

Historic magazine

THE BIZARRE.

NOTES QUERIES

A MONTHLY MAGAZINE OF

*HISTORY, FOLK-LORE, MATHEMATICS
MYSTICISM, ART, SCIENCE, Etc.*

"God perpetually geometrizes." — *Plato.*

VOLUME V.

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1888.

OF

A



Lingua, Trópus, Ratio, Numērus, Tonus, Angŭlus, Astra.

Language, Rhetoric, Logic, Arithmetic, Music, Geometry, Astronomy.



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-o-o-o-o-

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Zeal and Zest from Zoroaster to Zimmerman.

And so forth, &, Et Cætera, etc.

PREFACE.



This volume, like its predecessors, requires a few general remarks by way of preface, and calls to our mind the words of Quintilian that "this business has more of labor in it than of show." So of a preface, the reader of a book expects a few words as to what the book contains, or why it is published. Hence we say that the subjects of the volume are of a great variety, more liberally extended than those limited to the seven liberal sciences. There is a cause for all things, but it is not always easy to give the reason for the effect, and rise and explain. However, we continue to ask questions, and never received the desired answers to all; so with many of our contributors. There is always a good supply in hand. Every questioner is especially interested in something of interest to himself, or herself.

What is earth, sexton ?	A place to dig graves.
What is earth, rich man ?	A place to work slaves.
What is earth, grey beard ?	A place to grow old.
What is earth, miser ?	A place to dig gold.
What is earth, school boy ?	A place for my play.
What is earth, maiden ?	A place to be gay.
What is earth, seamstress ?	A place where I weep.
What is earth, sluggard ?	A place for to sleep.
What is earth, soldier ?	A place for a battle.
What is earth, herdsman ?	A place to raise cattle.
What is earth, widow ?	A place of true sorrow.
What is earth, tradesman ?	I'll tell you tomorrow.
What is earth, sick man ?	'Tis nothing to me.
What is earth, sailor ?	My home is the sea.
What is earth, statesman ?	A place to win fame.
What is earth, author ?	I'll write there my name.
What is earth, monarch ?	For my realm 'tis given.
What is earth, Christian ?	The gateway of heaven.

S. C. & L. M. Gould.

MANCHESTER, N. H., December, 1888.

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RECAPITULATION.

	No. Questions.	Answered.	Unanswered.
Vol. I,	522	329	193
Vol. II,	491	295	196
Vol. III,	151	106	45
Vol. IV,	185	117	68
Vol. V,	134	61	73
Total,	1483	908	575

About 300 questions remain unanswered, as questions asked in the first volumes are answered in successive volumes. The 575 unanswered questions include the 25 asked in the December No. of this volume.

1888.

457	485	483	463
479	467	469	478
471	475	477	465
481	461	459	487

MISCELLANEOUS

NOTES AND QUERIES,

WITH ANSWERS.

"Man is the first Dialogue that Nature held with God."—GOETHE.

VOL. V.

JANUARY, 1888.

No. 1.

JEW, HEBREW, OR ISRAELITE—THE DIFFERENCE. (Vol. IV, p. 412.)
A *Jew* is a Judæan; formerly one of the tribe and then of the kingdom of Judah; and later an inhabitant of Judæa.

Hebrew is from the Hebrew word *Eber*, "over." The passover or *pascha* undoubtedly was a custom reminding the Abrahamids of their emigration, and the crossing of the Euphrates at Tiphseh or Thapsakos; and from that crossing they were called Hebrews or over-people. *Iberia* has the same meaning. Abraham is the first one called a Hebrew (Genesis xiv, 13.) The term, however, is never given to his reputed descendants, the Idumeians, Ishmaelites, Midianites, and Nabatheans of Arabia; and I suspect that they were Erythraians from India, or Semites of an anterior descent.

The *Israelites* were the reputed posterity of Jacob, surnamed Israel. In the Bible they are first described as the Abrahamids and Arabs that left Egypt and ruled in Palestine; but at the death of Saul the Judæans made David their king, and so their adherents were largely included under that name. I doubt the existence of "twelve" tribes. That is astrological. The Canon was established by the Makkabees about 200 B. C.; and the "historical books" were compiled or revised at that time. The evidence that the Patriarchs, Judges, and early kings were historical characters is very slight.

A. WILDER, M. D., Newark N. J.

Council of Nicæa (Nice) and the Biblical Canon.

On page 372 of NOTES AND QUERIES, September, 1887, it is stated, "at the Council of Nicæa the canon of Scriptures was one of the chief objects of settlement, as to what books were to be received with authority, and what not." This is a mistake. In no trustworthy history of the first Nicene Council (A. D. 325), ancient or modern, can be found any reference to this council having in any manner had under consideration the canonicity of the scriptural writings. The extant accounts of the proceedings of the council, as given by eye-witnesses and members,—namely, Eusebius, Athanasius, Eustathius of Antioch, Auxano, a Novitian presbyter, and others with whom Jerome had conversed,—make no reference to any such action by the council.

The following are the only authentic sources of information concerning this council: Eusebius, "De Vita Constantini," III, 4-24, and "Theod." I, 9; Socrates, "Hist. Eccles.," I 4-14; Sozomen, "Hist. Eccles." I 15-28; Theodoret, "Hist. Eccles." I 1-3; Philostorgius, "Arian Fragments"; Rufinus, "Hist. Eccles." I 1-6, Ambrose, "De Fide;" "Acta Concilii Nicæni;" in Combes' "Novum Auctarium Biblioth. Patr.," vol. II, p. 547; Gelasius Cyzicenus, "Commentar de Synodo Nicæno," I ib. III, in Hardouins; "Concilorum Collectio," vol. I, p. 345 *et seq.*; Maruthas, "Lost History of Council of Nicæa" (in Syriac), in Asseman, "Biblioth. Orient," I, pp. 177, 195; Renaudot, "Hist. Patriarch, Alexandriner," p. 69 *et seq.*; various treatises in the first volume of Athanasius's works, especially his "Epistola de Nicænis Decretis;" several passages in Ephiphanius, "Contra Hæreses," lib. III, and Cowper's "Analecta Nicæna." All other narratives anent this council are based upon the foregoing, and contain nothing authentic not found in them. The British Museum contains a fragment of a Syrian manuscript concerning the Nicene Council written in A. D. 501. It furnishes a number of valuable data concerning this council not elsewhere accessible. Among other things it gives a list of all the decrees or canons of the council, but among them there is no canon concerning the authenticity of the Scriptures.

The sole foundation for the statement that this council took action relative to the selection of the canonical from the apocryphal books of

the Bible, is contained in a curious little manuscript, written by an unknown Greek author, certainly as late as the latter part of the ninth century, and perhaps later. This manuscript was brought from the Morea in the sixteenth century by Andreas Darmasius, and it was bought by Rev. John Pappus, a learned Lutheran Divine, who first published it in 1601, in Strasburg, in the original Greek, with a Latin version of his own. Its title in Greek was given as "Sunodikion Periechon en epitome hapasas apo ton hagion Apostolon gegonuias orthodoxous kai hairetikas sunodous." Its name in Latin was given by Pappus, as follows : " Libellus Synodicus, omnes synodus, tam orthodoxas quam haereticas ; brevi compendio continens quae ab Apostolorum inde tempore usque ad octavam." It contains an epitome of the proceedings of all the church councils, orthodox and heretical, from the time of the apostles down to the great eighth council of A. D. 869. It is published complete, both in Greek and Latin, under the title, " Synodicon Vetus," in Fabricius's " Bibliotheca Graeca." In the original Hamburg edition of Fabricius, in 14 quarto volumes, 1795-1828, the " Synodicon " can be found in volume XI, pp. 185-258 ; in Harles's revised edition, in 12 volumes, 1790-1809, it may be found in volume XII, pp. 360 *et seq.* It is also published entire in Voel and Justel's " Bibliotheca juris canon veteris," volume II, pp. 1166 *et seq.* ; and in Hardouin's " Conciliorum Collectio," volume V, pp. 1291 *et seq.* Mansi, in his great compilation, " Sacrorum conciliorum nova et amplissima collectio," 31 volumes, Florence, 1759, *et seq.*, included the " Libellus Synodicus " ; but he separated its various parts, distributing them throughout his work under the various councils to which they pertained,—that portion relating to the action of the Nicene Council upon the biblical canon being found in vol. II, p. 749.

" Synodicon Vetus " or " Libellus Synodicus " is a very inaccurate and unreliable little book. Various instances of its blunders, errors, and general untrustworthiness are indicated in C. J. Hefele's " History of the Christian Councils." See volume I, pp. 79, 80, 83, 84, 96, 125, 126, 223, English translation, Edinburgh, 1871.

In this obscure work, teeming with errors, written at a late date, written by whom, no one knows, is contained the first, last, and only mention of the Nicene council having decided upon the canonicity of the biblical books ; and in this account, as related in chapter xxxiv of the work, the decision is made, not by a vote of the council, but by

a miracle ! The following is the passage in the original Greek (Fabricius, "Bibl. Graece," original edition, XI, 198) :

"Τας ον Διαθηκους βιβλους και αποκρυφους, τοιδε trope kata delous poiesasa. En gar to oiko ton Theon, kato para te theia trapeze autas parathemene proseuxato, hos eurethenai thas theopnoustous epano, ton kurion exaitusamene, kai tas kibdelous, ho kai gegonen, upokaiden."

The passage in the Latin version is as follows :

"Sacros etiam libros et apocryphos, hoc modo manifesto fecit. In domo enim Dei, inferiore loco juxta divinam nensam omnibus collocatis, Dominum invocans oravit : ut qui divinitus inspirati essent, superius ; qui autem adulterini, inferius (quod et factum est) invenirentur."

This may be rendered in English thus :

"The council made manifest the canonical and apocryphal books in the following manner : Placing them by the side of the divine table in the house of God, they prayed, entreating the Lord that the divinely inspired books might be found upon the table, and the spurious ones underneath ; and it so happened."

The manner in which this story has obtained so general a circulation in this century, is this : Robert Taylor, an antichristian polemic of the earlier portion of the century, quotes a part of the foregoing passage in his "Diegesis (a virulent onslaught upon the Christian religion), p. 432, American edition, preceding his quotation with the following : "Pappus, in his 'Synodicon,' to the council of Nice, asserts." This gave rise to the impression that Pappus himself was the author of the passage, instead of his being only the editor of the anonymous work in which it is found ; and from that day to this, Pappus has been named as the author of the statement, scarcely anybody having any idea who Pappus was or when he lived. From Taylor's "Diegesis" it passed into general literature, particularly that of the free-thinking or liberal school. I have seen it stated in a number of books, and in two cases the author has been given as the learned *Pappius*, instead of *Pappus*.

The narrative is merely one of the many legendary embellishments of the mediaeval ages, and is universally rejected by the world's scholarship as destitute of any historic foundation.

WM. EMMETTE COLEMAN, San Francisco, Cal.

"EITHER" AND "NEITHER." As the words "not either" have been contracted into *neither*, "not ever" into *never*, and "no one" into *none*, why should not the negative or privative, when followed by a vowel, be always contracted in the same way ? For example, *neven* for "not even," *nin* for "not in," and *nout* for "not out" ?

THE LUNAR SOCIETY. This society was an informal association of scientific men in Birmingham, Eng., which flourished between 1780 and 1801, and perhaps later. The society numbered only seven or eight members who dined together every month near the full moon, "in order," says Priestley, "to have the benefit of its light in returning home." Hence the name, "Lunar Society." The members were accustomed to meet for dinner at two o'clock and not to part until eight; they discussed current chemical and philosophical subjects. On one occasion they considered "whether or not heat is a compound of phlogiston and empyreal air"; also, "what light is made of and how to make it." The society was probably founded by James Watt and it embraced the following eminent men of science:

James Watt (1736-1819), the celebrated inventor of improvements in the steam engine, and one of the claimants for the discovery of the composition of water.

James Keir (17—1814), a chemist and author; also, proprietor of several chemical establishments at West Bromwich, near Birmingham.

Dr. William Withering (1741-1799), physician and chemist; discoverer of the constituents of the mineral witherite named in his honor.

Matthew Boulton (1728-1809), mechanical engineer, and partner of James Watt.

Dr. Erasmus Darwin (1731-1802), the distinguished naturalist, author of "The Botanic Garden," etc.

Samuel Galton, F. R. S., a wealthy man of letters.

Rev. R. A. Johnson, of Kenilworth.

Rev. Dr. Joseph Priestley (1733-1804), the noted theological writer, the discoverer of oxygen, and the father of pneumatic chemistry.

These gentlemen not unfrequently entertained guests at their philosophical banquets; among them were:

Josiah Wedgwood (1730-1795), the well-known potter and inventor of the ware known by his name.

Mr. Wilkinson, a connection by marriage of Dr. Priestley.

William Bewly, a surgeon and apothecary of Norfolk, author of letters on the chemistry of gases; a friend of Dr. Priestley.

H. CARRINGTON BOLTON, New York City.

"THE LOCOMOTIVE EMPEROR." (Vol. III, p. 171.) Adrian traveled incessantly, and hated to remain long in a place. He had a disagreeable wife, and was himself of an imperious temper and philosophical taste.

A. WILDER.

QUESTIONS AND ANSWERS.

SONGS OF A NATION. (Vol. III, p. 59.) The songs of a nation are contrasted with its laws. In Greek, *nomos* was first a song; afterwards a *law*. The code of Drakō consisted of *thesmoi* — laws or ordinances of the gods; the institutes of Solōn were *nomoi*; so the saying, "Give me the making of the songs of a nation and I care not who makes its laws," relates to the popular rule as superseding the Eupatrid or higher-caste domination.

THE SHAMROCK. (Vol. III, p. 76.) The shamrock is the trefoil, or three-leaved *Oxalis*. It is the same as the device on cards called "clubs," and is also the equivalent of the cross. It is "pagan" to the core; common alike to Ireland and Ceylon, and everywhere meaning the same—the triad God. The sacred fig is three-leaved, and therefore a symbol of life.

THE VATICAN. (Vol. III, p. 76.) Vatican is from *vates* a mantis or prophet-priest. It is a "pagan" word and belongs to paganism.

BAUGH-NAUGH-CLAUGH-PAUGH. I suspect that this long word is but a merry jest, and that *bonnyclabber* is all that is meant.

POMPEII. (Vol. III, p. 76.) Pompeii is a Greek name from *Pompeios*, a name of Hermes as the psychopompos or leader of souls from this world to the next, and of the procession of candidates for initiation, who were mystically dead. Herculaneum of course is from Hercules.

GYPSIES. (Vol. p. 76.) Gypsies were called *Bohemians* as having been supposed to have originated in Bohemia. Penny-a-liners and other writers having no permanent work or employment also are so called by analogy.

"A" in SANSKRIT WORDS. (Vol. III, p. 140.) The letter *a* preponderates in Sanskrit words because in the original there is no vowel, and yet a vowel sound is required. The Semitic dialects have the same peculiarity. A short *a* is adopted as nearest the genuine sound.

"DJAFAR." (Vol. III, 121.) Djafar, or Giafar, was immortalized in "Arabian Nights Entertainments" as the Virgin of Haran al Rasit the celebrated Khalif.

A. WILDER.

THE SUPPOSED "MATHEMATICAL FALLACY." (Vol. III, pp. 171, 198; IV, pp. 262, 399, 341.) Your two correspondents upon the supposed "mathematical fallacy" appear to be suffering from what the logicians call an "undistributed middle." Starting from the proposition that, if two quantities are equal, their square roots must also be equal, and disregarding the fact that every number has two different square roots, they proceed as though either square root of the first member of the equation must be equal to each square root of the second member. Hence the erroneous equations, Vol. III, pp 198, 262. When the proper signs are prefixed to the several values, the equations are true, otherwise they are not. In other words, we have, provided the correct signs are used,

$$\frac{\pm\sqrt{1}}{\pm\sqrt{-1}} = \frac{\pm\sqrt{-1}}{\pm\sqrt{1}}$$

in which the radical quantities are considered in their intrinsic values only, without regard to the ambiguity of signs. Now, if either the upper or the lower signs were used throughout, this would be another mode of writing $+1 = -1$, which is hardly demonstratable. But if we vary the algebraic signs in every possible way, we shall find that all the sixteen resulting equations, after being cleared from the fractional forms, are reducible to some one of the following four, each of which must be true :

$$\begin{aligned} (+\sqrt{-1})(+\sqrt{-1}) &= -1 \\ (-\sqrt{-1})(-\sqrt{-1}) &= -1 \\ (+\sqrt{-1})(-\sqrt{-1}) &= +1 \\ (-\sqrt{-1})(+\sqrt{-1}) &= +1 \end{aligned}$$

To omit the algebraic signs from the factors of the first members, and combine these signs into the form ± 1 in the second, is a looseness which naturally leads to an absurd result in just one half the cases. We may, however, generalize the form by writing

$$(\pm\sqrt{-1})(\pm\sqrt{-1}) = \mp 1$$

provided that the equation be accompanied by the statement, that the upper sign in the second member holds only when both the upper, or both the lower, signs are used in the first member ; but that the lower sign in the second represents the cases when the upper sign is used for one factor of the first member, and the lower sign of the other.

N. P. D.

Table of the 271 Asteroids—1801 to 1887.

NO.	NAME.	DATE OF DISCOVERY.	DISCOVERER.
1.	Ceres,	Jan. 1, 1801,	Piazzi ₁ .
2.	Pallas,	Mar. 28, 1802,	Olbers ₁ .
3.	Juno,	Sept. 1, 1804,	Harding ₁ .
4.	Vesta,	Mar. 29, 1807,	Olbers ₂ .
5.	Astræa,	Dec. 8, 1845,	Hencke ₁ .
6.	Hebe,	July 1, 1847,	Hencke ₂ .
7.	Iris,	Aug. 13,	Hind ₁ .
8.	Flora,	Oct. 18,	Hind ₂ .
9.	Metis,	April 25, 1848,	Graham ₁ .
10.	Hygeia,	April 12, 1849,	De Gasparis ₁ .
11.	Parthenope,	May 11, 1850,	De Gasparis ₂ .
12.	Victoria,	Sept. 13,	Hind ₃ .
13.	Egeria,	Nov. 2,	De Gasparis ₃ .
14.	Irene,	May 19, 1851,	Hind ₄ .
15.	Eunomia,	July 29,	De Gasparis ₄ .
16.	Psyche,	Mar. 17, 1852,	De Gasparis ₅ .
17.	Thetis,	April 17,	Luther ₁ .
18.	Melpomene,	June 24,	Hind ₅ .
19.	Fortuna,	Aug. 22,	Hind ₆ .
20.	Massalia,	Sept. 19,	De Gasparis ₆ .
21.	Lutetia,	Nov. 15,	Goldschmidt ₁ .
22.	Calliope,	Nov. 16,	Hind ₇ .
23.	Thalia,	Dec. 15,	Hind ₈ .
24.	Themis.	April 5, 1853,	De Gasparis ₇ .
25.	Phocæa,	April 6,	Chacornac ₁ .
26.	Proserpina,	May 5,	Luther ₂ .
27.	Euterpe,	Nov. 8,	Hind ₉ .
28.	Bellona.	Mar. 1, 1854,	Luther ₃ .
29.	Amphitrite,	Mar. 1,	Marth ₁ .
30.	Urania,	July 22,	Hind ₁₀ .
31.	Euphrosyne,	Sept. 1,	Ferguson ₁ .
32.	Pomona,	Oct. 26,	Goldschmidt ₂ .
33.	Polyhymnia,	Oct. 28,	Chacornac ₂ .
34.	Circe,	April 6, 1855,	Chacornac ₃ .
35.	Leucothea,	April 19,	Luther ₄ .
36.	Atalanta,	Oct. 5,	Goldschmidt ₃ .
37.	Fides,	Oct. 5,	Luther ₅ .
38.	Leda,	Jan. 12, 1856,	Chacornac ₄ .
39.	Lætitia,	Feb. 8,	Chacornac ₅ .
40.	Harmonia,	Mar. 31,	Goldschmidt ₄ .
41.	Daphne,	May 22,	Goldschmidt ₅ .
42.	Isis,	May 23,	Pogson ₁ .

