:

Divide *10* by *4*

```
    3
4)10
  10
   0
```

proof *3* x *4* = *10*

Divide *4&7* by *5*

```
    &&
5)4&7
  47
   47
   47
```

proof

```
 &&
  5
4&7
```

What is the value of *4&7* in the decimal system?

4 x 12 x 12	equals	576
11 x 12	"	132
7 x 1	"	7
		715

Divide *3080* by *56*

```
      68
56)3080
   290
    380
    380
```

```
  68
  56
 340
294
3080
```


Convert one tenth in the decimal system into its equivalent in the dozenal system:

1/10 equals *1/J* therefor

```
   .1̇2497̇24972
J)1.0000000000
  J
   20
   18
    40
    34
     80
     76
      60
      5J
       20
```

Long division involves subtraction
Proof involves multiplication and
Addition

The foregoing examples demonstrate the fundamental processes involved in dozenal addition, subtration, multiplication, and division. It is seen that these processes follow very similarly those of the familiar decimal system.

The method of determining the value of one tenth which equals *.12497* plus, has already been shown. In similar manner one hundredth is ascertained as follows:

.01 decimal equals *1/84* dozenal

```
    .015343J0&62J
84)1.000000000
    84
    380
    358
     240
     210
      300
      294
       280
       210
        700
        6&4
         800
         778
          440
          420
           200
           148
            740
            6&4
remainder    48
```

Proof

```
   .015343J0&62J
x             84
    5915343J0&4
  &62J68781J8
  .&&&&&&&&&&74
             48  remainder
 1.000000000000
```

This shows how inconvenient numbers like ten and hundred can be in a system other than the decimal. Some other equally bad multiples of ten are given in Figure 2.

Careful analysis of the above method of converting one tenth, one hundredth, etc., into the corresponding dozenal values reveals that there is no real difference between the method of converting a fraction into a dozenal and the similar conversion into a decimal. Having mastered the dozenal multiplication table and the related addition and subtraction facts, it is very simple to convert any fraction into its dozenal equivalent with the same ease and dispatch of a decimal. In the dozenal system it is possible to take a third of a half or a fourth of a third as easily as one half of ten is taken in the decimal system. It will become progressively evident that all of the advantages long considered peculiar to a decimal system also apply in the dozenal system.

An indispensable constant is Pi which has the approximate value in the decimal system of 3.1416. Conversion to the dozenal system may be accomplished as follows:

PUT THE DECIMAL IN FRACTION FORM; CONVERT THE NUMERATOR AND DENOMINATOR, IN TURN, INTO THEIR RESPECTIVE CARDINAL VALUES IN THE DOZENAL SYSTEM AND DIVIDE THE DENOMINATOR INTO THE NUMERATOR.

Example: 3.1416 equals 3 and 1416/10,000.
Putting the three aside to be added later we have:

1416/10,000 equals *9J0/5954*

```
          .1848
5954 ) 9J0.0000
       5954
       40680
       3J368
        23140
        1&194
        3&680
        3J368
         1314
```

3 plus *.1848*

equals *3.1848* = π

Conversely, the rule for converting a dozenal into its equivalent decimal is:

PUT THE DOZENAL IN FRACTION FORM. CONVERT THE NUMERATOR AND DENOMINATOR, IN TURN, INTO THEIR RESPECTIVE VALUES IN THE DECIMAL SYSTEM AND DIVIDE THE NUMERATOR BY THE DENOMINATOR.

Since Pi is a transcendental number, that is, its value can never be determined exactly, it is of interest to note

BASIC TERMINOLOGY

In place of ten	(10) - - - - -	We have deci	- - - *J*	
" " " eleven	(11) - - - - -	" " alif	- - - *&*	
" " " twelve	(12) - - - - -	" " tan	- - - - *10* - - - - -	10^1
" " " hundred	(100) - - - -	" " candred	*100* - - - - -	10^2
" " " thousand	(1000) - - - -	" " dozend	*1.000* - - - - -	10^3
" " " million	(1,000,000)- -	" " zilion	*1,000,000* - -	10^6
" " " billion	(1,000,000,000)	" " diliard	*1,000,000,000*	10^9

Beyond the diliard it is unimportant whether the French and United States system given below is followed or the English-German system which would give much higher values.