43.	Ariadne,	April 5, 1856,	Pogson _g .
44.	Nysa,	May 27,	Goldschmidt _g .
45.	Eugenia,	June 27,	Goldschmidt ₇ .
46.	Hestia,	Aug. 16,	Pogson _g .
47.	Melete,	Sept. 9,	Goldschmidt _g .
48.	Aglaia,	Sept. 15,	Luther _g .
49.	Doris,	Sept. 19,	Goldschmidt _g .
50.	Pales,	Sept. 19,	Goldschmidt ₁₀ .
51.	Virginia,	Oct. 4,	Ferguson ₂ .
52.	Nemausa,	Jan. 22, 1858,	Laurent ₁ .
53.	Europa,	Feb. 4,	Goldschmidt ₁₁ .
54.	Calypso,	April 4,	Luther ₇ .
55.	Alexandra,	Sept. 10,	Goldschmidt ₁₂ .
56.	Pandora,	Sept. 10,	Searle ₁ .
57.	Mnemosyne,	Sept. 22, 1859,	Luther _g .
58.	Concordia,	Mar. 24, 1860,	Luther _g .
59.	Elpis,	Sept. 9,	Chacornac _g .
60.	Danaë,	Sept. 12,	Goldschmidt ₁₃ .
61.	Echo,	Sept. 14,	Ferguson ₂ .
62.	Erato,	Sept. 14,	Förster ₁ .
63.	Ausonia,	Feb. 10, 1861,	De Gasparis _g .
64.	Angelina,	Mar. 4,	Tempel ₁ .
65.	Cybele,	Mar. 8,	Tempel ₂ .
66.	Maia,	April 9,	Tuttle ₁ .
67.	Asia,	April 17,	Pogson _g .
68.	Leto,	April 29,	Luther ₁₀ .
69.	Hesperia,	April 29,	Schiaparelli ₁ .
70.	Panopæa,	May 5,	Goldschmidt ₁₄ .
71.	Niobe,	Aug. 13,	Luther ₁₁ .
72.	Feronia,	May 29,	C. H. F. [Peters ₁ .
73.	Clytie,	April 7, 1862,	Tuttle ₂ .
74.	Galatea,	Aug. 29,	Tempel _g .
75.	Eurydice,	Sept. 22,	Peters ₂ .
86.	Freia,	Oct. 21,	D'Arrest ₁ .
77.	Frigga,	Nov. 12,	Peters ₂ .
78.	Diana,	Mar. 15, 1863,	Luther ₁₂ .
79.	Eurynome,	Sept. 14,	Watson ₁ .
80.	Sappho,	May. 2, 1864,	Pogson _g .
81.	Terpsichore,	Sept. 30,	Tempel ₄ .
81.	Alcmene,	Nov. 27,	Luther ₁₃ .
83.	Beatrix,	April 26, 1865,	De Gasparis _g .
84.	Clio,	Aug. 25,	Luther ₁₄ .
85.	Io,	Sept. 19,	Peters ₄ .
86.	Semele,	Jan. 4, 1866,	Tietjen ₁ .
87.	Sylvia,	May 16,	Pogson _g .
88.	Thisbe,	June 15,	Peters _g .

89.	Julia,	Aug. 6, 1866,	Stephan ₁ .
90.	Antiope,	Oct. 1,	Luther ₁₆ .
91.	Ægina,	Nov. 4,	Borrelly ₁ .
92.	Undina,	July 7, 1867,	Peters ₆ .
93.	Minerva,	Aug. 24,	Watson ₂₉ .
94.	Aurora,	Sept. 6,	Watson ₈ .
95.	Arethusa,	Nov. 23,	Luther ₁₆ .
96.	Ægle,	Feb. 17, 1868,	Coggia ₁ .
97.	Clotho,	Feb. 17,	Tempel ₆ .
98.	Ianthe,	April 18,	Peters ₇ .
99.	Dike,	May 28,	Borrelly ₂ .
100.	Hecate,	July 11,	Watson ₄ .
101.	Helena,	Aug. 15,	Watson ₆ .
102.	Miriam,	Aug. 22,	Peters ₈ .
103.	Hera,	Sept. 7,	Watson ₆ .
104.	Clymene,	Sept. 13,	Watson ₇ .
105.	Artemis,	Sept. 16,	Watson ₈ .
106.	Dione,	Oct. 10,	Watson ₉ .
107.	Damilla,	Nov. 17,	Pogson ₇ .
108.	Hecuba,	April 2, 1869,	Luther ₁₇ .
109.	Felicitas,	Oct. 9,	Peters ₉ .
110.	Lydia,	April 19, 1870,	Borrelly ₈ .
111.	Ate,	Aug. 14,	Peters ₁₀ .
112.	Iphigenia,	Sept. 19,	Peters ₁₁ .
113.	Amalthea,	Mar. 12, 1871,	Luther ₁₈ .
114.	Cassandra,	July 23,	Peters ₁₂ .
115.	Thyra,	Aug. 6,	Watson ₁₀ .
116.	Sirona,	Sept. 8,	Peters ₁₈ .
117.	Lomia,	Sept. 12,	Borrelly ₄ .
118.	Peitho,	Mar. 15, 1872,	Luther ₁₉ .
119.	Althæa,	April 3,	Watson ₁₁ .
120.	Lachesis,	April 10,	Borrelly ₆ .
121.	Hermione,	May 12,	Watson ₁₂ .
122.	Gerda,	July 31,	Peters ₁₄ .
123.	Brunhilda,	July 31,	Peters ₁₈ .
124.	Alceste.	Aug. 23,	Peters ₁₆ .
125.	Liberatrix,	Sept. 11,	Prosper Henry ₁ .
126.	Velleda,	Nov. 5,	Paul Henry ₁ .
127.	Johanna,	Nov. 5,	Prosper Henry ₂ .
128.	Nemesis,	Nov. 25,	Watson ₁₉ .
129.	Antigone,	Feb. 5, 1873,	Peters ₁₇ .
130.	Electra,	Feb. 17,	Peters ₁₈ .
131.	Vala,	May 24,	Peters ₁₉ .
132.	Æthra,	June 13,	Watson ₁₄ .
133.	Cyrene,	Aug. 16,	Watson ₁₆ .

134.	Sophrosyne,	Sept. 27,	1873,	Luther ₂₀ .
125.	Hertha,	Feb. 18,	1874,	Peters ₂₀ .
136.	Austria,	Mar. 18,		Palisa ₁ .
137.	Melibœa,	April 21,		Palisa ₂ .
138.	Tolosa,	May 19,		Perrotin ₁ .
139.	Juewa,	Oct. 10,		Watson ₁₈ .
140.	Siwa,	Oct. 13,		Palisa ₂ .
141.	Lumen,	Jan. 13,	1875,	Paul Henry ₂ .
142.	Polana,	Jan. 28,		Palisa ₄ .
143.	Adria,	Eeb. 23,		Palisa ₅ .
144.	Vibilia,	June 3,		Peters ₂₁ .
145.	Adeona,	June 3,		Peters ₂₂ .
146.	Lucina,	June 8,		Borrelly ₆ .
147.	Prologenia,	July 10,		Schulhof ₁ .
148.	Gallia,	Aug. 7,		Prosper Henry ₂ .
149.	Medusa,	Sept. 21,		Perrotin ₂ .
150.	Nuwa,	Oct. 18,		Watson ₁₇ .
151.	Abundantia,	Nov. 1,		Palisa ₅ .
152.	Atala,	Nov. 2,		Paul Henry ₂ .
153.	Hilda,	Nov. 2,		Palisa ₇ .
154.	Bertha,	Nov. 4,		Prosper Henry ₄ .
155.	Scylla,	Nov. 8,		Palisa ₃ .
156.	Xauthippe,	Nov. 22,		Palisa ₃ .
157.	Dejanira,	Dec. 1,		Borrelly ₇ .
158.	Coronis,	Jan. 4,	1876,	Knorre ₁ .
159.	Æmilia,	Jan. 26,		Paul Henry ₄ .
160.	Una,	Feb. 20,		Peters ₂₂ .
161.	Athor,	April 19,		Watson ₁₈ .
162.	Laurentia.	April 21,		Prosper Henry ₂ .
163.	Erigone,	April 26,		Perrotin ₂ .
164.	Eva,	July 12,		Paul Henry ₈ .
165.	Loreley,	Aug. 9,		Peters ₂₄ .
166.	Rhodope,	Aug. 15,		Peters ₂₅ .
167.	Urda,	Aug. 28,		Peters ₂₆ .
168.	Sibylla,	Sept. 28,		Watson ₁₉ .
169.	Zelia,	Sept. 28,		Prosper Henry ₂ .
170.	Maria,	Jan. 10,	1877,	Perrotin ₄ .
171.	Ophelia,	Jan. 13,		Borrelly ₈ .
172.	Baucis,	Feb. 5,		Borrelly ₉ .
173.	Ino,	Aug. 1,		Borrelly ₁₀ .
174.	Phædra,	Sept. 2,		Watson ₂₀ .
175.	Andromache,	Oct. 1,		Watson ₂₁ .
176.	Idunna,	Oct. 14,		Peters ₂₇ .
177.	Irma,	Nov. 5,		Paul Henry ₆ .
178.	Belisana,	Nov. 6,		Palisa ₁₀ .
179.	Clytemnestra,	Nov. 11,		Watson ₂₂ .

180.	Garumna,	Jan. 29, 1878,	Perrotin ₈ .
181.	Eucharis,	Feb. 2,	Cottenot ₁ .
182.	Elsa,	Feb. 7,	Palisa ₁₁ .
183.	Istra,	Feb. 8,	Palisa ₁₂ .
184.	Deiopeia,	Feb. 28,	Palisa ₁₃ .
185.	Eunike,	Mar. 1,	Peters ₂₈ .
186.	Celuta,	April 6,	Prosper Henry ₇ .
187.	Lamberta,	April 11,	Coggia ₂ .
188.	Menippe,	June 18,	Peters ₂₉ .
189.	Phthia,	Sept. 9,	Peters ₃₀ .
190.	Ismene,	Sept. 22,	Peters ₃₁ .
191.	Kolga,	Sept. 30,	Peters ₃₂ .
192.	Nausicaä,	Feb. 17, 1819,	Palisa ₁₄ .
193.	Ambrosia,	Feb. 28,	Coggia ₃ .
194.	Prokne,	Mar. 21,	Peters ₃₃ .
195.	Eurykleia,	April 19,	Palisa ₁₅ .
196.	Philomela,	May 14,	Peters ₃₄ .
197.	Arete,	May 21,	Palisa ₁₆ .
198.	Ampella,	June 13,	Borrelly ₁₂ .
199.	Byblis,	Suly 9,	Peters ₃₅ .
200.	Dynamène,	July 27,	Peters ₃₆ .
201.	Penelope,	Aug. 7,	Palisa ₁₇ .
202.	Chryseis,	Sept. 11,	Peters ₃₇ .
203.	Pompeia,	Sept. 25,	Peters ₃₈ .
204.	Callisto,	Oct. 8,	Palisa ₁₈ .
205.	Martha,	Oct. 13,	Palisa ₁₉ .
206.	Hersilia,	Oct. 13,	Peters ₃₉ .
207.	Hedda,	Oct. 27,	Palisa ₂₀ .
208.	Lacrimosa,	Oct. 21,	Palisa ₂₁ .
209.	Dido,	Oct. 22,	Peters ₄₀ .
210.	Isabella,	Nov. 12,	Palisa ₂₂ .
211.	Isolda,	Dec. 10,	Palisa ₂₃ .
212.	Medea,	Feb. 6, 1880,	Palisa ₂₄ .
213.	Lilæa,	Feb. 16,	Peters ₄₁ .
214.	Aschera.	Feb. 29,	Palisa ₂₅ .
215.	Oenome,	April 7,	Knorre ₂ .
216.	Cleopatra,	April 10,	Palisa ₂₆ .
217.	Eudora,	Aug. 30,	Coggia ₄ .
218.	Bianca,	Sept. 4,	Palisa ₂₇ .
219.	Thusnelda,	Sept. 28,	Palisa ₂₈ .
220.	Stephania,	Feb. 23, 1881,	Palisa ₂₉ .
221.	Eos,	Jan. 18, 1882,	Palisa ₃₀ .
222.	Lucia,	Feb. 9,	Palisa ₃₁ .
223.	Rosa.	Mar. 9,	Palisa ₃₂ .
224.	Oceana.	Mar. 30,	Palisa ₃₃ .
225.	Henrietta,	April 19,	Palisa ₃₄ .

226.	Weringia,	July 19, 1882,	Palisa ₈₅ .
227.	Philosophia,	Aug. 12,	Paul Henry ₇ .
228.	Agathe,	Aug. 19,	Palisa ₈₆ .
229.	Adelinda,	Aug. 22,	Palisa ₈₇ .
230.	Athamantis,	Sept. 3,	DeBall ₁ .
231.	Vindobona,	Sept. 10,	Palisa ₈₈ .
232.	Russia,	Jan. 31, 1883,	Palisa ₈₉ .
233.	Asterope,	May 11,	Borrelly ₁₃ .
234.	Barbara,	Aug. 12,	Peters ₄₃ .
235.	Carolina,	Nov. 28,	Palisa ₉₀ .
236.	Honorio,	April 26, 1884,	Palisa ₉₁ .
237.	Cœlestina,	June 27,	Palisa ₉₂ .
238.	Hypatia,	July 1,	Knorre ₅ .
239.	Adrastea,	Aug. 18,	Palisa ₉₃ .
240.	Vanadis,	Aug. 27,	Borrelly ₁₈ .
241.	Germania,	Sept. 12,	Luther ₂₁ .
242.	Kriemhilda,	Sept. 22,	Palisa ₉₄ .
243.	Ida,	Sept. 29,	Palisa ₉₅ .
244.	Sita,	Oct. 14,	Palisa ₉₆ .
245.	Vera,	Feb. 6,	Pogson ₉ .
246.	Asporina,	Mar. 6,	Borrelly ₁₄ .
247.	Eukrate,	Mar. 14,	Luther ₂₂ .
248.	Lameia,	June 5,	Palisa ₉₇ .
249.	Ilse,	Aug. 16,	Peters ₄₈ .
250.	Bettina,	Sept. 3,	Palisa ₉₈ .
251.	Sophia,	Oct. 4,	Palisa ₉₉ .
252.	Clementina,	Oct. 11,	Perrotin ₆ .
253.	Matilda,	Nov. 12,	Palisa ₁₀₀ .
254.	Augusta,	Mar. 31, 1886,	Palisa ₁₀₁ .
255.	Oppavia,	Apr. 2,	Palisa ₁₀₂ .
256.	Walpurga,	Apr. 3,	Palisa ₁₀₃ .
257.	Silesia,	Apr. 5,	Palisa ₁₀₄ .
258.	Tyche,	May 7,	Luther ₂₃ .
259.	Aletheia,	June 28,	Peters ₄₄ .
260.	Huberta,	Oct. 3,	Palisa ₁₀₅ .
261.	Prymno,	Oct. 31,	Peters ₄₅ .
262.	Valda,	Nov. 3,	Palisa ₁₀₆ .
263.	Dresda,	Nov. 3,	Palisa ₁₀₇ .
264.	Libussa,	Dec. 22,	Peters ₄₆ .
265.	Anna,	Feb. 25, 1887,	Palisa ₁₀₈ .
266.	Aline	May 17,	Palisa ₁₀₉ .
267.	Tirza,	May 27,	Charlois ₁ .
268.	Adorea,	June 11,	Borrelly ₁₅ .
269.		Sept. 21,	Palisa ₁₁₀ .
270.	Anahita,	Oct. 8,	Peters ₄₇ .
271.		Oct. 16,	Knorre ₄ .

OBSERVATIONS ON THE ASTEROIDS. A call for a complete list of the Asteroids has waited for nearly a year.

The discovery of these planetoids have been numerous in later years.

The subscript figures immediately following the discoverers' names indicate the number each discovered successively.

The number discovered in each decade are as follows :

1801 to 1850 inclusive (first fifty years)	13
1851 to 1860 - - - - -	49
1861 to 1870 - - - - -	50
1871 to 1880 - - - - -	107
1881 to 1887 - - - - -	52
Total,	271

Dr. Palisa, of Europe, leads in the list — he having discovered 60 ; while Dr. Peters, of America, follows, as second in the list, with 47 ; these two together having discovered more than one-third of the 271.

Of the 271 Asteroids thus far known, 77 were discovered by American astronomers, and 196 by European astronomers.

Names. No. 47 (Melete) was first named *Pseudo-Daphne* ("false-Daphne") by its discoverer, Goldschmidt, because when he discovered No. 41 (Daphne), he soon after lost it ; and in searching for it later, he discovered No. 47 (Melete) and in turn lost this also, and not until August 27, 1861, did he re-discover Melete or "Pseudo-Daphne."

Nos. 49 and 50 (Doris and Pales) were called the "twin planets," because Goldschmidt discovered them at the same time, Sept. 19, 1857.

No. 59 (Elpis) was first called "Olympia," but afterwards named Elpis.

No. 65 (Cybele) was first called "Maximiliana," but of late years it has been called Cybele.

The Nine Muses have been immortalized by their names :

No. 18. Melpomene, Hind.	No. 33. Polyhymnia, Chacornac.
No. 22. Calliope, Hind.	No. 62. Erato, Förster.
No. 23. Thalia, Hind.	No. 81. Terpsichore, Tempel.
No. 27. Euterpe, Hind.	No. 84. Clio, Luther.
No. 30. Urania, Hind.	

Prof. Hind evidently intended to continue with the names of the last three Muses had not No. 30 (Urania) been his 8th and last dis-

covery of an Asteroid. Hence the names were completed as given.

The names of the Three Graces appear: No. 23 (Thalia), No. 31, (Euphrosynê), and No. 48 (Aglaia). While the names of only two of the Three Fates appear: No. 97 (Clôthô), and No. 120 (Lachesis); the other Fate is Atropos.

Several countries have been immortalized: No. 53 (Europa), No. 97 (Asia), No. 136 (Austria), No. 232 (Russia), and 241 (Germania).

FIRST MENTION OF ICE-CREAM. The first mention of ice-cream that is found in our history is in the account of the festivities following Washington's first inauguration as president, in the city of New York, in 1789. Among the ices used on that occasion was ice-cream, which is said to have been prepared, or at least suggested, by Dolly Adams, then the brightest star in social and diplomatic circles. The new confection made quite a sensation at that time, and probably helped to increase Dolly Adams's popularity.—*Pittsburgh Dispatch*.

THE MOTIVE POWER OF THE WORLD. Four fifths of the engines now working in the world have been constructed during the last twenty-five years. France owns 47,590 stationary or locomotive boilers, 7,000 locomotives, and 1,850 boilers of boats; Germany has 10,000 locomotives, 59,000 boilers, and 1,700 ships' boilers; Austria has 12,000 boilers, and 2,800 locomotives.

The force equivalent to the working power steam engines represent: in the United States, 7,500,000-horse power; in England, 7,000,000-horse power; in France, 3,000,000-horse power; in Austria, 1,500,000-horse power; and in Germany, 4,500,000-horse power. In these figures the motive power of the locomotives is not included, whose number in all the world amounts to 105,000, representing a total of 3,000,000-horse power. Adding this amount to the other powers, we obtain a grand total of 46,000,000-horse power.

A steam horse power is equal to three actual horses' power; and a living horse is equal to seven men. The steam engines of the world represent, therefore, approximately the work of 1,000,000,000 men, or more than double the working population of the earth, whose total population amounts to 1,455,923,000 inhabitants. Steam has accordingly trebled man's working power, enabling him to economize his physical strength, while attending to his intellectual development. — *London Times*.

MAIDEN—ATHENS. (Vol. IV, p. 442.) *Apropos* I send you a prolific word—*Athens*—to go with the word "Maiden." The sentence was formed many years ago. "Nat. Heath's Seth has ten hens; he set a hen at the east sea; she ate ants as she sat 'neath the ants' nest; he then set a hat, a neat net, 'neath the nest; the hens then ate the ants at the sea."

SETH HEATH.

QUESTIONS.

1. Lord Francis Bacon is quoted as saying that "small-pox and ague are minor evils compared with the plague." Where in his works does he say it?
E. B., Washington, D. C.

2. Is the decimal coinage a "Yankee notion"? Canada introduced it from the United States in 1858. Where did the United States get it, and when?
THOS. BENGOUGH, Toronto, Can.

3. Where, when, and how originated the "three days of grace" on promissory notes and bills of draft?
THOS. BENGOUGH.

4. Can any one inform me who was *Dick*, and what was the peculiarity of his *hat-band*, in the saying, "Odd as *Dick's hat-band*."
DJAFAR.

5. Can any of your readers inform me as to the authorship of the following lines? They have been much used to soothe the restless, seeking sleep.
DJAFAR.

"Sleep sweetly in this quiet room,
O thou, who'er thou art,
And let no mournful yesterdays
Disturb thy peaceful heart.
Nor let tomorrow scare thy rest,
With dreams of coming ill;
Thy Maker is thy changeless friend,
His love surrounds thee still.
Forget thyself and all the world,
Put out each glaring light;
The stars are watching overhead,
Sleep sweetly, thou, good night!"

6. Why are "sixty-three gallons" called a *hogshead* (hog's head)?
A. L. G., Manchester, N. H.

7. The "New Astronomy," by P. E. Trastour, M. D., page 60, says "that whitish glimmer of irregular form which makes the turn of our heavens, is known by the name of milky way, and more generally by the popular name of Saint James' Way." Why so called, and what *Saint James* is referred to?
CHARLES CABOT.

8. Which of the two apostles named James was the author of the Epistle that bears that name, James, brother of John, son of Zebedee; or James, son of Alphaeus?
ANDREW SMITH.

9. What was the real names by which Jesus (the Christ) was called by the Hebrews, the Greeks, and the Romans? for we are told that Pilate wrote the title "in Hebrew, and Greek, and Latin."—(John XIX, 20).
ANDREW SMITH.

10. In the constellation Orion are three stars generally known as "the Belt of Orion"; also, known by the name of the *Three Kings*. What three kings are alluded to?
ANDREW SMITH.

11. Why does fanning a person in a hot day cool the person? Also, why does blowing into hot tea or coffee cool it?
W. B.

12. Who is the author of this quotation: "In the house of mourning lay the casket robbed of its adorning."
J. FRANCIS RUGGLES, Bronson, Mich.

Simultaneous Equations.

By B. F. BURLINSON, Onelda Castle, N. Y.

In such equations the unknown quantities are similarly involved. The method given for the elimination and resolution of such equations is imperfectly treated in our text-books as regards its adaptability to the resolution of a great class of problems in algebra, geometry, and trigonometry. We beg permission to show in [a fuller manner its application and usefulness.

It is well known that if s = the sum of any number of quantities, m = the sum of their products taken two and two, n = the sum of their products taken three and three, p = the sum of their products taken four and four, r = the sum of their products taken five and five, etc., etc.; then the quantities themselves will be the roots of the general equation,

$$X^m - sX^{m-1} + mX^{m-2} - nX^{m-3} + pX^{m-4} - \dots \pm r = 0$$

We will now give some formulæ involving the utility of this principle. We take it for granted that the reader is acquainted with the notation of the triangle, now almost universally adopted by mathematicians. In the books s = the semi-perimeter of the triangle; we put it equal to the whole of the perimeter, which we consider more systematic. No other changes in notation have been made.

1. $a^2 + b^2 + c^2 = s^2 - 2m.$
2. $a^3 + b^3 + c^3 = s^3 - 3sm + 3n.$
3. $a^4 + b^4 + c^4 = s^4 - 4s^2m + 4sn + 2m^2.$
4. $a^5 + b^5 + c^5 = s^5 - 5s^3m + 5s^2n + 5sm^2 - 5mn.$
5. $a^6 + b^6 + c^6 = s^6 - 6s^4m + 6s^3n + 9s^2m^2 - 12smn + 3n^2 - 2m^3.$
6. $a^7 + b^7 + c^7 = s^7 - 7s^5m + 7s^4n + 14s^3m^2 - 21s^2mn + 7sn^2 - 7sm^3 + 7m^2n.$
7. $a^8 + b^8 + c^8 = s^8 - 8s^6m + 8s^5n + 20s^4m^2 - 32s^3mn + 12s^2n^2 - 16s^2m^3 + 24sm^2n - 8mn^2 + 2m^4.$
8. $a^2 + b^2 + c^2 + d^2 = (1)$
9. $a^3 + b^3 + c^3 + d^3 = (2)$
10. $a^4 + b^4 + c^4 + d^4 = s^4 - 4s^2m + 4sn + 2m^2 - 4p.$
11. $a^5 + b^5 + c^5 + d^5 = s^5 - 5s^3m + 5s^2n + 5sm^2 - 5mn - 5sp.$
12. $a^2 + b^2 + c^2 + d^2 + e^2 = (1) = (8).$
13. $a^3 + b^3 + c^3 + d^3 + e^3 = (2) = (9).$

14. $a^4 + b^4 + c^4 + d^4 + e^4 = (10).$
15. $a^5 + b^5 + c^5 + d^5 + e^5 = s^5 - 5s^2m + 5s^2n + 5sm^2 - 5mn - 5sp + 5r.$
16. $a^2b^2 + a^2c^2 + b^2c^2 = m^2 - 2sn.$
17. $a^3b^3 + a^3c^3 + b^3c^3 = m^3 - 3smn + 3n^2.$
18. $a^4b^4 + a^4c^4 + b^4c^4 = m^4 - 4sm^2n + 4mn^2 + 2s^2n^2.$
19. $a^2b + b^2c + a^2c + ab^2 + bc^2 + ac^2 = sm - 3n.$
20. $k = \frac{1}{4}\sqrt{(4s^2m - s^4 - 8sn)}.$
21. $t = [\text{an auxiliary quantity}] = \sqrt{(4s^2m - s^4 - 8sn)}.$
22. $R = n \div t. \quad (23). \quad r = t \div 2s.$
23. $R_1 [\text{the radius of the nine-point circle}] = n \div 2t.$
24. $R + R_1 + r = (t^2 + 3ns) \div 2st.$
25. $RR_1 + R_1r + Rr = (3nt^2 + 2n^2s) \div 4st^2.$
26. $RR_1r = n^2 \div 4st.$
27. $r_a + r_b + r_c = (4sm - s^3) \div 2t.$
28. $r_ar_b + r_ar_c + r_br_c = \frac{1}{4}s^2.$
29. $r_ar_br_c = \frac{1}{8}st.$
30. $P_a + P_b + P_c = mt \div 2n.$
31. $P_a^2 + P_b^2 + P_c^2 = t^2(m^2 - 2sn) \div 4n^2.$
32. $P_aP_b + P_aP_c + P_bP_c = (4s^3 - s^5 - 8s^2n) \div 4n.$
33. $P_aP_bP_c = t \div 8n.$
34. $m_a + m_b + m_c = (3s^2 - 6m) \div 4.$
35. $m_am_b + m_am_c + m_bm_c = (9m^2 - 18sn) \div 16.$
36. $m_a^2 + m_b^2 + m_c^2 = (9s^4 - 36s^2m + 36sn + 18m^2) \div 16.$
37. $m_am_bm_c = \sqrt{(-4s^6 + 24s^4m - 30s^2m^2 - 4m^3 - 36s^3n + 72smn - 27n^3)} \div 8.$
38. $l_al_b = \sqrt{(4s^4mn^2 - s^6n^2 - 8s^3n^3)} \div \sqrt{(s^2m^2 - 2smn + n^2)}.$
39. $\sin A + \sin B + \sin C = st \div 2n.$
40. $\cos A + \cos B + \cos C = (2sn + t^2) \div 2sn.$
41. $\sin A \sin B \sin C = t^3 \div 8n^2.$
42. $\cos A \cos B \cos C = (s^2t^2 - 8snt - 2t^3) \div 16sn^2.$
43. $\cos \frac{1}{2}A \cos \frac{1}{2}B \cos \frac{1}{2}C = st \div 8n.$
44. $\sin \frac{1}{2}A \sin \frac{1}{2}B \sin \frac{1}{2}C = t^2 \div 8sn.$
45. $\sin^2 \frac{1}{2}A + \sin^2 \frac{1}{2}B + \sin^2 \frac{1}{2}C = (4sn - t^2) \div 4sn.$
46. $\cos^2 \frac{1}{2}A + \cos^2 \frac{1}{2}B + \cos^2 \frac{1}{2}C = (8sn + t^2) \div 4sn.$
47. $\sin^2 A + \sin^2 B + \sin^2 C = (s^4t^2 - 8snt^2 - t^4) \div 8s^2n^2.$
48. $\cos^2 A + \cos^2 B + \cos^2 C = (8sn^2 - s^3t^2 + 8snt + 2t^3) \div 8sn^2.$
49. $\sin 2A + \sin 2B + \sin 2C = t^3 \div 2n^2.$
50. $\cos 2A + \cos 2B + \cos 2C = (8snt + 2t^3 - s^3t^2 - 4sn^2) \div 4sn^2.$

51. $\sin A \sin B + \sin A \sin C + \sin B \sin C = (s^4 t^2 + 8snt^2 + t^4) \div 16s^2 n^2.$
 52. $\cos A \cos B + \cos A \cos C + \cos B \cos C = (s^4 t^2 - 16s^2 n^2 + t^4) \div 16s^2 n^2.$
 53. $(1 + \cos A)(1 + \cos B)(1 + \cos C) = s^2 t^2 \div 8n^2.$
 54. $\tan \frac{1}{2} A + \tan \frac{1}{2} B + \tan \frac{1}{2} C = (8sn + t^2) \div s^2 t.$
 55. $\cot \frac{1}{2} A + \cot \frac{1}{2} B + \cot \frac{1}{2} C = s^2 \div t.$
 56. $\tan \frac{1}{2} A \tan \frac{1}{2} B \tan \frac{1}{2} C = t \div s^2.$
 57. $\cot \frac{1}{2} A \cot \frac{1}{2} B \cot \frac{1}{2} C = s^2 \div t.$
 58. $\tan \frac{1}{2} A \tan \frac{1}{2} B + \tan \frac{1}{2} A \tan \frac{1}{2} C + \tan \frac{1}{2} B \tan \frac{1}{2} C = 1.$
 59. $\cot A \cot B + \cot A \cot C + \cot B \cot C = 1.$
 60. $\sin^2 2A + \sin^2 2B + \sin^2 2C + 2 \cos 2A \cos 2B \cos 2C = 2.$

We next append a few problems taken from the various mathematical publications of this country to illustrate their solutions by our method. They will be found to be almost irresolvable by any other procedure.

I.

" Given, $\left\{ \begin{array}{l} x+y+z+w+v=35 \\ x^2+y^2+z^2+w^2+v^2=285 \\ x^3+y^3+z^3+w^3+v^3=2555 \\ x^4+y^4+z^4+w^4+v^4=24309 \\ x^5+y^5+z^5+w^5+v^5=240275 \end{array} \right\} ; \text{ to find } x, y, z, w, \text{ and } v."$ [The Wittemberger.]

SOLUTION : By formulæ, (12), (13), (14), and (15), we find that $m=470$, $n=3010$, $p=9129$, and $r=10395$. Hence, the values of the five unknown quantities are the roots of the equation,

$$X^5 - 35X^4 + 470X^3 - 3010X^2 + 9129X - 10395.$$

$$\therefore x=3, y=5, z=7, w=9, v=11.$$

II.

" Given, $\left\{ \begin{array}{l} x^3+y^3+z^3=415423=b \\ x^5+y^5+z^5=1876049407=d \\ x^7+y^7+z^7=9190945907263=c \end{array} \right\} ; \text{ to find } x, y, \text{ and } z."$ [The School Visitor.]

SOLUTION : By formulæ, (2), (4), and (6), we obtain the equation,

$$s^{13} - 16bs^{10} + 63ds^8 + 15b^2s^7 - 225cs^6 + 252bds^5 - 175b^3s^4 \\ + (450bc - 189d^2)s^3 - 315b^2ds^2 + 175b^4s - 225b^2c - 189bd^2.$$

Substituting the numerical values of b , d , and c , in this equation of

the thirteenth degree, we find by its resolution that $s=127$.

We then find that $m=(2s^5-5s^2b+3d)\div 5(s^3-b)=4679$; and next that $n=(s^8-5s^3b+9sd-5b^2)\div 15(s^3-b)=49913$.

Hence, from the cubic equation, $X^3-127X^2+4679X=49913$, we find that $x=19$, $y=37$, $z=71$.

III.

"Given, $\left\{ \begin{array}{l} w(x+y+z)=a \\ x(y+z+w)=b \\ y(x+z+w)=c \\ z(x+y+w)=d \end{array} \right\}$; to find x , y , z , and w ."

[*N.E. Journal of Education*, Boston, Mass.]

SOLUTION; We may deduce the following equations:

$$m=\frac{1}{2}(a+b+c+d)=g.$$

$$m^2+ns+2p=ab+ac+ad+bc+bd+cd=h.$$

$$s^2p+smn+2pm-n^2=abc+abd+bcd+acd=k.$$

$$s^2pm-snp+p^2=abcd=l.$$

From these equations, we find by elimination, that $9p^4-(6h-2g^2)p^3+(3gk-hg^2+h^2-6l)p^2-(hkg+2g^2l-g^3k-2hl)p=klg+g^4l-hg^2l-l^2$.

From this equation p is determined, and then s and n from the equations,

$$s^2=(hp+l-m^2p-3p^2)\div pm.$$

$$n=(h-m^2-2p)\div s.$$

Hence, the coefficients of the following equation are known whose roots are the values of x , y , z , and w :

$$X^4-sX^3+mX^2-nX=-p.$$

IV.

"Given: $x+y+z+w=s=100$.

$(xyz+xyw+xzw+yzw)(xy+xs+xw+sy+wy+zw)=b=201010896$.

$(x+y+s-w)(x+y-s+w)(x-y+s+w)(-x+y+z+w)=c=4677120$.

$(x+y+s)(x+y+w)(x+s+w)(y+z+w)=d=30808420$.

To find x , y , z , and w ."

[*The National Educator*.]

SOLUTION: We may find $m=[16d-c-s^4+\sqrt{(384s^3b+s^8+2s^4c-32s^4d+c^2-32dc+256d^2)}]\div 24s^2=3607$;

and $n=b\div m=55728$;

and $p=[5s^4+5c-32d+\sqrt{(384s^3b+s^8+2s^4c-32s^4d+c^2-32dc+256d^2)}]\div 48=311220$.

∴ From the equation,

$$X^4-100X^3+3607X^2-55728X=-311220,$$

we find that $x=15$, $y=21$, $z=36$, and $w=38$.

V.

"Given, the perimeter of a triangle, or $a+b+c=s=15600$ inches; the sum of its perpendiculars, or $P_a+P_b+P_c=s_1=9118$ inches; and the sum of the radii of its escribed circles, or $r_a+r_b+r_c=s_2=17810$ inches; to find the sides, a , b , and c , of the triangle."

[*The Wittemberger.*]

SOLUTION: We may find by formulæ, (21), (27), and (31), that

$$m=(4s_1s_2^3+s_1s^3)\div(4s_1+8s^2)=77047100;$$

$$\text{and } n=(4s_2^2+s^2)(2s_1s_2-s^2)\div(4s_1+8s^2)=119956200000.$$

Hence, the values, of a , b , and c , are the roots of the equation,

$$X^3-15600X^2+77047100X-119956200000.$$

$$\therefore a=3250 \text{ inches, } b=5070 \text{ inches, } c=7280 \text{ inches.}$$

VI.

"In the triangle, ABC , we have given: the product of the sides, or $abc=n=2572500$; the product of the perpendiculars, or $P_aP_bP_c=h=1234800$; and the product of the angle-bisectors, or $l_al_b=1470000$; to find the sides, a , b , and c , of the triangle."

[*The Yates County Chronicle*, Penn Yan, N. Y.]

SOLUTION: We have, in any triangle, $k=\frac{1}{2}(hn)^{\frac{1}{2}}=7350$. From formulæ, (21), (33), and (38), we derive the equation, $2bs_1^4-8kns_1^2+bn= -2bk^2$, where s_1 is one-half of the perimeter of the triangle. By making this equation numerical, we find that one of its roots is 210. Therefore, $s=420$. We next find from the following general equation that $m=(bn+4kns)\div bs=57575$. Hence, the values of a , b and c , are the roots of the equation,

$$X^3-420X^2+57575X-2572500.$$

$$\therefore a=175, b=140, c=105.$$

VII.

"In the triangle, ABC , we have given: $\cos A+\cos B+\cos C=d=\frac{1}{2}$; $\tan \frac{1}{2}A \tan \frac{1}{2}B \tan \frac{1}{2}C=q=\frac{1}{2}$; and $P_aP_bP_c=h=328586000$; to find the sides, a , b , and c , of the triangle."

[*The Yates County Chronicle.*]

SOLUTION: We find by the aid of formulæ, (21), (33), (40), and

$$(56), \text{ that } s=\left\{4h\div q(d-1)\right\}^{\frac{1}{2}}=2600;$$

and that $m = \left\{ (q^2d + 3q^2 + d - 1) \div 4(d - 1) \right\} \times \left\{ 16h^2 \div q^2(d - 1)^2 \right\}^{\frac{1}{2}}$
 $= 2209375$; and that $n = 2hq \div (d - 1)^2 = 609375000$.

Hence, we find by the designated method, from the equation,

$$X^3 - 2600X^2 + 2209375X = 609375000,$$

that $a = 625$, $b = 975$, $c = 1000$.

VIII.

"The quadrilateral, $ABCD$, is both inscribable and circumscrible. The quadrilateral contains an area of $k = 6912$ square feet. The square described on the radius of its inscribed circle contains an area of $r^2 = 1024$ square feet; while the square described on its circumscribed circle contains an area of $R^2 = 9945$ square feet. Required, the sides of the quadrilateral."

[*The Mathematical Messenger*, Ada, La.]

SOLUTION: Let $a = AB$, $b = BC$, $c = CD$, and $d = DA$, the sides in order. Because the quadrilateral is circumscribable, we have by geometry,

$$a + c = b + d \quad (1)$$

We make no further use of this equation than to arrange the sides in conformity with it. We shall have, (see Todhunter's Geometry):

$$k^2 = \frac{1}{16} \left\{ (s - 2a)(s - 2b)(s - 2c)(s - 2d) \right\} \quad (2)$$

$$rs = 2k \quad (3)$$

$$k^2 = abcd \quad (4)$$

$$R^2 = \frac{[(ab + cd)(ac + bd)(ad + bc)] \div [(s - 2a)(s - 2b)(s - 2c)(s - 2d)]}{(s - 2d)} \quad (5)$$

From (2), (4), and (5) we obtain by involving terms, and re-factoring,

$$k^2 = \frac{1}{16} (16p - s^4 + 4s^2m - 8sn) \quad (6)$$

$$k^2 = p \quad (7)$$

$$R^2 = (n^2 - 4pm + ps^2) \div (16p - s^4 + 4s^2m - 8sn) \quad (8)$$

From (2), (6), (7), and (8) we obtain by elimination, and resolution,

$$s = 2k \div r = 432.$$

$$m = (k^3 + r^2n) \div r^2k = 61632.$$

$$n = 2rk + 2k\sqrt{(4R^2 + r^2)} = 3234816.$$

$$p = k^2 = 47775744.$$

We now construct the biquadrate, the four roots of which will be the values of a , b , c , and d . The biquadrate is,

$$X^4 - 432X^3 + 61632X^2 - 3234816X = -47775744.$$

We find the four roots of this equation to be, 24, 72, 192 144.

Arranging these values in conformity with equation (1), we have,

$$\left\{ \begin{array}{l} AB=a=28 \text{ feet.} \\ BC=b=72 \text{ feet.} \\ CD=c=192 \text{ feet.} \\ DA=d=144 \text{ feet.} \end{array} \right\} \text{ Ans.}$$

We have given examples enough to show the usefulness of the method employed for solving simultaneous equations. The number could be increased to almost an infinite extent. We leave the subject to the further pursuit of the reader, who may carry it to any extent he may desire, by choosing data ad libitum from our formulæ.

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PI ($\pi = 3.141952+$) EXPRESSED BY THE DIGITS. (Vol. IV, 411.)

A nearer approximation to the value of pi (π), by the use of the nine digits, than given in your November number, 1887, may be expressed

as follows : $\frac{8 \times 9 \times 710}{36 \times 452} = 3.141592+$ correct to the last figure ; there-

fore, $\frac{36 \times 710}{8 \times 9 \times 452} = \text{area of a circle to radius 1 ; and } \sqrt{\frac{36 \times 710}{8 \times 9 \times 452}} \}$

= side of an equal square. T. P. STOWELL, Rochester, N. Y.

A COLLECTION OF N. H. REGISTERS WITH NOTE AND COMMENT THEREON. Mr. Joseph A. Stickney, the author of this neat souvenir and collector of a complete set of N. R. Registers, has done a good deed for his fellow bibliographers and the future historian. It is a duodecimo of 38 pages, giving a sketch of the first Registers published in New England, from 1767 to 1800 inclusive, 34 Nos., in nearly all of which matters relating to New Hampshire are mentioned.

Beginning with the first N. H. Register published for 1772, each copy of all Registers and Manuals is described and a synopsis of each one's contents given down to 1885 inclusive, a total of 122 Nos.

The first for 1772 by Daniel and Robert Fowle, Portsmouth, who were the first printers in New Hampshire, coming here in 1756. For

the next fourteen years, 1773 to 1786, no register is known to have been printed. For three years, 1787 to 1789, it was published by George Jerry Osborne, Portsmouth. For four years, 1790 to 1793, no register is known to have been published. For 1794, by Eliphalet Ladd, Dover; for 1795, by Stearns & Winslow, Exeter; for three years, 1796 to 1798, by Henry Ranlet, Exeter; also, for 1797, by Samuel Bragg, Jr., Dover; for 1799, no register known to have been published; for ten years, 1800 to 1809, by Dr. Samuel Curtis, Amherst; also, for 1801, by J. A. Harper, Portsmouth; for four years, 1810 to 1813, by George Hough & Daniel Cooledge, Concord; also, for seven years, 1811 to 1817, by Charles Norris & Co., Exeter; also, for 1816, by Daniel Cooledge, Concord; for two years, 1818 and 1819, by Isaac Hill, Concord; for two years, 1820 and 1821, by Hill & Moore, Concord; for seventeen years, 1822 to 1838, (1834, second edition), by John Farmer, Concord; also, for two years, 1833 and 1834, by N. J. T. George, Concord; for two years, 1839 and 1840, by Jacob B. Moore, Concord; for four years, 1841 to 1844, by Asa Fowler, Concord; for twenty-one years, 1845 to 1865, by G. Parker Lyon; for two years, 1866 and 1867, by Edson C. Eastman, Concord; for twelve years, 1869 to 1880, by Claremont Manufacturing Company; Claremont; for 1881, by S. L. Farman; White River Junction, Vt.; for four years, 1882 to 1885, by White River Paper Co., White River Junction, Vt.