trilion	=	one dozend diliards	10^{10}
quadrilion	=	" " trilions	10^{13}
quintilion	=	" " quadrilions	10^{16}
sextilion	=	" " quintilions	10^{19}
septilion	=	" " sextilions	10^{20}
octilion	=	" " septilions	10^{23}
nonilion	=	" " octilions	10^{26}
decilion	=	" " nonilions	10^{29}
undecilion	=	" " decilions	10^{30}
duodecilion	=	" " undecilions	10^{33}
tredecilion	=	" " duodecilions	10^{36}
quaturodecilion	=	" " tredecilions	10^{39}
quindecilion	=	" " quaturodecilions	10^{40}
sexdecilion	=	" " quindecilions	10^{43}
septendecilion	=	" " sexdecilions	10^{46}
octodecilion	=	" " septendecilions	10^{49}
novemdecilion	=	" " octodecilions	10^{50}
vigintilion	=	" " novemdecilions	10^{53}

To differentiate between zero in the two systems we place a small bar inside the new naught, or across the stem of a figure. However, it soon becomes superfluous when using the new system exclusively. If any digit in a number is so marked, it indicates the whole number is in the new system. Thus 7526 (old) and *7526* (new) or 64091 (old) and *64091* (new). Such well known factors as hundred and thousand lose their grandiose significance and become no more important than 77 or 986. One hundred, is written *84* and one thousand *6&4*. One tenth is no longer .1 but becomes *.124972* but note what becomes of other fractions.

Fraction	New	Old
1/2	*.6*	.5
1/3	*.4*	.333333333333
1/4	*.3*	.25
1/5	*.249724972497*	.2
1/6	*.2*	.166666666666
1/7	*.186J3186J318*	.142857142857
1/8	*.16*	.125
1/9	*.14*	.111111111111
1/J	*.124972497249*	.1
1/&	*.111111111111*	.090909090909
1/10	*.1*	.083333333333

FIG. 2

TERMINOLOGY

Dozenal

1	one	31	thirtaone	61	sixtaone	91	ninetaone
2	two	32	thirtatwo	62	sixtatwo	92	ninetatwo
3	three	33	thirtathree	63	sixtathree	93	ninetathree
4	four	34	thirtafour	64	sixtafour	94	ninetafour
5	five	35	thirtafive	65	sixtafive	95	ninetafive
6	six	36	thirtasix	66	sixtasix	96	ninetasix
7	seven	37	thirtaseven	67	sixtaseven	97	nintaseven
8	eight	38	thirtaeight	68	sixtaeight	98	nintaeight
9	nine	39	thirtanine	69	sixtanine	99	nintanine
J	deci	3J	thirtades	6J	sixtades	9J	nintades
&	alif	3&	thirtalif	6&	sixtalif	9&	nintalif
10	tan	40	forta	70	seventa	J0	desta
11	monotan	41	fortaone	71	seventaone	J1	destaone
12	duotan	42	fortatwo	72	seventatwo	J2	destatwo
13	thirtan	43	fortathree	73	seventathree	J3	destathree
14	fourtan	44	fortafour	74	seventafour	J4	destafour
15	fiftan	45	fortafive	75	seventafive	J5	destafive
16	sixtan	46	fortasix	76	seventasix	J6	destasix
17	seventan	47	fortaseven	77	seventaseven	J7	destaseven
18	eightan	48	fortaeight	78	seventaeight	J8	destaeight
19	ninetan	49	fortanine	79	seventanine	J9	destanine
1J	decitan	4J	fortades	7J	seventades	JJ	destades
1&	aliftan	4&	fortalif	7&	seventalif	J&	destalif
20	twenta	50	fifta	80	eighta	&0	alifta
21	twentaone	51	fiftaone	81	eightaone	&1	aliftaone
22	twentatwo	52	fiftatwo	82	eightatwo	&2	aliftatwo
23	twentathree	53	fiftathree	83	eightathree	&3	aliftathree
24	twentafour	54	fiftafour	84	eightafour	&4	aliftafour
25	twentafive	55	fiftafive	85	eightafive	&5	aliftafive
26	twentasix	56	fiftasix	86	eightasix	&6	aliftasix
27	twentaseven	57	fiftaseven	87	eightaseven	&7	aliftaseven
28	twentaeight	58	fiftaeight	88	eightaeight	&8	aliftaeight
29	twentanine	59	fiftanine	89	eightanine	&9	aliftanine
2J	twentades	5J	fiftades	8J	eightades	&J	aliftades
2&	twentalif	5&	fiftalif	8&	eightalif	&&	aliftalif
30	thirta	60	sixta	90	nineta	100	candred

1000	dozend
10,000	tandozend
100,000	cantozend
1,000,000	zilion
10,000,000	tanzilion
100,000,000	cantozilion
1,000,000,000	diliard
10,000,000,000	tandiliard
100,000,000,000	candiliard

FIG. 3

that the dozenal 3.1848 approaches the limiting value more closely than the conventional 3.1416.