The Political Manual for sixteen years, 1857 to 1872, was compiled by George E. Jenks, and published by McFarland & Jenks, Concord; the first three years (1857 to 1859) being also called "Legislative," and the last five years (1868 to 1872) had "N. H. Register combined" with the title.

The People Political Hand-Book for three years, 1875 to 1877, was compiled by Frederic Kelsey, and published by Charles C. Pearson & Co., Concord.

Since Mr. Stickney's bibliography was published three more Registers, for 1886, 1887, have 1888, have been published. A set of these Registers and Manuals are of great value for the fund of information in them concerning New Hampshire; and the same applies to the registers of any state.

A similar bibliography of Robert B. Thomas' Old Farmer's Almanac, (1793 to 1888), was compiled and published by Rev. J. H. Fitts, a few years ago.

New Books, Pamphlets, etc., Received.

SOBRIQUETS AND NICKNAMES; by Albert R. Frey, author of "William Shakespeare and Alleged Spanish Prototypes," (See *NOTES AND QUERIES*, Vol. III, May and June); "A Bibliography of Playing-Cards," (See *The Bookman*, Vol. IV, pp. 89-97); "A Bibliography of Junius," (See "Initials and Pseudonyms," by William Cushing, pp. 145-156, twelve pages).

"You jig, you amble, and you lisp, and nickname God's creatures."—*Shakespeare*. "The time was when men were had in price for learning; now letters only make men vile. He is upbraidingly called a poet, as if it were a contemptible nickname."—*Ben Jonson*.

Mr. Albert R. Frey has contributed to reference literature a work of 482 pages, as unique as it is important, in this work which presents the identity and origin of the applications which we come across daily in our reading, and of which the significance is unknown in a majority of cases. A sobriquet is apt to be a bit of condensed history, or the outgrowth of an important event. He deserves our cordial thanks for his patient and curious work which illustrates a very remarkable phase in human wit and satire. No reference library, or public library should be without this noteworthy and amusing work. It is necessary to every professional writer, and every studious reader. Literature, both in prose and poetry, history, the drama, fiction, and all sorts of reading, abound in sobriquets, nicknames, applications, like the Grand Monarch, the Glory of her sex, the Man in the Iron Mask, the Glorious Sorceress of the Nile, and hundreds of such allusions, which up to the time of this book we have had no work to refer for such allusions to any great extent for explanation. Mr. Frey seems to have given the subject an immense amount of study and research, and has amassed an amount of information surprising for bulk alone, and as remarkable for the very full references to the many works where the sobriquets are found. It is an entirely new departure in the reference book line. It is tastefully gotten up, arranged in double columns, accompanied with a full index of the real names of the persons alluded to. For sale by all booksellers. Sent post-paid on receipt of its price, \$3.50, by Ticknor & Co., publishers, Boston, Mass. Catalogues of books mailed free on application.

THE N. H. REGISTER AND BUSINESS DIRECTORY for the year 1888 makes its annual appearance from the press of the White River Junction Paper Co., and is, as in former years, an indispensable article for the house, shop, counting-room, and office. Full of the usual calculations, N. H. business affairs, government, state, and town officers, state institutions, societies, etc. For sale by T. W. Lane, Antiquarian Bookstore, 16 Hanover St., Manchester, N. H. Price, 20 cts.

Also, Dudley Leavitt's *Farmer's Almanac*, No. 92, for 1888, 8 cts., and Robert B. Thomas' *Old Farmer's Almanac*, No. 96, for 1888, price, 10 cents. Books, almanacs, or annuals obtained on order.

Also, Town Histories for sale; books bought, sold and exchanged.

NOVEL BUSINESS CALENDAR AND STAND. A most novel convenient, and valuable business calendar for 1888 is the Columbia Bicycle and stand, issued by the Pope Manufacturing Co., of Boston, Mass. In this calendar a new departure has been made, decidedly unique and different from any previous attempt in calendar construction. The calendar proper is in the form of a pad, containing 366 leaves, one for each day of the year, to be stripped of daily. A portion of each leaf is left blank for memoranda, so arranged that the blank for any coming day can be turned to immediately at any time. The pad rests upon a portable stand, and when placed upon the desk or writing-table the entire surface of the date leaf is in view, and left constantly before the eye, furnishing date and memoranda, impossible to be overlooked. A collection of quotations upon cycling from publications and writers illustrating the popularity of cycling, are on the slips.

SCIENTIFIC AMERICAN. Every week this most valuable periodical presents whatever is new in the world of science, art and manufactures. Full of practical information it discloses to the thoughtful not only what has been ascertained, but also suggests the possibilities still to be revealed. For forty years Munn & Co. have conducted this paper in connection with the procuring of patents for new inventions. The *Scientific American* is authority on all scientific subjects, and should be in every household. The scientific progress of the country can in no way be gleaned so well as by the regular perusal of its pages. Munn & Co., 361 Broadway, New York,

THE SEVEN CREATIVE PRINCIPLES, a series of lectures delivered before the Society of Esoteric Culture, Boston, Boston, Mass., with an introductory lecture on the Idea of God, and a concluding lecture on the Esoteric Significance of Color, by Hiram Erastus Butler. These lectures will be found highly interesting and valuable to thinkers, on account of the original views presented, and the novel and forcible analysis and treatment of the treatment of Creation. They contain many central thoughts that are new to the public, and are presented as gushing springs from the great fountain of natural Truth, to refresh the soul, strengthen the mind, and open the eyes to the thoughtful to possibilities of attainments not now thought of. Cloth, 8vo. pp. 170.

HISTORY OF WEARE, N. H. This history has been preparing since 1881, by David Cross, Josiah G. Dearborn, and S. C. Gould, of Manchester, N. H.; Abner P. Collins, and Robert Peaslee, of No. Weare, N. H., a committee of five appointed by the town and authorized to published the same. It contains 708 pages of history, together with 300 pages of genealogies of the families of the town, making a book of 1000 pages, or more; with portraits, illustrations, maps, etc. Cloth, octavo; price, by express, \$4.00; by mail, \$4.30, post-paid; by mail registered, \$4.50. Address S. C. GOULD, Manchester, N. H.

DOINGS, PAPERS, POEMS, ETC., OF CONTRIBUTORS TO THE MAINE FARMERS' ALMANAC. The contributors to the ever welcome almanac, (so many years calculated, compiled, and edited by Daniel Robinson), meet annually and celebrate, exchange greetings, make new acquaintances, renew old ones, read papers, poems, propound questions, and laugh heartily. The biennial proceedings of the seventh and eighth annual sessions have been received from the publisher of the almanac, Charles E. Nash, Augusta, Me. It is gotten up, like the three previous volumes, in handsome octavo style, reported by Dr. Wm. McDavid, of Augusta. The Farmers' Almanac began 1819 and has appeared regularly each year since, the almanac for 1888 being No. 70., sent by Brother Nash on receipt of ten cents. Each annual issue contains from two to four pages of problems and solutions; also puzzles, etc.

BOSTON INVESTIGATOR. Truth, Perseverance, Union, Justice — the means; Happiness the end. Hear all sides, then decide. Devoted to the development of universal liberty. In its fifth-seventh volume. Published at \$3.00 a year, by J. P. Mendum. Contains eight pages weekly, of material philosophy, original communications on scientific matters, humanity, freedom, equal rights, and liberty. It is strongly of the opinion that liberalism is the only true system that can benefit community and the nation, and it prefers the real and practical to the visionary and dogmatic. It will pursue in the future the course as in the past, the acquisition of truth and the discharge of duty, and the teachings of science, reason, useful and practical knowledge, social reform, true morality, and the equal rights of men and women. Address J. P. Mendum, Paine Memorial Building, Appleton St., Boston, Mass.

THE WRITER'S LITERARY BUREAU. This bureau is established in connection with *The Writer*, Boston, Mass., for the purpose of examining manuscripts for the press, and to assist authors in marketing their manuscripts to the best suited periodicals; also to give advice to authors on literary merits of articles, as to modifications and requirements. All needing such service should consult the bureau by letter or in person. Send for their circular, Box 1905, Boston, Mass.

HISTORY OF WATERBURY, CONN. Price, Lee & Co., publishers of New Haven, Ct., announce a history of Waterbury, as in preparation and soon to appear. It is to be written by Miss Anna L. Ward, of that town, a correspondent of this monthly and one of the compilers of of the "Ward-Hoyt Cyclopædia of Quotations," and Miss Sara J. Pritchard. Any information relating in any way to that town, to the Naugatuck (*Matiatuck-oke*, "a place without trees") Valley, the region originally included in the plantation, or the Indian tribes, genesis of the first settlement, acquisition of title, land allotments, early settlers; revolutionary, ecclesiastical, educational, military, and literary history, etc., will be thankfully received by the writers. The volume will contain portraits, illustrations, maps, etc.

BANNER OF LIGHT. The oldest journal in the world devoted to the philosophy of spiritualism. It is a family newspaper, eight pages forty columns, weekly. Contains lectures, original essays on philosophy, psychology, scientific articles, reports of the various societies of theosophy, psychical research, annual conventions, etc. Poems, communications from talented writers, etc. For terms, see prospectus on cover of this magazine. Catalogues of books also furnished free.

IN THRALDOM: A PSYCHOLOGICAL ROMANCE. By Leon Mead. Fireside Series No. 33. J. S. Ogilvie & Co., New York. Paper, 12mo. It leads off with the oft-quoted remark of Shakespeare, "There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy," and this truth from the dramatist is the key to this romance—*psychological*.

THE AMERICAN JEWS' ANNUAL FOR 5648 A. M. 1888 A. C. December, 1887, January, 1889. Royal 8vo. pp. 168. From the Bloch Publishing and Printing Company, Cincinnati, O. Price, 25 cts.

The leading articles are: A resumé of the leading events of the year, by Rabbi Isaac M. Wise; Fifty years of Judaism in America, by Rabbi Joseph Krauskopf; the Jewish-American as a politician, by Hon. Lewis Abraham; Fragments of History, by A. E. Frankland; poems, stories, and miscellaneous reading; calendar, dates, feasts, holidays, new moons, Jewish and common eras.

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MISCELLANEOUS

NOTES AND QUERIES,

WITH ANSWERS.

"Rich is that universal self whom thou worshipping as the Soul."—VEDAS.

VOL. V.

FEBRUARY, 1888.

No. 2.

*Periodicity—A Mathematical and Phisical Proof
of the Immortality of Man.*

NEVER, FOREVER!

FOREVER, NEVER!

Among the papers left by Dr. Ivan Slavonski, the Russian mathematician, whose death was announced in the St. Petersburg papers, was one paper in 1870, with the above title. For many years preceding his death, Dr. Slavonski had been Professor of Pure Mathematics in the Imperial University of St. Petersburg, and was recognized throughout Europe as one of the first mathematicians of his day. He discovered the formula for the reduction of "the irreducible case," in which Cardan's rule had failed, and thus rendered it possible to solve, by formulæ, cubic equations containing an imaginary expression — a task which had previously been considered almost as difficult as the solution of the problem, the "squaring of the circle." At his death he left a number of papers in the care of his friend and colleague Prof. Imanoff, expressing at the same time his wish that if anything of value should be found among them, it should be published. The first of these papers which has seen the light, is the one here, published and which was read by Prof. Imanoff before the Society of Physical Sciences at St Petersburg, and printed in the volume of its Transactions published in April, 1870. It is impossible, and perhaps not desirable, to reproduce here the entire essay, as in some parts of it are calculations, the expression of which would require the use of many

cumbrous mathematical signs and formulæ, that would be unintelligible generally, except to those who had made mathematics a special study. It is however both possible and desirable to give the gist of the thesis and make it comprehensible. It is evident at the outset that Dr. Slavonski intended this essay to be complete, and therefore he started at the natural beginning of his subject. To lose as little time as possible, let us also begin at the beginning.

PERMUTATION.

In how many ways is it possible to arrange two letters, A and B, as they are arranged in a printed line, such as this. A moment's thought will show that there are but two ways, namely: A B and B A; the three letters, A B C, give six permutations, which are as follows:

A B C, A C B, B A C, B C A, C A B, C B A.

In these permutations, observe that all three of the letters enter into each result, and that each enters into it but once. This is permutation according to law, or rather it is the law of permutation, for it is impossible to make more than six different arrangements of the three letters, A B C. Take four letters, A B C D, and arrange them in all possible ways, and you will find that but twenty-four different arrangements are possible as follows:

A B C D,	B A C D,	C A B D,	D A B C,
A B D C,	B A D C,	C A D B,	D A C B,
A C B D,	B C A D,	C B A D,	D B A C,
A C D B,	B C D A,	C B D A,	D B C A,
A D B C,	B D A C,	C D A B,	D C A B,
A D C B,	B D C A,	C D B A,	D C B A,

The rule for finding the number of possible permutations is as follows: To find the permutation of two letters, multiply 1 by 2; of three letters, multiply 1 by 2 and the result by 3; of four letters, multiply 1 by 2, the result by 3, and this last result by 4. Therefore, for five letters, A B C D E, there will be 120 permutations; for six letters, 720 permutations; for seven letters, 5,040 permutations; for eight letters, 40,320 permutations; for nine letters, 362,880 permutations, and for ten letters, 3,628,800 permutations, and so on through the alphabet, which twenty-four letters of our alphabet can be permuted

620,448,401,733,239,039,360,000

ways and no more; and so on for any larger number of things we choose to take.

COMBINATION.

In combination, which is the disposition of any number of letters,

or objects, in all possible ways, we find two letters, A B, may be arranged by pairs in four ways, namely, A A, A B, B A, B B ; three letters, A B C, may be varied by pairs nine ways, as follows :

A A, A B, A C, B A, B B, B C, C A, C B, C C,

Therefore, to show the vast number of combinations of a few things taken by twos, by threes, by fours, and so on, it is only necessary to state that in this way the twenty-four letters of the alphabet would give

1,391,724,238,887,252,999,425,128,498,402,200

combinations and no more. This result is definitely fixed by the law of their arrangement. This statement and exemplification of these laws, well known to tyros in mathematics, may be wearisome, but it is necessary for the full comprehension of the strange results which follow from it when taken in connection with other elements of the problem. Let us now proceed to something less dry and formidable.

MASS MOTION AND MOLECULAR MOTION.

In the present state of science it seems almost superfluous to speak of the changes which are constantly taking place in every part of the universe with which we are acquainted. Mass motion is shown on the largest scale in the whirling of planets and suns, and systems of suns. The geological eras descending by a series of colossal steps down into the darkness of the past eternity, show cycles upon cycles of changes in the earth we inhabit ; nor does science rest here, for back in the night of time, the solar system was a nebulous ball whirling in space and throwing from it rings which afterwards broke up and produced the planets. The solar system is known to be in motion about some larger sun, to which it is but a planet, and its satellites are in turn but satellites. Molecular motion cannot be seen, but is known to be present among the molecules of all bodies. No scientist doubts that mass motion and molecular motion exist in accordance with law, and in no other way.

ATOMS. DO THEY EXIST?

Chemical bodies which, upon being analyzed are found to be composed of different element, are compounded in definite proportions. Thus water consists of eight parts by weight of oxygen and one of hydrogen, and this proportion never varies. The elements are not only bound together in a quantitative order, in the stable condition of substances, but when a compound is broken up and its elements released from their affinities, they cannot escape the law of numerical destiny ; they rush into new unions, but still in definite proportions. This is the fact, but the mind is not satisfied with facts. It seeks for the causes that determine combination in the fixed ways, and prevent it from taking place in others. The atomic theory assigns a cause for

this. An atom is a portion of matter exceedingly small and capable of being divided. This definition is good enough for present purposes, but another will be given presently to answer any metaphysical objection which may be raised against the existence of atoms. The old Greek philosophers loved to speculate about the infinite divisibility of matter, and held that we cannot conceive of particles so small that, if possessing weight, bulk, and figure, they cannot be still divided; but after all is said, the question is not about a possibility of conception, but of the facts of nature. The chemist assumes that in nature the divisibility of matter has a limit. As Liebig says :

"Without disputing the infinite divisibility of matter the chemist merely maintains the firm and immutable foundations of his science when he admits the existence of physical atoms as a truth entirely incontrovertible."

If then, for instance, water be formed by the combination of atoms of oxygen with atoms of hydrogen the atomic theory affords an explanation of why its composition is definite and constant. It is not necessary to ask him who says that it is impossible to know whether atoms exist or matter is infinitely divisible—who says the fact is "unknowable"—it is only necessary to ask such a man whether or not there is the smallest existent portion of matter? To say that there is not, is to say that there is a portion of matter not smaller than itself, which is a self-evident absurdity.

ARE ATOMS INFINITE IN MATTER ?

This question has also been relegated needlessly to the realms of the unknowable as Dr. Slavonski has shown, and shown by so simple a proposition as the following :

"We have shown by a proposition, the opposite of which is unthinkable, that there are atoms—that is, there are the smallest existent particles of matter. By the same manner of reasoning it may be shown that the number of these atoms is limited. Thus there are as many of these smallest existent portions of matter as there are, for the simple reason that to state that there are more or less than this number of them, is to state an unthinkable proposition and to be guilty of stating a great absurdity."

The number of atoms that exist must be limited. To speak of an "unlimited number" is to be unintelligible.

THE RESULT.

Thus far four elements of the problem by Dr. Slavonski have been given. They are :

Firstly—That bodies which undergo change of place according to law, can be permuted and combined in a fixed number of ways.

Secondly—That everything in the universe is undergoing change according to law.

Thirdly—That atoms exist, and are not a metaphysical abstraction or a physical makeshift.

Fourthly—That the number of these atoms is limited.

It now remains to show the results of these four propositions when brought to bear upon each other. If there were but three atoms in the universe, and the law of their existence were that they could be changed in respect to each other only by taking position in contact, the first with the second, the second with the third, and so on in one line,

A B C, A C B, B A C, B C A, C A B, C B A,

it is evident that only six permutations would be possible. If taken in pairs there would be nine combinations,

A A, A B, A C, B A, B B, B C, C A, C B, C C.

The truth is, however, in regard to the actual sum of the atoms in the universe, that they can combine in so great a number of ways that men generally speak and think of their combinations as infinite; the word "infinite" in this case as in all others, being the means of covering the ignorance and the impossibility of the conception of vast numbers of units; in space units of miles, and in time units of years. If it were possible to cover the surface of the earth with numbers, the numbers thus written would not form the billionth part of the atoms of the material used to write them. Yet, in the universe, the number of atoms is limited by, and only by, the atoms themselves. These atoms are continually undergoing change of place—for atomic changes can only be changes of place—and this change is according to law. There must then come a time when all possible changes and combinations shall have been exhausted. It is possible that when that time comes the universe will be at rest, as Spencer, Helmholtz, and Thompson also maintain, looking at the subject in a different light. Dr. Slavovski thought this was not possible, and for the following reason: In the first place, heat and motion, or, if this expression be objectionable, heat or motion, are as much properties of matter as impenetrability is. No matter is without them, and properties of matter are nothing but

THE UNIVERSE ALWAYS IN MOTION.

what we ever find connected with it. If we cannot conceive of matter which is not impenetrable, neither can we think, nor have we any experimental scientific reason to suppose, there is or can be matter which does not move. Consequently, reasoning in the positive and scientific method from the known properties of matter, we arrive at the conclusion that there can be no rest for the atoms which are the component parts of the universe. Besides this, since time has no ob-

jective existence but is merely a necessary form, a category of thought, if the universe is ever to be at rest it is at rest now. The very fact that it is in motion, not as a mass, but in its molecules, shows that it has always been in motion; without heat there is no motion, and without motion there is no heat. Without gravity there is no motion, and even the first "floculi" of Herbert Spencer could not have been formed.

Again, Carnot's rule (from which Spencer, Helmholtz, and Thompson have concluded that the universe must at some future time be at rest) is, that work is produced by heat only when heat is transmitted from a hotter to a colder body; and that even here the heat is but partially converted into work. The deduction from this is, that, since all the heat is not converted into work, a part of it is stored up and becomes static, and therefore less and less work must from year to year be done in the universe, until finally the heat is equally distributed, and the universe rests. That this conclusion is not altogether a just one may be seen when we take into consideration the fact that although heat is but partially converted into work, or motion, it may not be restored in its entirety, for motion may produce magnetism or electricity, which in turn will be converted into heat, the store of which is thus kept at its maximum. This plainly results from the doctrine of conservation of force. Matter itself is indestructible, or must be so considered, until it is shown to be otherwise, and its properties are therefore indestructible.

A SYSTEM OF CYCLIC CHANGES.

There will then come a time when all possible place-changes of the atoms have been exhausted, and nature must return upon its tracks, as when a pendulum has swung to its utmost limit it must return again. When all changes have been exhausted, the next position taken must be one which before existed. Ever in motion the atoms revolve, and all their revolutions must repeat what they repeated before. The order of the universe is unlimited, for there is nothing beyond to disturb it. Even the universe is a system of cyclic changes, ever turning upon itself.

THE PROOF OF IMMORTALITY.

These cyclic changes Dr. Slavonski calls "Periodicity." Since all positions of the atoms repeat themselves after ages have past, there must come a time when the universe will be in the same condition as it now is, and consequently, the earth in all respects, be the same that it is at this moment and that it has already been a vast number of times. The geological eras which have made it what it is will again work out their necessary results, and man will appear again, each individual being precisely the same individual he is now, for he will be born of the same parents, be reared under the same circumstances,

live as he now lives — with those with whom he lives, and die as he will die a few years from now. But—*resurgat*—"he shall live again" when the cyclic change shall again have passed.

THIS IS IMMORTALITY.

To live is to be conscious, and that which affects us when we are unconscious is unnoticed by us. Suppose the reader of this article were to die before he had half finished it; the time which would elapse before he should reappear on earth as an infant would be unnoticed by him, and consequently *for him* it would not exist. So far as he is actually concerned he would be immortal. If it were possible for him to die and be brought to life again between the successive swingings of a pendulum, the world would seem the same to him as when he left it; and yet not more so than if millions of years had passed — for at the close of the cyclic change the world will be actually the same as it was when it began — between two seconds it would be apparently the same; and this doctrine is more beautiful than any other.

"IF A MAN DIE, SHALL HE LIVE AGAIN."—*Job* XIV, 14.

The old man's dream is to live over again the days of his childhood and youth, and this dream must become a reality. Death does not bear him into the region of the unknown, but into the known.

This is a *resumé*, a condensation of Dr. Slavonski's paper which has excited much attention among the thinkers of Europe. The objections which are urged against the paper may be stated as follows:

The first is that to which all systems are open which treat of the universe, namely: that there is danger, and even great probability, that some essential element of the problem has been overlooked. The universe is large, and if one disturbing cause be not considered in arguments pertaining to it, the result may not only be, but must be vitiated. If this objection be a valid one, man can never arrive at truth and it is useless to seek for it.

A French critic, in speaking of it, condemns the way in which it is brought forward, as audacious, and compares the "presumptuous boldness" of it with that which La Place spoke of his

NEBULA HYPOTHESIS:

"Je presente (cette hypothese) avec la defiance que doit inspirer tout ce qui n'est point un resultat de l'observation ou calculi."

Audacity is a funny thing for a Frenchman to condemn, and in reality Dr. Slavonski's theory is the result both of observation and calculation; it is a compound of physics and mathematics; it is *A Physical and Mathematical Proof of the Immortality of Man*.

It is hardly necessary to refer to "religious objections," for there

never was yet a theory made which did not have to contend with them. Suffice it to say that the objections are what they usually are. Others say that the doctors have measured the possibility of things by the possibility of thought. This objection is usually urged by positivists, whose opinions are always worthy of respect ; but in reply it may be said that their own theories—those of Spencer and Huxley—do precisely the same thing, and that no thinker can avoid doing so, except a philosophical skeptic. Moreover, the doctrine that the measure of the truth of a proposition is the unthinkableness of its opposites, is only a statement that the measure of the impossibility of things is the possibilities of thought. With this, Dr. Slavonski's theory is left for thought. True or not, it will suffer the fate of all theories.

In connection with Dr. Slavonski's theory one should also read that of Mr. Buxton, delivered as a lecture in Albany, N. Y., January 18, 1841, on "Analogy Out-Analogized, being the doctrine of Ontology Extended ; proving the Earth to be Endowed with Animality." A *resumé* of this novel production may be given in a future number.

—o—o—

THE UMBRELLA—ITS HISTORY. In Queen Anne's time it is mentioned, both by Swift and Gay, that the umbrella was used by women, but up to the middle of the 18th century, it appears never to have been used in England by men ; though Wolfe, the then future conqueror of Quebec, wrote from Paris, in 1752, describing it as in general use in that city, and wondering that so convenient a practice had not yet penetrated to England. Hanway, the famous traveler and philanthropist, who returned to England in 1750, is said to have been the first Englishman who carried an umbrella ; and a Scotch footman named John MacDonald, who had traveled with his master in France and Spain, mentions in his curious autobiography, that he brought one to London in 1778, and persisted in carrying it in wet weather, though a jeering crowd followed him, crying, "Frenchman, why don't you get a coach?" In about three months, he says, the annoyance almost ceased, and gradually a few foreigners, and then some Englishmen, followed his example. Defoe had described the umbrella as one of the contrivances of Robinson Crusoe, and umbrellas were in consequence called "Robinsons." They were looked upon for a long time as a sign of extreme effeminacy, and they multiplied very slowly. Dr. Jamieson, in 1782, is said to have been the first person who used one at Glasgow ; and Southey's mother, who was born in 1752, was accustomed to say she remembered the time when any one would have been hooted who carried one in the streets of Bristol. A single coarse cotton one was often kept in a coffee house to be lent out to customers, or in a private house to be taken out with a carriage and held over the heads of ladies as they got in or out ; but for many years those who used umbrellas in the street were exposed to the insults of

the mob and to the persistent and very natural animosity of the hackney coachman, who bespattered them with mud and lashed them furiously with their whips. But the manifest convenience of the new fashion secured its ultimate triumph, and before the close of the century umbrellas had passed into general use. — *Lecky's History of England.*

VESTIGES OF CIVILIZATION ; or the *Ætiology* of History ; Religious, *Æsthetical*, Political, and Philosophical. (Vol. I, p. 48.) The author of this work, anonymously written, in the preface, says that " History is written in America, *biographically* ; in Britain, *empirically* ; in Germany, *scholastically* ; in France alone, *philosophically* ; but nowhere is it written *scientifically*." Who is the author of this book? *Logos.*

After diligent inquiries, I have ascertained that the author of the above-mentioned work was *James O'Connell* ; that he was a lawyer without practice in New York City, supporting himself by writing anonymously for reviews, and translating works from the French, etc ; that not being appreciated he became a misanthrope and recluse ; that shortly after the appearance of the " *Vestiges* " — of which only a few hundred copies were published, and which fell flat,— he left for London, and from there went to Paris where he died. I have further ascertained that he was educated at the College of William-and-Mary, at Emmettsburg, Md. ; and that on account of a disagreement with the professors and his adjuration of Romanism, he left without taking his degree. This is all that my informant seems to remember, except faintly recalls reading a translation, by Mr. O'Connell, of what impressed him as a most remarkable French work, entitled, he believes, " *The Tonlon Galleys.*" The translation was contributed to a paper published, he thinks, by one named Bullard.

Can any reader give me further information, or put me on the track of any, concerning the life and literature of this singular man. Any items in reference to his ancestry or career ; especially any suggestions as to how I might verify the fact of his death, and get a trace of his last friends, would be cordially appreciated by the writer. I seek this information for literary reasons.

A. L. LEUBUSCHER, Water Mill, L. I. N. Y.

LITERARY INGENUITY. The following line is said, in an old book, to have " cost the inventor much foolish labor, for it is a *perfect line*, and every word is the very same word, both backward and forward."

ODO TENET MULUM, MADIDAM MAPPAN TENET ANNA.

SAYINGS OF JESUS (THE CHRIST). (Vol. III, p. 218.) Several times sayings of Jesus have been quoted in your magazine, which are not found in the King James' version. Can you give a selection of more of them, or state where such can be found? J. P. SHIELDS.

Many of the sayings of Jesus are quoted by the early Christian Fathers from the gospels then in existence, some of which are now extant, though considered apocryphal, that is, uncanonical. Some of these gospels have been collected and published by William Hone, Henry Cowper, S. Baring Gould, Alexander Walker, and others. We will here give a chapter of these "Sayings," remarking that the exact wording varies slightly in some of them in the writings, just as some of those vary in the canonical gospels.

SAYINGS OF JESUS NOT RECORDED IN THE CANONICAL GOSPELS.

1. "It is better to give than to receive."—*Acts* xx, 35.
2. "And straightway, the Holy Spirit (my mother) took me by one of the hairs of my head, and bore me away to the great mountain called Thabor."—Origen, *Homily* xv; Jerome Hieronymus, *Mich.* vii 6, quoting from the Gospel of the Twelve.
3. "He who shall wonder shall reign, and he who reigns shall rest." Clemens Alexandrinus, *Stromata* i, 9.
4. "Keep the mysteries for me and the sons of my house."—*Homily* xix, 20.
5. "Be ye proved money-changers; retain that which is good metal, reject that which is bad."—*Stromata* i, 28.
6. "Be never glad unless ye are in charity with your brother."—Jerome, *Pelagius* i, 3.
7. "I am come to abolish the sacrifices; if ye cease not from sacrificing, the wrath of God will cease not from weighing upon you."—Epiphanius, *Hæresies* xxx, 16.
8. "I have a desire to eat the flesh of the Paschal Lamb with you."—*Hæresies* xxx, 15.
9. "Let us resist all iniquity and hate it."—Barnabas, *Epistle* iii, 11.
10. "He that is near me is near the fire, and he that is far from me is far from the kingdom."—Didymus, *Patrum Nova Bibliotheca* p. 34.
11. "Be never joyful except when ye see your brother walking in love."—Jerome, *Præfat. Com. in Jesai*, lib. xviii.
12. "In those things in which I shall overtake you, in those things will I judge you."—Justin Martyr, *Dialog. Tryphon*.

The following "parable" is recorded by Irenæus (*Adv. Hæres.* v. 33)

which Jesus taught, but it is not found in the canonical gospels:

"The days shall come in which a vine shall grow, each vine having 10,000 boughs, and on each bough 10,000 branches, and on each branch 10,000 sprigs, and on each sprig 10,000 clusters, and on each cluster 10,000 grapes, and each grape when pressed, shall yield 25 measures of wine. And when one of the saints shall take hold of a cluster, another shall cry out, 'I am a better cluster, take me; through me bless the Lord.'"

To CUT A DIDO. Whence came the expression "to cut a dido?"
INQUIRER II.

About 800 B. C. Dido (called also Elissa), daughter of Belus II, king of Tyre, and sister of Pygmalion, fled from that kingdom, on account of family dissensions and regal disputes, to the coast of Africa.

Here she desired land of the natives to found a city and queendom, but they bargained her a piece of land such as could be covered with a bull's hide. She evaded their jealous concession by cutting the hide into very small strips, tying them together, and thus surrounding a quite large tract of land. Hence, this incident is supposed to have been the foundation of the above phrase. She and her following built a city, called it Carthage, and Brysa (meaning *a hide*) became the citadel of the place. The name Dido means *the beloved*; Elissa means *the joyous one*. The anachronism of dates is said to be made by the poets as a matter of license. Troy's destruction is usually put down as 1184 B. C. Æneas visits Dido soon after; this would make Carthage contemporary with Troy. For a discussion of the subject further, see Anthon's "Classical Dictionary," p. 439, article *Dido*.

LAST WORDS OF THE ANARCHISTS. (Vol. II. p. 497; III, p. 143; IV, p. 292.) The last words of the four anarchists hung in Chicago, November 11, 1887, were as follows:

August Spies—"There will be a time when our silence will be more powerful than the voices you strangle today!"

Adolph Fischer—"Hurrah for anarchy! This is the happiest moment of my life."

Albert R. Parsons—"Will I be allowed to speak, O men of America? Let me speak, Sheriff Matson! Let the voice of the people be heard! O —"

George Engel—"Hurrah for anarchy!"

QUESTIONS AND ANSWERS.

PORTRAITS OF CHRIST. (Vol. III, p. 441.) The portraits of Christ were taken from those of Serapis. It is idle to believe in any genuine one. I would just as soon believe in the one taken by the bloody sweat on Veronica's handkerchief—absurd alike.

DOUBLE CONSCIOUSNESS. (Vol. IV, p. 397.) The subject of "Double Consciousness," in your November No., deserves careful study. Perhaps more than one soul tampers with our physical organism. Then, too, we have two cerebral hemispheres, not identical in functions; a "head" and "heart"; a cerebral and ganglial nervous system. We *feel* and accordingly act; we *think* and determine action.

PELASGI, PELASGOS. (Vol. IV, p.) I doubt the name *Pelasgi* being from *pelasgos*, the sea. I would quicker derive it from *palaïos*, ancient. It would be as accordant with etymology. So, too, would *Pelesti*, or Philistines—probably a cognate people. The *Cherethites* of the book of Second Samuel were *Creti*; and the *Pelethites*, *Philisti*. If so, they were *Pelasgi*. At any rate there is no other conjecture more plausible.

THE ROSICRUCIANS. (Vol. IV, p. 433.) I was interested in the paragraph on Rosicrucians. If the *rose* had a part in the name, etymology would dictate it to be spelled *Rosa*-crucians. Yet the impaled rose has a phallic rendering. The rose on the cross, of course, is a phonetic ideograph. So the ass's head in the Judæan temple was phonetic of the Hebrew letters for IHVH — one being Aō, and the other Yaō. The Aryan term *Ros* or *Ras* is like Hebrew for chief, origin, leader. The crucified chief, may be so understood. All true parables have a plurality of interpretations; each true on its own plane.

"GOD IS A CIRCLE WHOSE CIRCUMFERENCE IS EVERYWHERE, AND WHOSE CENTER IS NOWHERE TO BE FOUND." (Vol. III, p. 62; IV, p. 412.) Emerson says: "St. Augustine described the nature of God as a circle whose center was everywhere, and its circumference nowhere." I supposed this was from Hor-Apollo. A. WILDER.

We have always observed that the words were ascribed to Hermes Trismegistus, but have never seen them in his works — "The Divine Pymander," nor "Virgin of the World." H. P. Blavatsky, in her work, "Isis Unveiled," credits the quotation to Hermes, and further-

more adds that she would put it: "God is a circle whose center is everywhere, and whose circumference is nowhere to be found."

THE "THREE KINGS" OF ORION, (Vol. V, p. 16.) The kings referred to are generally believed to be the "three shepherd-kings" who are said to have followed the Star of Bethlehem at the Nativity of Jesus the Christ. Their names are given as *Caspar*, *Melchior*, and *Balthasar*; while the names of the "three star-kings" are *Ahnikah*, *Anilam*, and *Mintaka*. These three stars always point to the Pleiades or Seven Stars on one side, and to Sirius or the Dog-Star on the other side. In Job these stars are called the *Bands of Orion* (xxxviii, 31); the ancient husbandmen called them *Jacob's Rod*, and sometimes the *Rake*. The University of Leipsic, in 1807, gave them the name of *Napoleon*. In Green's "Astronomical Recreations" they are called the *Golden Girdle*; while the more common appellation is the *Yard*, because they are about three degrees in length and are used in estimating distances between other stars. The stars forming Orion's sword are called the *Ell* because they are one and a quarter the length of the *Yard*.

PSEUDO-JONATHAN. (Vol. IV, p. 299.) The term *pseudo*, "false," has been applied to several persons, but its meaning is more in the sense of *mistaken* than *false*. Jonathan ben-Uzziel was called Pseudo-Jonathan because tradition credits him with a Targum on the Pentateuch subsequent to that of Onkelos, in which some commentators think he undertook to rival Onkelos.

Pseudo-Athanasius is applied to Athanasius (Junior), or Celetes, surnamed Herniosus, bishop of Alexandria, A. D. 590. He is supposed to be the author of several works ascribed to Athanasius the Great, hence the name.

Pseudo-Daniel is applied to the author of the book of Daniel by Hengstenberg in his "Christology of the Old Testament," p. 251. Some commentators like Hitzig, in *Verbemerk* § 3, imagine that the Daniel of Ezekiel (xiv, 14, 20), was purely a mythical personage, whose prototype is to be sought in Melchizedek, and that the character was borrowed by the author of the book of Daniel as suited to his design. The order of the names, "Noah, Daniel, Job," seems to indicate the antiquity of the three persons. Job was one of the early

husbandmen (Gen. XLVI, 13), while the book that bears his name is considered one of the oldest poems extant.

Pseudo-Daphne is applied to the asteroid numbered 47 whose real name is Melete, because its discoverer Goldschmidt, mistook it for Daphne, No. 41. (See N. AND Q. Vol, V, pp. 8, 14).

Pseudo-Matthew is applied in the same manner to Saint Matthew the reputed author of the first synoptic gospel, because some commentators think he wrote the "Gospel of the Hebrews," or copied his gospel from it; while others say he elaborated his from Saint Mark and still others claim that Mark's gospel is an epitome of Matthew's.

Pseudo-Orpheus is applied to the author of one of the Sibylline Books because of the close resemblance of some of the sentiments to those in the songs of Orpheus.

Pseudo-Smerdis is applied to Ahasuerus the successor of Cambyses who seized the throne of Persia B. C. 522, and was murdered after a brief reign of eight months. Herodotus and Josephus do not agree as to this person's real name. He is supposed to be Artaxerxes I of Ezra VI, 7-24.

Pseudo-Sibyl is applied by Drummond, in "The Jewish Messiah," p. 13, to an Egyptian Jew, the author of Book III of the Sibylline Oracles, and prophesies the advent of the Messiah, and the author is assigned to Ptolemy Physcon B. C. 170-117.

PETRIFIED BODIES. (Vol. IV, 412.) The body of a child, nine months old, was buried in the "Old Burying-Ground," Stoddard, N. H., in January, 1818. In 1856, the body was disinterred, with others adjacent to it, for the purpose of removal to another lot. The body of this child alone had petrified. It was nearly as white as marble, and the features were as natural as the day it was buried, though the body soon crumbled on being exposed to the air. As the adjacent bodies were not petrified, it would be natural to suppose that another buried in the same place would not necessarily petrify.

S. L. G., Hollis, N. H.

THE "CROAKERS PIECES." The first four of the once famous *Croaker Pieces* were written by Joseph Rodman Drake for the New York *Evening Post*, in which they appeared between the 10th and 20th of March, 1819. Then Drake made Fitz-Greene Halleck a partner, and the remainder of the pieces were signed "Croaker & Co." The paper written by Drake was "The American Flag"; and the last of the series, "Curtain Conversations," was written by Halleck.

MAGIC SQUARE FOR 1888. This square is composed of the series of odd numbers beginning with 457.

1888.

457	484	483	463
479	467	469	473
471	475	477	465
481	461	459	487

If added in the following manner each sum is 1888 :

1. Added virtically, horizontally, and diagonally.
2. The sum of the four numbers composing the corners.
3. The sum of the quadrate group comprising a corner.
4. The sum of the four numbers forming the center.

Such squares are more perfectly magical than ordinary magic squares.

H. A. WOOD, Cleveland, Ohio.

HOW TO ARRANGE AND ADD THE DIGITS AND CIPHER TO = 100. Many persons have tried their their skill at this problem. There are more ways than one. Here is one way :

$$\begin{array}{r} 95\frac{1}{2} \\ 40\frac{3}{8} \\ \hline 100 \end{array}$$

LOGARITHMS. The logarithm of 1.2345679 (omitting the 8) has a remarkable peculiarity which renders the computation of its logarithm very simple.

$$\begin{aligned} \text{Thus } \log. 9.99999999 &= 0.999999999 = \log. 10 - 1 \\ \log. 8.1 &= .908485018 \end{aligned}$$

$$\log. 1.2345679 = .091514980$$

$$\begin{aligned} \text{Then } \log. 12345679 + \log. 9 &= 111111111 \\ \log. 12345679 + \log. 18 &= 222222222 \\ \log. 12345679 + \log. 27 &= 333333333 \\ \log. 12345679 + \log. 36 &= 444444444 \\ \log. 12345679 + \log. 45 &= 555555555 \\ \log. 12345679 + \log. 54 &= 666666666 \\ \log. 12345679 + \log. 63 &= 777777777 \\ \log. 12345679 + \log. 72 &= 888888888 \\ \log. 12345679 + \log. 81 &= 999999999 \end{aligned}$$

Chemical Elements in order of their Discovery.