Extracting square root in the dozenal system affords an amusing exercise. Every rule common to our present system applies.

```
        √3.00'00'00'    (1.895 -        Proof
         1                                      1.895
28  ) 2 00                                      1.895
      1 94                                      1.895
349 )   28 00                                 1 1J34
        26 69                                   13709
3565  ) 1 53 00                                   87&1
        1 53 81                               3.000081
```

This three place dozenal square root of three is substantially more accurate than the four place decimal 1.7321. The square root of two is very close to 1.5, in fact is more exact than decimal 1.41. And so it goes with many other examples which might be cited.

WEIGHTS AND MEASURES: The value and versatility of the metric system has grown with the adaptation of a comprehensive set of standard weights and measures. If the dozenal system is to grow apace, an equally comprehensive list of weights and measures must be standardized. Standardization should begin with the creation of acceptable tables. Nevertheless, whenever the adoption of a standard of any physical measurement is being considered it is important to evaluate the effects such a standard will have on others already adopted or forecast for adoption. It is quite true that practically every physical standard of measurement is related to every other, either directly or thru some media. For example: length is related to volume, volume to weight, weight to mass, mass to velocity, velocity to acceleration, acceleration to force, force to power, power to time, time to space, time to velocity, time to angle, time to acceleration etc.

The new standard of volume, weight, and mass would relate to a cubic inch of chemically pure water at maximum density and gravity with such compensable factors as atmospheric buoyancy cancelled. Maximum gravity being defined by the formula adopted by the International Association of Geodesy in 1930, unless a more suitable standard is subsequently determined. This could be the sea level polar gravity compensated for ocean depth at the north- and reduced to sea level at the south pole. Or it might be desirable to establish that standard at ocean bottom at the north pole. This would have three obvious advantages: First it would place all gravity measurements, including anomalies likely to be encountered, on one side of the standard, i.e. they could all be made positive or negative. Second: modification of the pound to fit the new volume relationship would require a smaller adjustment. Third: there would be little likelihood of the reference being disturbed by catastrophic wars. To these it might be added that while a number of explorers claim to have discovered the North Pole, no one claims possession of it, the principal reason being that the North Pole exists at a depth of 14,150 feet.

The new standard of weight is the nuance (u, as in ooze, a, as in alone) and is defined as the mass which will counterpoise one cubic inch of chemically pure water at maximum density and such other limiting conditions as may be specified by the General Conference on Weights and Measures. It is also defined as the *.001* (one dozendth) part of a cubic foot under identical conditions. The new standard inch would be defined in terms of an exact multiple of some wave length of light, e.g. *1JJ00* (39456) times the wave length of the red line of cadmium. It would differ only slightly from our present inch as defined in terms of the standard meter. The standard foot would equal *10* (tan) inches and the standard yard *30* (thirta inches) or *3* feet. From these standards the following measures are derived:

WEIGHT AND VOLUME MEASURES

8 nugals	*1* cubic foot	*1000* nuances
4 nuqarts	*1* nugal	
2 nupints	*1* nuqart	
1 nupint	*1* nupint	
54 nupints	*54* pounds	*1* cubic foot
23 nuances	*1* nupint	*1* pound

FIG. 4

Of special interest are the binary relationships in the above table. Thus:

	Binary	*Dozenal*	Decimal
Number of nupints in a pound	2^0	*1*	1
" " nupints " " nuqart	2^1	*2*	2
" " nuqarts " " nugal	2^2	*4*	4
" " nugals " " cu. ft.	2^3	*8*	8
" " nupints " " nugal	2^4	*14*	16
" " nuqarts " " cu. ft.	2^5	*28*	32
" " pounds " " " "	2^6	*54*	64