ELEMENT.	DATE.	DISCOVERER.	ELEMENT.	DATE.	DISCOVERER.
Gold,		} Ancients.	Sodium,	1807	Davy.
Silver,			Potassium,	1807	Davy.
Copper,			Calcium,	1808	Davy.
Iron,			Barium,	1808	Davy.
Tin,			Strontium,	1808	Davy.
Lead,			Boron,	1808	Davy.
Mercury,			Iodine,	1811	Courtois.
Sulphur,			Lithium,	1817	Arfvedson.
Carbon,			Selenium,	1817	Berzelius.
Antimony, (?)	1450	Basil Valentine	Cadmium,	1818	Stromeyer.
Bismuth, (?)	1450	Basil Valentine	Silicon,	1823	Berzelius.
Zinc, (?)	1520	Paracelsus.	Zirconium,	1824	Berzelius.
Phosphorus,	1669	Brand.	Bromine,	1826	Balard.
Arsenic,	1694	Schroeder.	Glucinum,	1828	Wöhler.
Cobalt,	1733	Brandt.	Yttrium,	1828	Wöhler.
Platinum,	1741	Wood.	Thorium,	1828	Berzelius.
Nickel,	1751	Cronstedt.	Aluminium,	1828	Wöhler.
Hydrogen,	1766	Cavendish.	Magnesium,	1829	Bussy.
Fluorine,	1771	Scheele.	Vanadium,	1830	Sefstrom.
Nitrogen,	1772	Rutherford.	Lanthanum,	1839	Mosander.
Oxygen,	1774	Priestley.	Didymium,	1841	Mosander.
Manganese,	1774	Gahn.	Erbium,	1843	Mosander.
Chlorine,	1774	Scheele.	Ruthenium,	1845	Claus.
Tungsten,	1781	d' Elhujar.	Caesium,	1860	Bunsen.
Tellurium,	1782	Reichenstein	Rubidium,	1860	Bunsen.
Molybdenum,	1782	Hjelm.	Thallium,	1862	Crookes.
Uranium,	1789	Klaproth.	Indium,	1863	{ Reich and
Titanium,	1791	Gregor.			{ Richter.
Chromium,	1797	Vauquelin.	Gallium,	1875	{ Lecoq de
Columbium,	1801	Hatchett.			{ Boisbaudran.
Tantalum,	1802	Ekeberg.	Ytterbium,	1878	Marignac.
Cerium,	1803	Berzelius.	Scandium,	1879	Nilson.
Iridium,	1803	Tennant.	Samarium,	1879	{ Lecoq de
Osmium,	1803	Tennant.			{ Boisbaudran.
Rhodium,	1804	Wollaston.	Germanium,	1886	Winkler.
Palladium,	1804	Wollaston.			

Besides the above there is a number of substances which have been announced as elements, but the true nature of them is still under investigation. These include :

Name.	Date.	Discoverer.	Name.	Date.	Discoverer.
Thulium,	1879,	Cleve.	Praseodymium,	1885,	Welsbach.
Holmium,	1879,	Cleve.	Dysprosium,	1886,	Lecoq de
Neodymium,	1885,	Welsbach,			Boisbaudran.

There are more than thirty others, not named as yet, but temporarily denoted by letters. H. CARRINGTON BOLTON, New York City.

MISCELLANEOUS

NOTES AND QUERIES,

WITH ANSWERS.

"When Adam was made, the ancient worlds were called forth again."—ZOHAR.

VOL. V.

MARCH, 1888.

No. 3.

LETTERS OF "JUNIUS." In what newspaper were the letters of "Junius" published, and when? LLEWELLYN.

These letters appeared in the *Public Advertiser*, published in London, in the last century. The dates of the paper containing the articles are as follows:

1768—Nov. 21.

1769—Jan. 21; Feb. 7, 21; Mar. 8, 19; April 18, 21, 24; May 30; July 8, 19, 29; Aug. 8, 22; Sept. 7, 19, 25; Oct. 13, 17, 20; Nov. 15, 29; Dec. 12, 19.

1770—Feb. 14; Mar. 19; April 3; May 28; Aug. 22; Nov. 14.

1771—Jan. 39; April 22; June 22; July 9, 24; Aug. 13; Sept. 28, 30; Oct. 5; Nov. 2, 28.

1772—Jan. 21 (two letters).

The authorship of the letters of "Junius" has been attributed to no less than 51 different persons, and as the names of these persons may be of interest, we append them here, with a reference to some work where they are mentioned. Many more references could be given, but these are sufficient.

Adair, James, M. P. Serjeant at Law, died 1798.—Wade's "Junius," II, xv; Letter of Junius April 9, 1771.

Allen, Captain.—*Notes and Queries*, 1st Series, XI, 302.

Barré, Lieut.-Col. Isaac, M. P.—*Morning Herald*, 1813.

Bentinck, William Henry Cavendish. — Coventry's "Critical Enquiry," No. 61.

Bickerton, Mr.—*Oxford Spy*, 1818, page 24.

Boyd, Hugh M'Aulay, born, 1746, died 1791. — Almon's "Anecdotes," Vol. I, 1797.

Burke, Rt. Hon. Edward, b. 1728, d. 1797.—*Public Advertiser*, October 15, 1771.

Burke, William.—Wade's edition of "Woodfall's Junius," No. 86.

Butler, John, Bishop of Hereford.—Dr. Good's "Essay on Junius," in the edition published in 1814.

Camden, Charles, Lord, b. 1713, d. 1794.—Wade's "Junius."

De Lolme, John Lewis, b. 1745 (?), d. 1807. — Dr. Busby's work, No 46. Junius quotes from De Lolme's "Essay on the English Constitution."

Dunning, John, afterward Lord Ashburton, b. 1731, d. 1783.—Jacques's work, p. 141.

Dyer, Samuel, b. 1725, d. 1772.—Dr. Good's "Essay."

Flood, Henry, b. 1732, d. 1791.—Dr. Good's "Essay."

Francis, Sir Philip, b. 1740, d. 1818. — Parkes & Mervale's "Memoirs of Sir Phillip Francis," 1867, Vol. I, pp. 232-303.

George III, King of England.—Ireland's poem, "Scribbleomania," page 308, for a curious note on this subject.

Gibbon, Edward, b. 1737, d. 1794.—Woodfall's "Junius," Nos. 52.

Glover, Richard, b. 1712, d. 1785.—Woodfall's "Junius," No. 41, 42

Grattan, Henry, b. 1750, d. 1820.—Almon's "Letters."

Greatrakes, William, b. 1729, d. 1781.—*Gentlemen's Magazine*, 1813.

Grenville, George, b. 1712, d. 1770. He died before the letters were completed. Hence his claims need not be noticed.

Grenville, James, d. 1783. He was brother of the last mentioned, but he himself laid no claim to the letters.

Hamilton, William Gerard, b. 1729, d. 1796. — *Public Advertiser*, November 30, 1771.

Hollis, James.—Referred to by Wade and Allibone.

Hollis, Thomas, b. 1720, d. 1774.—Coventry's "Critical Enquiry."

Jackson, Sir George, Secretary of the Admiralty. — *Notes and Queries*, 1st Series, I, 172, 276, 322.

Jones, Sir William, b. 1746, d. 1794.—Coventry's "Critical Enquiry."

Kent, John, d. 1773.—"Letters of Junius," July 21, 1769.

Lee, Maj.-Gen. Charles, b. 1731, d. 1782.—Girdlestone, in Wade's Woodfall's "Junius," Nos. 33, 37.

Lloyd, Charles, d. 1773.—Burke's work, Nos. 63, 64, on his claim.
 Lyttleton, Thomas, 2d Lord, b. 1744, d. 1779.—*Littell's Living Age*, XLII, 223.

Maclean, Laughlin, b. 1727, d. 1777.—"Waldie's (P.) Library," edited by John Jay Smith.

Marshall, Rev. Edmund, d. 1797.—Nichols's "Literary Illustrations of the Eighteenth Century," VIII, 680.

Paine, Thomas, b. 1737, d. 1809. — Woodfall's "Junius," No. 89; also, see W. H. Burr's elaborate work in favor of Paine.

Pitt, William, Earl of Chatham, b. 1708, d. 1778. — "Chatham Papers," page 52.

Portland, William, Duke of Portland, b. 1738, 1809. — Johnston's work, No. 47.

Pownall, Thomas, b. 1722, d. 1805.—Woodfall's "Junius," No. 84.

Rich, Lieut.-Col., Sir Robert.—Woodfall's "Junius," No. 83.

Roberts, John, d. 1772.—*Public Advertiser*, March 21, 1772.

Rosenhagen, Rev. Philip.—*Notes and Queries*, 3d Series, v, 16.

Sackville, George, Viscount, b. 1716, d. 1785.—Wraxall's "Memoirs of his own Time," II, 90.

Shelburne, Earl of, Marquis of Lansdowne, d. 1804. — Wade's Woodfall's "Junius."

Stanhope, Philip Dormer, Earl of Chesterfield, b. 1695, d. 1772.—Woodfall's "Junius," Nos. 55, 79, 80.

Suett, Richard, d. 1805.—Woodfall's "Junius," No. 53.

Temple, Richard, Earl, b. 1711, d. 1779.—"Grenville Papers," edited by William J. Smith (L. 1852).

Tooke, John Horne, b. 1736, d. 1812.—"Memoirs of John Horne Tooke," II, 358.

Walpole, Horatio, Earl of Oxford, b. 1717, d. 1797. — Wilke's "Papers of a Critic," II, 158.

Wedderburn, Alexander, Lord Loughborough, b. 1733, d. 1805.—Holland's "Memoirs of the Whig Party."

Wilkes, John, b. 1727, d. 1797.—*The Gazetteer*.

Wilmot, James, D. D., b. 1726, d. 1807.—Beckford's "Vathek."

Wray, Daniel, b. 1701, d. 1783. — Nichols's "Literary Illustrations of the Eighteenth Century."

For further details, see the very complete bibliography of "Junius," in Cushing's "Initials and Pseudonyms," New York, 1885, pp. 146-157, prepared by A. R. Frey, of the Astor Library, New York.

THE SMARAGDINE TABLET. (Vol. I, p. 29 ; IV, 358.) What work of Hermes contains the "Smaragdine Tablet," to which you refer in your paper on *The Staff of Adam and The Shém-Hammephordsh*? What translation is preferable? ALEX. CUTTS.

The "Pymander" has been published in several editions. Those in our library are :

Hermes Trismegistus : his Divine Pymander. Edited by Paschal Beverly Randolph. Prefatory notes by Alfred E. Giles, and Flora S. Russell. Octavo, pp. 144 ; Boston, 1871.

The Divine Pymander of Hermes Mecerurius Trismegistus. Translated from the Arabic by Dr. Everard [1650]. *Credo mercurium Trismegistuan Sapientem Egyptium Floruisseante Pharaonem*. With introduction and preliminary essay by Hargraves Jennings. Quarto, pp. 112. Madras, India, 1884.

The Theological and Philosophical Works of Hermes Trismegistus, Christian Neo-platonist. The Poemandres. Translated from the original Greek, with preface, notes, and indexes, by John David Chambers. Octavo, pp. 170 ; Edinburgh, 1882.

The Divine Pymander of Hermes Trismegistus. Reprinted (from the original English translation) in the *Journal of Speculative Philosophy*, Vol. XX, Nos. 3 and 4, July and October, 1886 ; edited by William T. Harris, Concord, Mass.

A translation of the Smaragdine Tablet is found in the former two works cited, and also in the following works :

The Philosopher's Stone, a lecture before the Chicago Philosophical Society, by Gen. N. B. Buford, p. 14.

Isis Unveiled, by Helen P. Blavatsky, Vol. I, p. 507.

New Platonism and Alchemy ; an outline of the interior doctrines of the alchemists of the middle ages ; by Alexander Wilder, p. 24.

Also in Mackenzie's "Royal Masonic Cyclopædia," New York, p. 671, translated from Dr. Everard, from the Latin of Ficinus, from the great work of the learned Jesuit, Athanasius Kircher, in his "Edipus Ægyptiacus."

Eliphaz Levi (Abbè Alphonse Louis Constant) says the Emerald Stone is "the whole of magic in a single page."

For the enlightenment of this correspondent we give here another translation of the Smaragdine Tablet (Emerald Stone), taken from the Madras edition (p. ix), as a matter of comparison with the translation given in this magazine, Vol. I, p. 29 :

1. I speak not fictitious things, but that which is certain and most true.

2. What is below, is like that which is above ; and what is above, is like that which is below ; to accomplish the miracle of one thing.

3. As all things were produced by the one word of one Being, so all things were produced from this one thing by adaptation.

4. Its father is the sun, its mother is the moon, the wind carries it in its belly, and its nurse is the earth.

5. It is the father of all perfection throughout the world.

6. The power is vigorous if it be changed into earth.

7. Separate the earth from the fire, the subtle from the gross, acting prudently and with judgment.

8. Ascend with the greatest sagacity from the earth to heaven, and then again descend to the earth, and unite together the powers of things inferior. Thus you will obtain the glory of the whole world, and obscurity will fly away from you.

9. This has more fortitude than fortitude itself, because it conquers every subtle thing, and can penetrate every solid.

10. Thus was the world formed.

11. Hence proceed wonders which are here established.

12. Therefore I am called Hermes Trismegistus, having three parts of the whole world.

13. That which I had to say concerning the operation of the sun is completed.

HOGSHEAD—63 GALLONS. (Vol. V, p. 16.) The word *hogshead* is derived from the Danish "Ox-hud" (oxhide) and means "the larger skins," in contradistinction to the smaller goat skins. This is an instance of the misuse of the letter "h." WALTER H. SMITH.

"TRUTH, LIKE A TORCH, THE MORE IT'S SHOOK, IT SHINES." (Vol. I, p. 79 ; II, 321.) Prof. DeMorgan gives one stanza, without naming author, in "Budget of Paradoxes," p. 210 :

"Truth, like a torch, the more it's shook, it shines;
But those who want to use it, hold it steady;
They shake the flame who like a glare to gaze at,
They heep it still who want a light to see by."

TAE MOABITE STONE. (Vol. IV, p. 15.) Inasmuch as you have published the text of the *Shapirah Manuscripts*, I would like to see also the text of the *Moabite Stone* published in your pages for reference ; any reliable translation. H. LANGDON LARKIN.

The Moabite Stone was discovered by Ganneau on a block of black basalt at Dibon in Moab, which, according to the decipherment given by him, is as printed below, taken from the *Archeological Review* for January and June, 1870. B. F. De Costa has also made a translation, (Royal octavo, N. Y., 1871). The fullest exhibit, together with the literature on the subject, is that of Dr. C. D. Ginsburg [second edition,]

London, 1871. Dr. Deutsch of the British Museum has also written a commentary on it. (See "The Palestine Exploration Fund," *Quarterly Statement*, No. 5).

I, MESHA, SON OF CHEMOSH, . . . KING OF MOAB, [SON] OF YABNI . . . MY FATHER REIGNED OVER MOAB (THIRTY YEARS), AND I REIGNED AFTER HIM; I MADE THIS ALTAR FOR CHEMOSH AT KARHAH ON ACCOUNT OF THE ASSISTANCE HE GAVE ME IN ALL BATTLES, AND BECAUSE HE MADE ME SUCCESSFUL AGAINST MY ENEMIES, THE MEN OF THE KING OF ISRAEL, WHO OPPRESSED MOAB A LONG TIME, FOR CHEMOSH WAS ANGRY AGAINST HIS LAND. HIS SON SUCCEEDED HIM, AND HE ALSO SAID, I WILL OPPRESS MOAD. IN MY DAYS HE (CHEMOSH) SAID, I [WILL GO] AND APPEAR (BE FAVORABLE) TO MOAB AND HIS TEMPLE; THEN ISRAEL WASTED CONTINUALLY. OMRI TOOK [THE PLAIN OF] MAHDEBA AND DWELT IN IT . . . BUILT FORTY . . . [AND DWELT] CHEMOSH THERE IN MY DAYS. I BUILT BAAL-MEON AND MADE (SACRIFICES) THERE AND I [BUILT] KIRYATHAN. THE MEN OF GAD [DWELT] IN [THIS] LAND FROM EARLY TIMES, AND THERE BUILT THE KING OF ISRAEL [YAAZER]; I BESIEGED THE CITY, TOOK IT, AND KILLED ALL [WHO DWELT] IN THE CITY, TO THE GRATIFICATION OF CHEMOSH AND MOAB; I MADE CAPTIVE THERE . . . [AND BROUGHT] IT TO CHEMOSH AT KERIYOTH. I REMAINED HERE WITH THE CHIEFS AND [THE SOLDIERS UNTIL] THE NEXT DAY. THEN CHEMOSH BADE ME GO AND TAKE NEBO FROM ISRAEL. [I AROSE UP] WENT IN THE NIGHT AND FOUGHT AGAINST IT FROM THE BREAK OF DAY TILL NOON; I TOOK IT, KILLED ALL, SEVEN THOUSAND . . . [TO PLEASE ASTOR] FOR CHEMOSH DEVOTED TO ASTOR I TOOK FROM THERE ALL THE VESSELS OF JEHOVAH, AND [OFFERED] THEM TO CHEMOSH. AND THE KING OF ISRAEL BUILT YAHAZ, AND DWELT THERE, WHEN I MADE WAR UPON HIM. CHEMOSH DROVE HIM OUT FROM THENCE; I TOOK FROM MOAD TWO HUNDRED MEN, ALL CHIEFS, TRANSFERRED THEM TO YAHAZ, AND BEGAN TO MAKE WAR AGAINST DIDON. I BUILT KIRHAH, HA-MATH-HA-YEARIM, AND HAMATH. I CONSTRUCTED THEIR GATES AND THEIR TOWERS; I BUILT THE PALACE, AND I MADE AQUEDUCTS (?) IN THE INTERIOR OF THE TOWN. THERE WERE NO CISTERNS IN THE INTERIOR OF THE TOWN OF KIRHAH, AND I SAID TO ALL THE PEOPLE, MAKE A DITCH AROUND KIRHAH WITH [THE MEN] OF ISRAEL. I BUILT (ARO)ER, AND I MADE THE PASSAGE OVER THE ARNON. I BUILT BETH-BAMOTH, WHICH HAD BEEN OVERTHROWN, AND BEZER, WHICH HAD BEEN DESTROYED. I FORTIFIED DIBON TO HOLD IT IN SUBJECTION, AND I CONSTRUCTED FORTRESSES IN THE TOWNS WHICH I ADDED TO [MY] LAND. I BUILT . . . BETH - DIBLATHAN, BETH-BAAL-MEON, AND TRANSPORTED THITHER [MOABITES] [IN ORDER TO TAKE POSSESSION OF] THE LAND. AT HORONAN DWELT [THE CHILDREN OF REUBEN] CHEMOSH TOLD ME, GO, FIGHT AGAINST HORONAN. [I FOUGHT AGAINST IT AND TOOK IT], [AND THERE DWELT] CHEMOSH IN MY DAYS

VOLAPÜK—*The Universal Language.*

Menad bal, pük bal.—"One mankind, one language."

The word Volapük is from *vol*, world, and *pük*, language, that is, a world-language. Several articles on the new language have appeared in the press expounding and explaining it. We select from *The Open Court*, Chicago, material for an article.

Leibnitz devoted much time to the construction of his *Spécieuse Générale*, which fell flat. Labbe invented a philosophical language, and Kircher published his *Polygraphia* in 1663. In 1668 the Royal Society sanctioned John Wilkins' *Philosophical Language* by publication in London. Most inventors of this kind attempted the ideographic—to have signs represent ideas. We have this in the mathematics, in the plus and minus signs, but practically this is reverting to hieroglyphics.

Johann Martin Schleyer seems to have solved the problem, for in 1878, he arranged the most simple artificial language, and so rapidly has it become recognized as of practical use in Europe, Asia, and Africa, that one million persons are said to use it in their intercourse.

The alphabet employed is the Roman with some of the German dotted letters added. Volapük is formed on the general model of the Aryan tongues in its signs representing letters and words, the root words being taken from living languages, mainly Indo-Germanic and Romance. In making the Vocabulary, English afforded the largest number of words; Latin, German, French, and Spanish next, in the order named. The simple Anglo-Saxon roots abound in English and their brevity caused their adoption.

Savants, travelers, and merchants will have the greatest use of Volapük. It is said there are 800 languages at the present time—40 or 50 of which are spoken by civilized people who are fast being united in their interests by railroads, telegraphs, and steamboats. It takes years to learn three or four Romance or Germanic tongues, and much longer to learn a single Hindoo or Semitic dialect. Turkish, Spanish, and Chinese are still more difficult. The principles of Volapük can be learned in a very short time, and a month's study and practice will make one a fluent writer and speaker. There are now a dozen or more periodicals published in Volapük, the commercial journals being the most favored. Soon medical and scientific works will be worded in the new language with an ever increasing number of cosmopolitan readers. Discoveries that have laid dormant for years because in inaccessible languages will be widely announced.