The cubic relationships are equally valuable, e.g. a nupint (pronounced u, as in nut, and very short i) or pound of any substance whose specific gravity is one, is equivalent to a cube *3*x*3*x*3* inches = *23* (twenta-three) cubic inches. Likewise the nugal (u, as in nut, silent a) is equivalent to a cube *6*x*6*x*6* inches = *160* (one candred sixta) cubic inches, and the nuqart (u, as in nut, very short a) equals two cubes *3*x*3*x*3* = (fortasix) cubic inches. The cubic foot itself is equal to a cube *10*x*10*x*10* equals *1000* (one dozend) cubic inches or *1000* nuances. If we multiply the number of nuances in a pound (*23*) by the number of pounds in a cubic foot (*54*) we get *1000* nuances. This same relationship carries forward into the cubic yard which is a cube *3*x*3*x*3* ft = (twentathree) cubic feet. As already shown, one cubic foot equals *8*x*8* = *54* (fiftafour) pounds from which it follows that *23*x*54* equals *1000* pounds or one cubic yard which we call a tun to distinguish it from the current ton. The following table makes this clear:

*3*x*3*x*3*	=	*23* cu. in.	=	*1* nupint	=	*1* pound
*3*x*3*x*3*	=	*23* cu. ft.	=	*1* cu. yd.	=	*1* tun
23 nuances x *54* pounds			=	*1000* nuances	=	*1* cu. ft.
23 cubic ft. x *54* pounds			=	*1000* pounds	=	*1* cu. yd.

FIG. 5

Thus it can be seen that the pound acts as a sort of liaison between the cubic yard into which it fits as *.001* (one dosendth) part and the cubic foot of which it constitutes one fiftafourth part but contains the same number of cubic inches (*23*) as it is contained in one cubic yard. From this it follows that the specific gravity of a substance is equal to the weight of one cubic yard in tuns; or one cubic foot in dozenances;[7] or one cubic inch in nuances of dozinances. Since one dozinance is the *.001* (one dozendth part) of a nuance as well as a cubic inch, it is a convenient measure for precise graduated cylinders used in quantitative analysis. Roughly *90* dozinances or *.090* cubic inches equals one cubic centimeter.

THE CIRCLE:

The circle is divided into six equal angles, called novograds and subdivided into hours, numins, nusecs and novosecs. The reason for six major subdivisions of the circle is that *6* is the nearest whole number to 2π. Thus we have *6* novograds or *6,000,000* (six zilion) novosecs in a circle. By the simple

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(7) See table of prefixes. Fig. 9.

expedient of shifting the dozenal point it is possible to define any angle to any degree of fineness desired. Novośecs of arc divide the circle into 17,915,904 (old system) parts as compared with a precision theodolite graduated to tenths of seconds which would have 12,960,000 divisions. Furthermore the length of any arc is easily obtained by multiplying the angle in novograds by the constant $\frac{2\pi}{6} = 1.06968$.

There are *3* novograds or *3,000,000* (3 zilion) novosecs in any plane triangle.

ANGLE MEASUREMENT:

1 circle = *6* novograds = *1000* numins = *60,000* nusecs = *6,000,000* novosecs.

For centuries men have been seeking a simple relationship between time, space, and terrestrial measurements. A step in this direction is to increase the number of minutes in an hour to *60* (72) and the number of seconds in a minute a like amount. Since time is a function of the rotational period of the earth it is consequently related to angular measurement. We thus obtain, one day equals *20* (twenta) hours, equals *1000* (one dozend) numins, equals *60,000* (sixta dozend) nusec.s A further breakdown for scientific purposes is *100* (one candred) novosecs equals one nusec. The earth's rotational velocity is at the rate of *300,000* (three candozend) novosecs per hour or *6,000,000* (six zilion) novosecs per day. From this it follows that time and angle measurements are related as indicated below:

	TIME one mean solar day		ANGLE one circle
equals	*20* hours	equals	*6* novograds
"	*1000* numins	"	*1000* numins
"	*60,000* nusecs	"	*60,000* nusecs
"	*6,000,000* novosecs	"	*6,000,000* novosecs

(See Fig. 6)

There now remains the important relationship between time and distance on the earth's surface. If we accept the dimensions of the International Ellipsoid [8] as most nearly defining the shape of the earth it is easy to determine some standards

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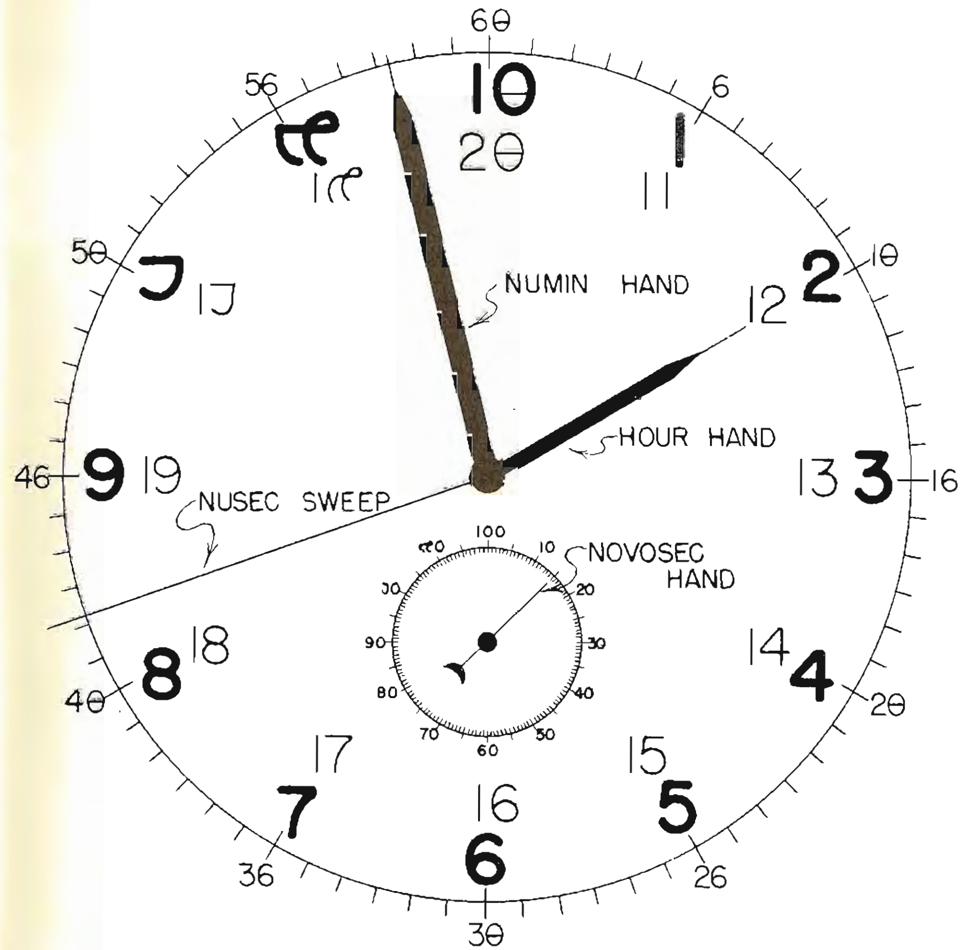
(8) Lambert, Walter D. and Swick, Clarence H. "Formulas and Tables For The Computation of Geodetic Positions on The International Ellipsoid" U. S. Govt. Printing Office, Spcl. Pub. 200 (1935).



DOZENAL 20 HOUR CLOCK

WITH NUSEC SWEEP AND NOVOSEC HAND

of length for geodetic and navigational purposes. The semi-major and semi-minor axes, designated a and b, are defining parameters from which the mean radius or the radius of the replacement sphere may be calculated; $R = \frac{2a+b}{3}$ = unity. Or a more rigorous method would make it equal to a sphere with the same area as the earth.

Having determined the radius of this sphere the length of any great-circle regardless of direction is known. A great-circle of this sphere is divided into *6,000,000* (six zilion) parts called navisecs. A navisec of distance equals *.0000002* (two tan-zilionths) of a great-circle or seven and one third (*7.4*) feet approximately on the replacement sphere. The navisec is designed to replace the meter as a standard for geodetic distances and calculations. For example, the length of a great circle in feet is *7.4* times *6,000,000* equals *38,000,000* (thirta eight zilion) feet or *380,000,000* (three candred eighta zilion) inches.