The numerals are 1 bal, 2 tel, 3 kil, 4 fol, 5 lul, 6 mäl, 7 vel, 8 jöl, 9 lül, 10 bals, 20 tels, 100 tum, 1,000 mil, 1,000,000 balion; 11 would be balsebal, 21 telsebal,—the letter a meaning and. Hence,

1 bal,	26 telsemäl,	51 lulsebal,	76 velsemäl,
2 tel,	27 telsevel,	52 lulsetel,	77 velsevel,
3 kil,	28 telsejöl,	53 lulsekil,	78 velsejöl,
4 fol,	29 telsezül,	54 lulsefol,	79 velsezül,
5 lul,	30 kils,	55 lulselul,	80 jöls,
6 mäl,	31 kilsebal,	56 lulsemäl,	81 jölsebal,
7 vel,	32 kilsetel,	57 lulsevel,	82 jölsetel,
8 jöl,	33 kilsekil,	58 lulsejöl,	83 jölsekil,
9 zül,	34 kilsefol,	59 lulsezül,	84 jölsefol,
10 bals,	35 kilselul,	60 mäls,	85 jölselul,
11 balsebal,	36 kilsemäl,	61 mälsebal,	86 jölsemäl,
12 balsetel,	37 kilsevel,	62 mälsetel,	87 jölsevel,
13 balsekil,	38 kilsejöl,	63 mälsekil,	88 jölsejöl,
14 balsefol,	39 kilsezül,	64 mälsefol,	89 jölsezül,
15 balselul,	40 fols,	65 mälselul,	90 züls,
16 balsemäl,	41 folsebal,	66 mälsemäl,	91 zülsebal,
17 balsevel,	42 folsetel,	67 mälsevel,	92 zülsetel,
18 balsejöl,	43 folsekil,	68 mälsejöl,	93 zülsekil,
19 balsezül,	44 folsefol,	69 mälsezül,	94 zülsefol,
20 tels,	45 folselul,	70 vels,	95 zülselul,
21 telsebal,	46 folsemäl,	71 velsebal,	96 zülsemäl,
22 telsetel,	47 folsevel,	72 velsetel,	97 zülsevel,
23 telsekil,	48 folsejöl,	73 velsekil,	98 zülsejöl,
24 telsefol,	49 folsezül,	74 velsefol,	99 zülsezül,
25 telaselul,	50 luls,	75 velaselul,	100 tum.

There is but one declension. The plural of any word is formed by adding *s*, and the plural is never formed in any other way. The first three vowels added to any noun form the genitive, dative, and accusative cases.

Thus	Nominative,	<i>Vol</i> ,	World.
	Genitive,	<i>Vola</i> ,	Of the world.
	Dative,	<i>Vole</i> ,	To the world.
	Accusative,	<i>Voli</i> .	The, or a, world.

Plural of world would be vols. Every noun is declined in the same way. The verbs are all regular and there is but one conjugation. The tenses are denoted by the letters *a*, *e*, *i*, *o*, *u*, placed before the verbs; the letter *p* preceding these denotes the passive voice.

The personal pronouns are *ob* I; *ol* thou; *om* he; *of* she; *os* it; *on* they. The verb *Lof*, to love, would be conjugated thus:

<i>Löfob</i> ,	I love.	<i>Löfobs</i> ,	we love.
<i>Löfol</i> ,	thou lovest.	<i>Löfols</i> ,	ye love.
<i>Löfom</i> ,	he loves.	<i>Löfoms</i> ,	they (on) love.
<i>Löfof</i> ,	she loves.	<i>Löfofs</i> ,	they (f) love.

Imperfect,	<i>Alöfob,</i>	I loved.
Perfect,	<i>Elöfob,</i>	I have loved.
Pluperfect,	<i>Ilöfob,</i>	I had loved.
Future,	<i>Olöfob,</i>	I will love.
Future perfect,	<i>Ulöfob,</i>	I will have loved.
	<i>Palöfob,</i>	I am loved.
	<i>Pelöfob,</i>	I have been loved.

Negatives are *no*. Adjectives are formed by adding *ik* to the noun, *gud* is the good, and *gudik* is good—compared thus : *gudik, gudihum, gudihüm*. Adverbs are made by adding *o* to the adjective : *gudiko* is well. There is so much made from one stem or root that there is but little to memorize after learning the system.

Max Müller is quoted as saying : " The universal language of Prof. Schleyer is well known to me. I thoroughly agree with the principles upon which it is based."

A German poem, " The Eye of the Child," has been thus translated into Volapük :

LOG CILA.

O log cila, mag nifäla !
Logob velik stalis olik
No peglumöl fa ded sina,
Litöl se ol jin lanelik.

As pronounced in English spelling the verse would sound somewhat as follows :

O logue chelah margue neyfaläh !
Logobue velique stalees olique
No paygloomwail fah daib senah,
Leetos say ole sheen lanelique.

The accent is on the last syllable in every word.

Volapük is free from all ambiguity. Every word is pronounced uniformly by all Volapükists speaking the " universal language."

Volaspodel is a "correspondent." A Vocabulary is in preparation and soon to be published by M. W. Wood, M. D., of the U. S. Army, Volapük-English and English-Volapük on same page, about 325 pages. A department—Läbled Volapükik Gaseda Konodik—is published in *The Office*, New York, beginning November, 1887 ; Redakel : Charles E. Sprague, LTDL. E KAD.

ANAGRAMS. The New York *Sun* recently published some very apt anagrams under the caption of " Innocent Amusement." I send you a few gathered from several sources, which will serve for a diversion to some of your readers, whether young or old :

Abraham Lincoln—is "All in ban, march on"; also, "Baron, call in Ham."

Astronomers—are "Moon starers"; also, make "No more stars."

Augustus DeMorgan—makes "Great gun, do us a sum."

Charles James Stuart—"Claims Arthur's seat."

Desperation—says "Ned is a toper."

Fulmination—says "Sin is no fault."

Funeral—is "Real fun."

Hannibal Hamlin—says "Ban him in a hall."

Horatio Nelson—says *Honor est a Nilo*, "Honor is from the Nile."

James Stuart is "A just master."

Masquerade—is "Mad as queer."

Monarch—"March on."

Misanthrope—says "Spare him not."

Misrepresentation—brings "Simon Peter in tears."

Napoleon Bonaparte—says "No, appear not on Elba."

New door—makes *One word*.

Old England—is "Golden land."

Penitentiary—says "Nay, I repent it."

Presbyterians—are "Best in prayers."

Punishment—is "Nine thumps."

Quid est veritas, (Vulgate) ("What is truth," John xiv, 18,),—is answered by *Est vir qui adest* ("It is the man who is before you.")

Revolution—is "To love ruin."

Telegraphs—are "Great helps."

Thomas Babington Macaulay—"Mouths big, a Cantab anomaly."

William Shakespeare—"We all make his praise."

Victoria, England's Queen—"Governs a nice quiet land."

MARGANA.

BENGOUGH — PRONUNCIATION OF THE NAME. (Vol. IV, p. 440.)

The Herald, of Port Hope, Canada, ("devoted to speling by sound"), for December, 1887, says:

"Elsewhere we quote Mikljon (Meiklejohn) to sho that the gutural has been dropt from refusal to pronounce it. The pronunciation having changed, the speling shud folo suit and not lag centuries behind, stil indicating to the eye the gost of a gutural long since ded to the ear, and which shud hav been interd decently long ago. If ugh is silent, then stop at o. Bengo appears a les comon pronunciation than Bengof. Which is right we don't determin. The beuty of the two following rules we spel by, is herein aparent as talying with the highset filology."

Rule 1. Omit evry useles leter. Rule 2. Change *d* to *t*, *ph* to *f*, *gh* to *f*, if sounded so.

Description of a Model Newspaper,

DAILY, SEMI-WEEKLY, AND WEEKLY :

Which paper should be owned and conducted by godly men, and should be sold at the lowest paying rate.

As will be seen, this piece of metrical prose is in 8-and-7 trochaics. The lines, however, contain several peculiarities, all but the first of which need to be pointed out.

1. Each stanza is without rhyme.
2. No rhyme is found in any two contiguous stanzas taken as one.
3. In every stanza, the vowel or the diphthongal sound in the last accented syllable of each line, and that in the final (unaccented) syllable of each of the first and third lines, are all different.
4. Neither of the two final syllables of the first line of any stanza contains the same vowel or the same diphthongal sound as that in the terminal syllable of the last line of the preceding stanza.
5. The same vowel or the same diphthongal sound does not occur in the last syllable of any two contiguous stanzas.
6. The same vowel or the same diphthongal sound does not occur in the last syllable of the second line of any two such stanzas.
7. As half-stated in 3, the same vowel or the same diphthongal sound does not occur in the last syllable of the second line of any two contiguous pairs of lines, or half stanzas.

Moreover, no emphatic monosyllable is admitted where incompatible with the rhythm ; no unemphatic monosyllable is employed in an accented place ; no second and no fourth line (all which of course end on the accent) terminate on a secondary emphatic syllable of a word ; no word beginning with a vowel-sound comes immediately after one ending in a vowel-sound ; no word beginning with a consonant-sound comes immediately after one ending in the same consonant-sound ; and, excepting nineteen necessary but simple monosyllables and one echoed trisyllable, no word in the piece is used more than once.

The rigorous application of rules so minute and complex must sometimes, obviously, necessitate a recourse to forms of expression such as would scarcely be *chosen* in writing *freely*, — a consideration to be kept in mind in reading these verses.

The phonetic exhibit, on the right margin, is in explanation of rules 3 to 7 inclusive.

The following are the twenty words alluded to above : a, all, and, are, as, at, by, for, from, in, it, not, of, on, that, the, 'tis, to, with, abstinence. In verification of this list, it may be proper to state that

the writer has made an alphabetic assemblage of all the words in the piece.

The whole composition has many times been systematically and carefully compared with the above rules, 13 in all; and, in each of its 2239 checkable places (exclusive of those caused by comparison of the phonetics of the margin with the orthoëpics of the dictionary), it is believed to be strictly in accordance with the same.

I. — NEGATIVE.

	Accented.	Unaccented.
It rejecteth contributions *	ū	shū
Fav'ring wrong, untruth, or guile,	ī	
Or that countenance or wink at	ī	ǎ
Routs, the stage, or harmful sports.	ō	
It from things announced to happen	ǎ	p'n
Weedeth such as fail of worth;	ū	
And from gleanings past, historic,	ō	ī
Purgeth matters, lines, unsafe.	ā	
It admitteth nothing vulgar;	ū	ǎ
Doth not jest at sacred thoughts;	au	
And ignoreth outrage, swearing,	ā	ī
Hazards, drink, nicotian leaf.	ē	
It inserteth not nor hints of	ī	ō
Spiteful or injurious words;	ū	
But, when glaring vice it noteth,	ō	ě
Claims for guilty pains condign.	ī	
And it barreth fiction vapid,	ǎ	ī
Frivolous, corrupt, or low;	ō	
Shutting out the same as hurtful	ū	ōō
Both to wise and saintly walk.	au	

II. — POSITIVE.

'Tis a sheet octavoed, — handy;	ǎ	ī
Fit in paper; impress clear;	ē	
And, regarding type-arrangement,	ā	ě
Excellent, attractive, spruce.	ōō	
'Tis a journal prudent, sober,	ō	ě
Courtly, sensible, concise;	ī	
With, anon, a buoyant outbreak,	ou	ā
Hum'rous turn, or spice of wit.	ī	

* Advertisements emphatically included.

'Tis a guest esteemed by fathers,	ah	ě
Matrons, children, misses, youth ;	öö	
Plenteous in gainful reading,	ē	ı
Fireside problems, wholesome tales.	ā	
'Tis a record prized of ranchmen,	ă	ě
Shepherds, tillers of the soil ;	oi	
And, amongst the social topics,	ö	ı
Giveth all the farm-hints new.	ü	
'Tis a bulletin for merchants,	ě	ă
Proxies,† holders bond or share ;	ā	
Trusty, full, on stocks and money,	ü	ı
Commerce, trade, exchange, and gold.	ō	
'Tis a chronicle for workers,	ü	ě
Whether using head or hands, —	ă	
For collegians philosophic,	ö	ı
As for navvies on the rail.	ā	
'Tis a news-collector, valued	ă	yü
For its manifold accounts ;	ou	
Gath'ring in, from thousand sources,	ō	ě
Numberless occurrences, deeds.	ē	
'Tis a chart of useful knowledge,	ö	ě
And of sound affairs of taste ;	ā	
With alacrity producing	ü	ı
All essential fancy, fact.	ă	
'Tis a leader ardent, stalworth,	au	ü
In the total-abst'nence league, —	ē	
Abstinence for self-secureness,	ü	ě
And for sake of friend or foe.	ō	
'Tis, concerning views of statecraft,	ā	ă
Independent, dauntless, firm ;	ı	
First, though, weighing ev'ry question	wě	yü
In the scales of Truth and Right.	ı	
'Tis at feud with error, falsehood,	au	öö
Fraud, injustice, aught unclean ;	ē	
For the common weal contending,	ě	ı
Void of all intent unfair.	ā	

† Here used for brokers, agents, etc.

'Tis a guardian constant, helpful,	ě	öö
Of the lower creatures, dumb ;	ů	
Judging that Immanuel's dictate †	ı	ā
Loud condemneth ill to these.	ē	
'Tis a Mentor to the Christian, —	ı	yă
Middle-aged, or young or old ;	ō	
Urgent for unceasing progress,	ö	ě
And a faith that acts by love.	ů	
And, in chief, it has the sinner's	ı	ě
Highest welfare deep at heart ;	ă	
Making known, as fleet his life-days,	ı	ā
What should bring eternal good.	öö	

† The Golden Rule.

WILLIAM BOYD.

Cambridge, Mass., 1877.

"ODD AS DICK'S HAT-BAND." (Vol. V, p. 16.) Dr. Brewer, in his "Phrase and Fable," elucidates the saying as follows :

1. "As tight as Dick's hat-band." The hat-band of Richard Cromwell was the crown, which was too tight for him to wear with safety.

2. "Dick's hat-band, which was made of sand." His regal honors were "a rope of sand."

3. "As queer as Dick's hat-band." Few things have been more ridiculous than the exaltation and abdication of the Protector's son.

4. "As fine as Dick's hat-band." The crown of England would be a very fine thing for any one to get.

WALTER H. SMITH.

ST. JAMES' WAY. (Vol. V, p. 16.) The Milky Way is so called from the fact that it is seen to best advantage in August. "Old St. James's Day" is August 5th ; St. James, the Great Apostle, is referred to. A similar astronomical instance is referred to in the name of the Perseid meteoric shower, which precipitates itself about August 10th, and has earned for itself in consequence the phrase — "The tears of St. Lawrence."

WALTER H. SMITH.

We are told by Tylor, in his "Primitive Culture," Vol. I, p. 301, that the starry band that lies like a road across the sky, known as the *milky way*, is called by the Baustös, a South African tribe of savages, "The way of the gods" ; the Ojīs, another African tribe of savages, say it is "The Way of the Spirits," by which souls go up to heaven ; the North American tribes know it as "The Path of the Master of

Life," also "The Path of Life," and "The Road of Souls," where they travel to the land beyond the grave.

Some of the ancient philosophers maintained that the *Via Lactea*, or "Milky Way," was formerly the sun's path, and that its present luminous appearance is the track which its scattered beams left visible in the heavens. The more proper name is the Galaxy.

BOHÆME'S "WHEEL OF BIRTH." (Vol. IV, p. 395.) The *wheel of birth* is called by Jacob Bohæme *Centum Naturæ*. This does not simply mean the revolving of life and of the forces of life in general, which is so justly comparable to a circling wheel, and which is liable to be brought into disorder by sin. The "Wheel of Birth," in a stricter sense, is the "Wheel of coming into existence," the "Wheel of Becoming," the first magical life-circle, which is the becoming of all natural and creaturely birth and becoming; the first restlessly circling movement, which is the womb and basis of the life that is working itself into shape. It is a secretly-burning wheel, because "life is a fire" (*ignis ubique latet*). In Bohæme's works, image succeeds image, metaphor succeeds metaphor; he, therefore, designates it by another symbol as the "Dark Fire-root," which never dares to catch fire and burst into fierce flames (whereby the whole of life would be brought into confusion), but is destined to remain in latency, in concealment, and in subordination to the higher principle. The "Wheel of Birth" may be described as the "Hearth of Life," or, the "Mother of Life." In Nature it is Fire, in the world of souls and spirits it is Desire. Modern thinkers disagree with Bohæme on this point, assigning *instinct* as the deepest root in natural life; and restrict *desire* to self-conscious life.

In the Epistle of James (iii, 6,) it is called "the course of nature," the Greek being *trochôs tês genêscos*; the Latin, *rotam nativitatîs nostræ*.

The Emphatic Diaglott translates it "the wheel of nature."

George R. Noyes' translation, "the wheel of life."

The Douay Version (Vulgate), "the wheel of our nativity."

Julia A. Smith's translation, "the wheel of creation."

Jonathan Morgan's translation, "the course of creation."

Friends' translation, "the whole course of our being, and is kindled in the birth."

Murdock's Syriac translation, "the series of our generation that rolls on like a wheel."

QUESTIONS.

1. Can any one give information relative to the manufacture of the ancient "Greek Fire"? Also, of the manufacture of "Russia sheet iron," and imitations of the same? Also, of "Russia leather?"

R.

2. Who is the author of the expression, "The Seven Cardinal Virtues of a politician are 'The Five Loaves and Two Fishes.'"

A. R. CHIVIST.

3. In England the driver of horses sits on the right side of a carriage and turns out to the left; if he is a teamster, he walks on the right side of his cattle and turns out to the left.

In the United States a driver of horses sits on the right side and turns out to the right; if he is a teamster, he walks on the left side of his cattle and turns out to the right.

Can any reader state at what period in the history of the colonies this radical change was made, and also the reason which led to its adoption?

DJAFAR.

4. Who were the thirty disciples of Hillel I, wh, in the language of the Talmud, "were worthy to possess the power of stopping the sun, like Joshua"?

R. K. D.

5. Whence the origin of making the 31 verses of Proverbs xxi, apply to the destiny of males, and the 31 verses of Proverbs xxxi, apply to the destiny of females, each verse to the birth-day?

R. K. D.

6. Gen. Sir Henry Johnson, a British general, was born in Dublin, 1748 and died March, 1835. Bart. Oct. 2, 1818; finally made a Major-General; married Rebecca Franlas, a celebrated wit; was in command at Stony Point, surprised and taken prisoner by General Wayne, and after the capture of Yorktown, returned to England and distinguished himself at many places during the Irish Rebellion of 1798.

Can any of the numerous readers and contributors of N. AND Q., inform me why he wears a narrow black band across his forehead as displayed in all his authentic portraits? Please state full particulars as to cause, etc.

M. O. WAGGONER, Toledo, O.

7. What are the particulars connected with the Ethan Allen statue known as Kinney's Heroic Statue? What is its correctness or life-like representation of this old hero? Shall be pleased to have a full detail of all that pertains to this or any other alleged likeness or portrait of him extant.

M. O. WAGGONER.

8. Where and when was the word "Sublime" first applied to the Third Degree of Blue Lodge Masonry.

E. A.

MISCELLANEOUS

NOTES AND QUERIES,

WITH ANSWERS.

"He is a rash man, who outside of pure mathematics, pronounces the word impossible."—ARAGO.

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No. 4.

Speculations Concerning Matter.

Let us shut our eyes and think. We will ask ourselves some hard questions, and we shall simply tell the truth when we admit our ignorance. With some such confession at the outset, let us bravely attack the problem.

That which we actually know is little enough, compared with what is taken for granted. Our assumptions have stood so long in the place of facts that we shall find more difficulty in giving them up than in accepting any new knowledge, based upon no matter how great weight of evidence. We are, then, so far as we are able, to lay aside our opinions, as if they had never been formed, and to take the attitude of learners. Standing wistfully in the class for small beginners, we begin with wonder, and wonder how we shall begin.

The very first question staggers and dismays us: Is there and matter? With united voice you say at once, "Yes, matter is." You go farther; your mind goes at a gallop to no end of conclusions. You are persuaded beforehand. All the generations of all ages assert it. The proposition needs no debate. You even agree to do without evidence, testify alone, and rest your case. "Matter is!" But we reserve the right to cross-question the witness: Assertion is not proof. Very well, you go on and say, for substance. "I, Richard Roe, am; I knew John Roe; I helped put him in the ground after he was dead; I have a wife, and I can't be mistaken about it; I am fifteen

years the elder ; she reminds me of that often. But what is the use of more evidence than we have? we eat, drink, smell matter ; see, hear, feel, taste, get drunk on matter ; we breathe it, absorb it, secrete it ; we may weigh it, pound it, divide, grind and pulverize it — but we can never get away from it ; in it we live, move and have our being ; in short, we are matter—therefore I say again, matter is ! ” You say so. Well, who are you?