Because the inch, foot, and even the navisec are relatively small distances when position and length measurements are required for long lines on the surface of the earth some more convenient standards are made up of multiples of these. Thus a navinaut contains *600* (six candred) navisec of *3800* (thirta eight candred) or (three dozend eight candred) feet. Dividing *6,000,000* by *600* or *38,000,000* by *3800* gives *10,000* (tan dozend) as the number of navinauts around the world. Since there are *1000* numins around the world it is evident that *10* navinauts = *1* numin. If we convert *3800*, the number of feet in a navinaut, into its equivalent decimal we get 6336 compared to 6080 in the nautical mile. Of more than passing interest is the fact that *500* (five candred) navisecs equals one statute mile, which when converted to feet is *3080* (three dozend eighta) but *3080* dozenal equals 5280 decimal. Consequently the statute mile would be retained in the new system. However the nautical mile would be replaced by the navinaut, a somewhat longer but much more convenient unit. The correlation table begun with the division of the circle and later added to by the subdivisions of time can now be expanded to include terrestrial distance.(9)

Direction would be defined in terms of the an hour clock. Thus north is *10* o'clock, east *3* o'clock, south *6* o'clock, west *9* o'clock etc. The mariner's compass would have tan (twelve) not *14* (sixteen) cardinal points. A navigators chronometer would have a face similar to that of Figure 6.

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(9) See table titled "Distance, Time, and Angle Measurement Correlation", Fig. 7.

DISTANCE, TIME, AND ANGLE MEASUREMENT CORRELATION

TIME: one mean solar day			ANGLE: one circle	
equals	*20* hours		equals	*6* novograds
"	*1000* numins		"	*1000* numins
"	*60,000* nusecs		"	*60,000* nusecs
"	*6,000,000* novosecs		"	*6,000,000* novosecs

DISTANCE: Earth's great circle	
equals	*20* hours
"	*1000* numins
"	*10,000* navinauts
"	*6,000,000* navisecs

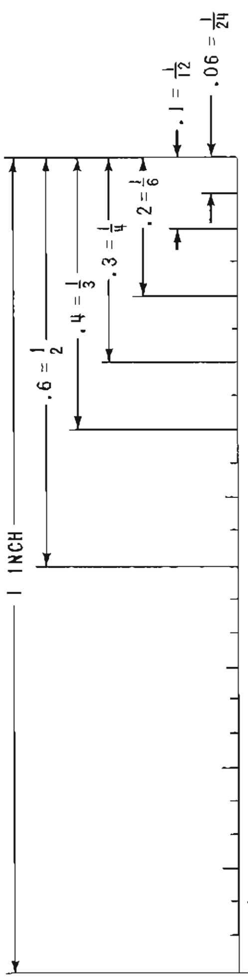
1 navisec	equals	*7.4* feet		
1 navinaut	"	*3800* feet		
1 numin	"	*38,000* feet		
1 hour	"	*600* navinauts	equals	*1,X00,000* feet

FIG. 7

The novosec hand on such a clock would have little practical value for sight reading, since it would make one complete revolution per nusec. The nusec and numin hands would have relatively faster movements than present clocks, however, the rate of the hour hand would not be changed.

From the subdivision of the circle into six parts, representing a circumference it follows that the diameter must equal 2. Applying this correlation to the replacement sphere of the earth in a manner similar to that used to obtain the navisec of arc we can divide the mean diameter of the earth into exactly *2,000,000* (two zilion) lineal parts called diasecs. The value of the diasec thus calculated is *7.04* which is interesting in view of the value previously determined for the navisec *7.04*. Of course this merely represents the ratio between 2π and six in the dozenal system. From this it follows that *2,000,000* diasecs equal one earth diameter which is easily convertible into feet *12,080,000* (duotan zilion eighta dozend) or inches *120,800,000* (one candred twenta zilion eight candozend). A diasec of length equals *.0000006* (six tan zilionths) of an earth diameter, the reciprocal of two zilion.

TABLE FOR MICROSCOPY



10^{-2} = .1	one tanth	= .083	(APPROXIMATE DECIMAL VALUES)	
10^{-3} = .01	= one candredth	= .007		
10^{-2} = .001	= one dozendth	= .000 58		
10^{-4} = .000 1	= one tandozendth	= .000 048		
10^{-5} = .000 01	= one candozendth	= .000 004		
10^{-6} = .000 001	= one zilionth or DICRON	= .000 000 335	= .0085	MICRON
10^{-7} = .000 000 1	= one tanzilionth or tanizili-inch	= .000 000 027 8		
10^{-8} = .000 000 01	= one cantozilionth or cantizili-inch	= .000 000 002 23	= .6	Angstrom
10^{-9} = .000 000 001	= one diliardth or dozizili-inch	= .000 000 000 194	= .05	Angstrom
10^{-J} = .000 000 000 1	= one tendiliardth	= .000 000 000 015 9	= .004	Angstrom
$10^{-\&}$ = .000 000 000 01	= one candiliardth	= .000 000 000 001 35	= 1/3	X unit
3 x $10^{-\&}$ = .000 000 000 03	= three candiliardths	= .000 000 000 004 04	= one	X unit
10^{-10} = .000 000 000 001	= one trilionth or TIMOTAN	= .000 000 000 000 112	= 1/35	X unit

One DICRO-INCH or DICRON equals *1,000,000* (one zilion) TIMOTAN.
One TIMOTAN equals one zilionth of one zilionth of an inch.
DICRON and TIMOTAN are singular and plural.

FIG. 8

For astronomical purposes the earth's diameter may be multiplied by one dozend giving dozodiams (accent on i as in die, a as in along) or one zilion giving degadiams. Thus one degadiam equals *12,080,000,000,000* (duotan trilion eighta diliard) or *12.08* x 10^{10} feet equals *3,J00,000,000* (*3.J* x 10^{9}) (three diliard deci candred zilion) navinauts or, converting the number of feet in a degadiam to its decimal equivalent, we obtain 125,320,745,189,376 feet; but it is easier to call it a degadiam. Roughly one light-year equals *190* (one candred nineta) degadiams.

MICROSCOPY:

Microscopy entails the use of very short lineal measurements. Beginning with the standard inch, which can be evenly divided into halves, thirds, fourths, sixths, tanths, candredths, dozendths, tandozendths, candozendths, zilionths, etc., it is possible to make the lengths as short as we wish by adding ciphers and shifting the dozenal point. The zilionth which may be written *.000001* or 10^{-6} is called a dicro-inch or dicron. One zilionth of a dicron is called a timotan and may be written *.000000000001* or 10^{-10} which equals 1/8,916,100,448,256 which is circa 1.12 x 10^{-13} inches in the decimal system. The timotan is approximately 1/35 X-unit or 1/35,000 Angstrom-unit. Since a micron in the metric system equals one millionth meter and a dicron equals one zilionth inch it follows that the dicron is equivalent to approximately one hundredth (.0085) micron. This comparison is only important in that it conveys a relative meaning to those accustomed to the use of microns and millimicrons in laboratory measurements. In this system all fine measurements would be made in dicron and extremely fine measurements in timotan, dicron and timotan being both singular and plural in a grammatical sense. (See Fig. 8.)

THERMOMETRY:

Now let us look at our method of measuring temperature. Every physicist knows that temperature measurement begins at the absolute zero but to get to it he must go down 273.16 centigrade or 491.45 fahrenheit degrees. But is it necessary to use such figures for temperatures which mean so much in the everyday life of all of us? The dozenal scale has three primary calibration points: the absolute zero, the temperature of melting ice, and the temperature of boiling water at 18.557 pounds per square inch. Note that 18.557 psia is not atmospheric pressure. It is an arbitrarily selected calibration point near that of the standard atmosphere chosen to effect a convenient subdivision of the scale. Practically it is just as logical to select 18.557 as a calibration point as it is to use 14.696 which is the current standard. We thus obtain:

ABSOLUTE ZERO	*0*
MELTING ICE	*300*
BOILING WATER @ 18.557	*400*

From this graduation we have exactly *300* (three candred) divisions between absolute zero and the melting point of ice and exactly *100* (one candred) degrees between the melting point of ice and the boiling point of water. It is not necessary to have below zero and above zero temperatures, however, adoption of this scale does not preclude such usage if found to be desirable. The melting point of ice can be designated zero as readily as it can *300*, in which case the boiling point of water would become *100*.

The advantages of the dozenal temperature scale are quite obvious but temperature alone is not a measure of a quantity of heat. For this a thermal unit is necessary. It is defined as one candredth part of the heat required to raise the temperature of one pound of water from *300* to *400* degrees dozenal. It differs only slightly from the present British-Thermal-Unit.

POWER:

The ton-rod-minute credited to James Watt in his efforts to determine the time rate of performance of his steam engine has evolved to us as the horsepower. The new system would employ the inch-nuance-nusec or the foot-pound-nusec in a manner similar to that currently known as the centimeter-gram-second and meter-kilogram-second units. It is desirable that the convenience of the volt, ampere, watt, ohm relationship be perpetuated, however, the kilowatt would be replaced by the dozowatt and the milliampere by the doziampere; the microfarad by the dicrofarad etc.

DOZENAL PREFIXES AND METRIC COUNTERPARTS

Prefix	Signification		Prefix (metric)	Signification
tanto	*10*	:	deca	10
canto	*100*	:	hecto	100
dozo	*1000*	:	kilo	1000
tanti	*0.1*	:	deci	0.1
canti	*0.01*	:	centi	0.01
dozi	*0.001*	:	milli	0.001
dega	*1,000,000*	:	mega	1,000,000
dicro	*0.000001*	:	micro	0.000001

FIG. 9

One DICRON equals 10^{-6} equals *.000001* inch or one zilionth of an inch. One TIMOTAN = 10^{-10} = *.000000000001* inch or one zilionth of a DICRON. DICRON & TIMOTAN are singular and plural.

Example: One dozonance = *1000* nuances (one dozend nuances)
One dozinance = *.001* nuance (one dozendth nuance)

MONETARY SYSTEM

6	cents = *1*	nickel	= *1/2* dime	= *.06* dollar	
10	" = *2*	"s	= *1*	" = *.10*	"
30	" = *6*	"s	= *3*	"s = *1*	quarter dollar
60	" = *10*	"s	= *6*	"s = *1*	half dollar
100	" = *20*	"s	= *10*	"s = *1*	dollar

Note how easy it is to take *1/3* of a quarter = (1 dime) or *1/2* quarter = (*3* nickels) or *1/3* of a half = (2 dimes). Two bits can be divided into a logical one bit (*3* nickels), an impossibility in our present money system.

NEW BRITISH METRIC COMMITTEE

The British Association for the Advancement of Science has formed a committee, called the British Association Metric Committee, which has been authorized to investigate the practicability, implications, consequences both international and domestic, and the cost of a changeover to the metric system or the decimalization of weights, measures and coinage.

The purpose of the investigation is an objective examination of the pros and cons of the metric system and decimal coinage, - and an assessment of the long-term benefits which might accrue, weighed against the short-term costs and inconveniences.

. . . .

Apparently we are threatened with another instance of Britain's loss of vision and leadership. It is saddening.

Britain has had a long record of brilliant pioneering in the establishment of reliable standards. For many generations, she has led western civilization in its magnificent development. Many of her great minds have perceived the insidious, confining bondage of the system of numbers based on ten; - and have proclaimed that the duodecimal system, based on the dozen, offered great advantages. Some of these long preceded the French decimetric proposals, - such as Thomas Hariot, Joshua Jordaine, and Edw. Hatton.

When the French Metric System was proposed for world adoption, John Playfair published in the Edinburgh Review, (1807), a searching analysis of the faults of that system, and warned that when a system of weights and measures based on ten was combined with the ten number system, the resultant inescapable infactorability would prove intolerable.

Sir Isaac Pitman also supported that view. And Sir Herbert Spencer, in one of the most simply eloquent papers, (Against the Metric System, 1897), informed his world that the change to the dozen base would "facilitate both the thoughts and actions of men, and in so far diminish the friction of life throughout the future, the task of establishing it should be undertaken". He provided funds in his will for the publication of this paper, and for its free distribution among the members of both Houses of Parliament.

One fact, the French Metric System has proven. It has shown beyond any doubt, the necessity to base our numbers and our measures on the same base, in one comprehensive system. But the French system is only partial. It cannot provide convenient measures for time, arc, nor angle; nor can it comprise a congruent notation for music, color, nor electronic computation.

Britain should honor her great pioneers, and follow their guidance in developing a dozenal metric system for the orderly easement of man's thinking, - an advance equal, in its long-range effects, to the Renaissance. Jean Essig, in France, (Douze, Notre Dix Futur, 1956), has pointed the way, in suggesting that consideration be given to revising the Metric System to the twelve-base.