Now, as a matter of fact, you cannot answer this apparently simple question, and have probably never made the attempt. You, as an individual, the unit of the race, present a highly complex organism. But what are you? Of what are you? You may you are of the earth, earthy. Reasoning in the circle in which our limitations compel us to grope, no other answer can be given. But what is the earth? How readily you reply, “The earth is a part of a system of which our sun is the centre.” But of what is our solar system a part? In response to this inquiry the answer is less ready, still you venture to say, “Our solar system is one of many such systems in space.” Upon being pressed for further information, as to number, relative size, distances from each other, relative age, composition, origin, purpose and so on, you may recite the few well-ascertained facts of astronomy, but upon the whole you decline to furnish a bill of particulars.

But can you form the faintest mental conception of space? Try it. What is it? Summon to your aid the genius of computation and mete out its volume. Come, ye children of light, and read me my riddle! Can man by searching find out—space? Assault the problem ; grapple with it ; master it if you may. From the far points amid the inter-stellar depths, beyond which the telescope is blind, prolong the intellectual vision and assign to space its limits. Whither-ward and how stand the towers that guard its borders? Has it a centre, and if so, our poor logic demands a circumference. And beyond this—what? Come, boaster, begin. Is it here? Is it there? What answer? In the presence of this awful mystery we stand to-day, baffled and foiled. Thought, like the tired dove, would fain return. Imagination folds its weary wings, and of Science the asserting voice is hushed!

But you want to talk about matter. Very well, let us come back to earth. After putting our feet upon good old terra firma we know where we are. Yes, you think you know just where you are. But you don't. Unfortunately for our peace of mind we are surrounded by space and may as well surrender at once. This globe of ours lives in space, and every crevice, chink and cranny of the cosmos is full of it. Plenum is the word. It stands ready to fill all vacancies, but gets out of the way and goes somewhere whenever called upon. It will stop up a hole so much quicker than lightning that the probabilities are in favor of its having been there before the hole was made.

It accommodates itself to the environment, and consents to everything but a vacuum. Should space ever be vanquished in any professor's vacuum tube, the crack of doom would summarily end all. There's a motive power for some future Edison to tame and put in harness. Why not? 'Tis as easy as lying. But you say, "Space is nothing in itself—it is only the vehicle, the medium, the—room; you can't have anything, you know, without a place to put it. Space is that place; wherever there is nothing, nothing is there—it is simply the absence of anything—don't you see?" I seem to see the drift of the witness: You would define space as something full of nothing, unless otherwise occupied. Well, that makes everything clear. Space is nothing. Indescribable, extensionless, measureless, termless—why not nameless? There being no such thing we will henceforth do without it. Good bye, space.

But no number of farewells will dismiss it. Avoid it we cannot. Can we either talk, reason, or think without it? Concerning this first-born mystery we habitually speak in the terms of the rest of our knowledge; yet, in spite of this intimate and familiar contact, life-long and continuous, we are still strangers. Now how do the authorities assist us? Let us appeal to the definers: Worcester says "space is Extension, considered independently of anything which it may contain; that which makes extended objects conceivable and possible." Locke says, "Pure space is capable neither of resistance nor motion." What are these but explanations that do not explain? The core of the definition seems to lie in one word—**NOTHING**.

Why longer cling to this shadow? We see, or seem to see, that space is after all but an idea, born of necessity, christened and clothed and set up in the intellectual temple, side by side with the gods of Time and Sense, Spirit and Matter. But I see you are growing weary; let us rest our tired brains by thinking upon Nothing—synonym Space—lest peradventure this hydra which has hitherto swallowed all, devour us.

WILLIAM E. MOORE, Manchester, N. H.

TERMS USED IN TALKING TO DOMESTIC ANIMALS. In controlling the movements of domestic animals by the voice, besides words of ordinary import, man uses a variety of peculiar terms, calls and inarticulate sounds—not to include whistling—which vary in different localities; In driving yoked cattle and harnessed horses teamsters cry "get up," "click click" (tongue against teeth), "gee," "haw," "whoa," "whoosh," "back," etc., in English-speaking countries: "arre," "arri," "juh," "gio," etc, in European countries.

In the United States "gee" directs the animals away from the driver, hence to the right. Webster's Unabridged states, however, in England the same term has the opposite effect because the driver

walks on the right hand side of his team. In Virginia mule drivers gee the animals with the cry "hep-ye-ee-a:" in Norfolk, England, "whoosh-wo:" in France, "hue" and "huhaut:" in Germany "hott" and "hotte": in some parts of Russia "haita," serve the same purpose. To direct animals to the left another series of terms is used.

In calling cattle in the field the following cries are used in the localities given: "boss, boss" (Conn.): "sake," "sake" (Conn.): "coo, coo" (Va.): "sook, sook," also "sookey" (Md.): "sookow" (Ala.): "tlon, tlon" (Russia): and for calling horses, "kope, kope" (Md. and Ala.): for calling sheep, "konanny" (Md.): for calling hogs "chee-oo-oo" (Va.).

The undersigned is desirous of collecting words and expressions (oaths excepted) used in addressing domesticated animals in all parts of the United States and in foreign lands.

In particular he seeks information as to:

1. The terms used to start, hasten, haw, gee, back and stop horses, oxen, camels and other animals in harness.
2. Terms used for calling in the field: cattle, horses, mules, asses, camels, sheep, goats, swine, poultry, and other animals.
3. Exclamations used in driving from the person, domestic animals.
4. Any expressions and inarticulate sounds used in addressing domestic animals for any purpose whatever (dogs and cats).
5. References to information in works of travel and general literature will be very welcome.

Persons willing to collect and forward the above mentioned data will confer great obligations on the writer: he is already indebted to many correspondents for kind replies to his appeal in NOTES AND QUERIES for the *Counting-out-Rhymes of Children* the results of which have been published by Elliot Stock, London, with that title.

To indicate the value of vowels in English please use the vowel-signs of Webster's Unabridged, and in cases of difficulty spell phonetically. All correspondence will be gratefully received, and materials used will be credited to the contributors.

H. C. BOLTON, University Club, New York City.

THREE EIGHTS IN SUCCESSION. It is 111 years since our heroic grandfathers and great-grandfathers wrote the three successive sevens, in the year succeeding American Independence. It will be 111 years before our grandchildren and great-grandchildren, will write the three successive nines. Then 223 years later, if the earth still revolves, time will deal a hand with four of a kind—four twos, 2222—something that has not happened since the days of Peter the Hermit.

Notes on the History of the Magic Lantern.

The "magic" lantern is an outgrowth of the *camera obscura* the origin of which is unknown. Its invention is usually attributed to John Baptist Porta, but Libri (*Histoire des sciences mathématiques en Italie*, Paris 1841, 4 Volumes, octavo,) has shown that it was frequently mentioned by authors of much earlier date.

The first mention of the *camera obscura* occurs in unpublished MSS. of the celebrated Italian painter, sculptor and architect Leonardo da Vinci. Da Vinci was born in 1452 and died in 1519. His reputation as an artist is immortal but it is less generally known that he was well versed in music, military science, mechanics, hydraulics, astronomy, geometry, physics, natural history and anatomy. In several of these branches he made original investigations, anticipating later philosophers.

In a MS. quoted by Libri, da Vinci proposed a theory of vision which he seeks to explain by reference to the *camera obscura*. (*Libri*, III, 54 and 233). This takes the invention back into the 15th century—say 1490.

In a work published in 1521 by Cæsariano, a Milanese architect, he attributes the invention to a Benedictine monk, Dom Panunce, which is, however, regarded as doubtful. (*Libri*, IV, 303.)

Cardanus, an Italian physician, mathematician and author, also mentions the *camera obscura* in a treatise entitled "*De verum subtilitate*" published at Nuremberg in 1550.

All these references antedate John Baptist Porta's work, "*De Magia Naturalis*" of which the first edition appeared in 1553 when its precocious author was only 15 years of age. While Porta was not the inventor of the *camera obscura* in its simplest form, he has the honor of first employing a convex lens to perfect the images, and of placing transparent drawings opposite the opening. To these drawings he attached movable parts and thus produced astonishing effects which the unlearned ascribed to magic, a term connected with the lantern ever since.

Porta's *camera obscura* consisted of a simple box with a small opening at one side through which the rays of light entered and fell upon a white paper screen at the opposite side. The lens was subsequently inserted.

The difference between a dark chamber of this construction and a magic lantern is very slight, and consists chiefly in the relative position of parts and the source of illumination. By whom the great improvement was made, of substituting artificial light for sunlight in exhibiting transparent pictures, is unknown to the writer.

Deschales in his "*Mundus Mathematicus*" (Leyden 1674) states that a Dane, possibly the physician Thomas Bartholin, showed him in 1665 a lantern magica having two convex lenses. (*Pogg. Gesch. Phys.*, p. 436.)

Athanasius Kircher, a learned Jesuit, Professor of Mathematics at the Collegio Romano (b. 1602, died 1680), in his second edition of "*Ars magna lucis et umbræ*," 1671, describes the magic lantern.

The oxy-hydrogen light now commonly used in connection with the exhibition of pictures by the lantern, was the invention of Thomas Drummond of the Royal Engineers (b. 1797, d. 1840), who employed it in 1824 in the trigonometrical survey of Ireland. The principle on which it is based had, however, been established in 1801, by Prof. Robert Hare of Philadelphia. To prevent explosions from the ignition of the mixed gases, Dr. Hare also applied the principle of Sir H. Davy's safety lamp, but this was not altogether satisfactory for it did not prevent some disastrous explosions. Later the so-called "safety-jet" was introduced, consisting of concentric tubes which prevent the gases, oxygen and hydrogen, from mingling previous to their issuing from the orifice. This invention is variously ascribed to Hemming, Maugham, and Daniell. The publication of the latter is dated 1833.

H. C. BOLTON, New York City.

FOWL VOCABULARY. The following domestic fowl vocabulary is very good, and will perhaps recall to the reader's mind a farm-yard picture:

Ur-ka-do-dle-do-oo. Challenge of male.

Tuck, tuck, tuck. Food-call of male.

R-a-r-r-ee. Announcing presence of hawk.

Cut-cut-ca-da-cut. Announcement of egg-laying.

Cluck, cluck cluck. Call of young.

Kerr, kerr, kerr. Song of contentment of hen.

C-r-a-w-z-ze. Quieting young chicks.

W-h-o-o-i-e (whistle). Expression of apprehension at night.

C-r-a-i-a-i-o-n. Terror and protest at capture.—*Wide Awake*.

Periodicity—Immortality.

The exposition of Dr. Slavonski's Periodicity in the February issue of *Notes and Queries* is very interesting and stimulating to thought. But I feel assured that there is a higher point of view than that employed by this renowned scientist; consequently that there are "missing links" in the system. If I rightly regard the conception of Dr. S., it makes matter, or material form, commanding in rule or authority, and life subordinate or dependent upon its mutations; whereas life is the ruler and material form the servant. Whether the form of matter operated by life be high or low; simple, complex, or composite; it is never wholly abandoned by life. If any special power of life abandons its form or vehicle as no longer useful—leaves it *dead* as to that special form—the great *over-soul* of life begins the work of decomposition as a process that shall make it the element to nurture and give form to other *definite* life-expression. Time and Space being the immeasurable continents, and material substance the equally immeasurable content of creative investiture, they can only be rightly estimated as they serve to inseminate, evolve and give organic expression to Creative Life which presides over and rules all in orderly providences. So, while these external instrumentalities are of much subordinate interest, inasmuch as they are to be ruled and converted in perfect efficiency and use to the fulness of Life in the Human form, they can never function to *constitute* immortal vitality, but can only minister to its immaculate powers in whatever relations and conditions such vitality may command. Immortality must be a *verity of Life*, and not a *pendant of matter*. Even continuous existence in spiritual form does not realize immortality; for immortality is quality and power in Supreme Life, and not mere spiritual continuity in immature personal expressions of life. Amplest conceptions of life will recognize its presence and power in all of its instrumental forms from the very lowest upward, but a valid conception of *Immortal Life* will never identify it with aught below Divine Supremacy in character and power: for the Divine alone hath immortality. To me a mathematical chase after immortality in the vortices and immeasurable changes of physical substance is futile in the extreme, for it is never to be found there. Only the Light of Supreme Life is adequate to solve the ultimate

problems of Life: and this, reflexly, is literally "the Light of the world."

Newness and ascension is the law in matter, because newness and ascension is the order of Life operating through matter.

I rejoice in the truth of Immortality for man, revealed as a state of Supreme Lordship without regard to time, space, or local state, for this, indeed, is the Light of Life, and at the same time the Light of the world.

But while I must not trespass further in these desultory strictures, let me formulate as concisely as possible, the order of

LIFE IN THE HUMAN FORM.

In *Sub degree* it organizes corporeal sensibility, and at last perfects it.

In *Super degree* it organizes personal spirit and rational understanding, and finally perfects this form.

In *Supreme degree* it organizes the wisdom and power of Divine Natural Personality, and finally perfects it—realizes its fulness.

This threefold Personality matured constitutes, as I understand it, the Life and Light of Immortality revealed by Jesus Christ.

WILLIAM H. KIMBALL, Concord, N. H.

SONNET. The following appeared about thirty years ago, with no credit of authorship, in some of the leading literary journals of the country. Can any of your readers tell us of its paternity?

H., Manchester, N. H.

SONNET OF A YOUTH WHO DIED OF EXCESSIVE FRUIT-PIE.

Currants have checked the current of my blood,
And berries brought me to be buried here;
Pears have pared off my body's hardihood,
And plums and plumbers spare not one so spare;
Fain would I feign my fall; so fair a fare
Lessens not fate, but 'tis a lesson good:
Gilt will not long hide guilt; such thin-washed ware
Wears quickly, and its rude touch soon is rued.
Grave on my grave some sentence grave and terse,
That lies not, as it lies upon my clay;
But in a gentle strain of unstrained verse,
Prays all to pity a poor patty's prey;
Rehearses I was fruit-full to my hearse,
Tells that my days are told, and soon I'm toll'd away!

WARSAW—WARSAU. (Vol. II, p. 543; III, p. 50.) I have been much interested in the scraps of information, derivation, and explanation of the almost endless variety of subjects discussed in your pages. I send a few geographical names observed in a half hour's study, and would like more light.

- { Warsaw is in New York and other States.
- { Warsau is in Wisconsin.
- { Cheboygan is a town or city in the north of Michigan.
- { Sheboygan is a town or city on the lake in Wisconsin.
- { LaCrosse is on the east of the Mississippi river.
- { LaCrescent is on the west side nearly opposite.
- { Somerset is on the east side as above.
- { Winterset is on the west side.
- { Winnepissiogee, a lake in New Hampshire.
- { Winnepisgoosis, } lakes in Canada
- { Winnipeg, }
- { Arthabasca, } both in Canada. { Lackawaxen, } Pennsylvania.
- { Arthabaska, }
- { Lackawana, }
- { Spatsum } are both in Canada. { Norfolk is in Virginia.
- { Spuzzum }
- { Suffolk is in North Carolina.
- { Essex is in Massachusetts. { Detroit is in Michigan.
- { Sussex is in Virginia. { Gratiot is in Wisconsin.
- { Menominee is in Michigan. { Deux (two) Rivers, } Canada.
- { Menomonee is in Wisconsin. { Three Rivers, }

SCHOOL BOY.

TWO MORE ASTEROIDS DISCOVERED IN 1888. (Vol. V, pp. 8-13.)

Asteroid No. 271 has been named Penthésilée.

No. 272 was discovered February 4, 1888, by Prof. Charlois of Naples, to be added to the list as Charlois².

No. 273 was discovered March 8, 1888, by Prof. Pilasa, of Vienna, to be added to the list as Pilasa₈₁.

ERRATA. Vol. V, p. 6, second line from bottom, for "Virgin of Haran al Rasit," read Vizier of Haran al-Rasit.

Vol. V, p. 28, first line from top, for "capable," read incapable.

Vol. V, p. 39, first horizontal row, second square to the right, for "484," read 485. Same page, for "95" read 59, in the mixed number.

DIES IRÆ.—NEW TRANSLATION. I find in **NOTES AND QUERIES**, August, 1886, a memoranda about translations of *Dies Iræ*. I do not remember sending you a copy of Judge John S. Hager's translation of it, and have asked him to send one, which I presume he will do. I know something of the different versions of this magnificent old hymn, and I consider Judge Hager's the best one. The Judge is now collector of this port, and is a man of high position and character, and of much culture besides. This hymn is a fine instance of impossibility of translation. Take for example the stanza :

Tuba, mirum spargens sonum
Per sepulchra regionum,
Coget omne ante thronum.

The massive vowel sounds, in solid syllables, intrinsically proper to represent the great trumpet blasts, cannot be matched in English. The English sounds sizzle and squeak in comparison. The full voiced *oo* and *o* strike upon the ear with a boom that cannot be rendered by the English *e*, and *a*, and *i*. You could as well render a picture mainly of dark red, by a copy in full blue; but our San Francisco Judge has done the best.

F. B. PERKINS, San Francisco, Cal.

Dies Iræ.—TRANSLATION BY JUDGE JOHN S. HAGER.

LATIN TEXT.	TRANSLATION.
<i>Dies iræ, dies illa Solvat æscum in favilla, Teste David cum Sibylla.</i>	Day of wrath ! that day when burning Earth dissolves, to ashes turning; Witness Psalm and Sibyl's warning.
<i>Quantus tremor est futurus, Quando Juxæ est venturus, Cuncta stridite discussurus.</i>	O, the consternation pending ! God in judgment comes, descending, To arraign a world offending.
<i>Tuba, mirum spargens sonum Per sepulchra regionum, Coget omnes ante thronum.</i>	Trumpet's wondrous peal is falling, All the dead of ages calling, To the throne, in sounds appalling.
<i>Mors stupebit, et natura, Quam resurget creatura, Judicant responsura.</i>	Death and nature, stunned and quaking, See resurgent man awaking, While the day of doom is breaking.
<i>Liber scriptus proferetur, In quo totum continetur, Unde mundus judicetur.</i>	There the book divinely worded, Open lie- with all recorded : Whence the judgments are awarded.
<i>Judex ergo cum sedebit, Quidquid latet apparebit, Nil inultum remanebit.</i>	Lo ! the Judge the throne ascending ; Lo ! the veil of secrets rending : Naught is spared the vengeance pending.

Quid sum miser tunc dicturus,
Quem patronem rogaturus,
Quam vix justus sit securus ?

Rex tremendæ majestatis,
Qui salvandos salvas gratis,
Salva me, fons pietatis.

Recordare, Jesu pie,
Quod sum causa tuæ viæ ;
Ne me perdas illa diæ.

Quærens me, sedisti lassus,
Redemisti, cruce[m] passus
Tantus labor non sit casus.

Juste Juxta ultionis,
Donum fac remissionis
Ante diem rationis.

Ingemisco tanquam reus,
Culpa rubet vultus meus ;
Supplicanti parce, Deus !

Qui Mariam absolvisti,
Et latronem exaudisti,
Mihi quoque spem dedisti.

Preces meæ non sunt dignæ,
Sed tu bonus fac benigne,
Ne personam cremer igne.

Inter oves locum præsta,
Et ab hædis me sequestra,
Statuens in parte dextra.

Confutatis maledictis
Flammis acribus addictis,
Voca me cum benedictis.

Oro supplex et acclinis,
Cor contritum quasi cinis ;
Gere curam mei finis.

Lachrymosa dies illa !
Qua resurget ex favilla,
Judicandus homo reus :
Hinc ergo parce, Deus !

Oh, what then shall I be saying ;
Whom invoke for aid while praying,
When the just are fear betraying ?

King of majesty and splendor,
Who dost free salvation tender,
Mercy's source, be my defender.

Blessed Jesus, my salvation
Caused thy gracious visitation ;
Leave me not to condemnation.

Tolling, weary, thou hast sought me,
On the cross redemption brought me ;
Be this hope not vainly taught me.

Holy Judge of retribution,
Grant me saving absolution
Ere the judgment distribution.

As in guilt I groan repenting,
Sin in shame's red blush lamenting ;
Save me God, be thou relenting.

Mary's sin thou saw'st condoning ;
Thou did'st heed the robber's moaning,
In my soul thus hope enthroning.

Prayers of mine are unavailing,
But do thou with grace prevailing,
Spare me endless fire and wailing.

With the sheep from goats divided,
Be for me a place provided,
On thy right to safety guided.

When the wicked, headlong flying,
Doomed to flames in woe are crying,
Call thou me to joy undying.

Low in prayer before thee bending,
Grief my contrite heart is rending ;
Shield me when this life is ending.

Day of tears and lamentation,
When from dust and earth's cremation
Men shall rise : O God, prepare me
For that judgment day, and spare me !

This hymn is sometimes called *Prosa de mortuis*, also *De die judicii*. The Germans call it *Gigantenhymnus*, ("the hymn of the giants.") It is used in the Latin Church on the day of All-Souls (November 2).

It is based upon Zeph. i, 15 : *Dies iræ, dies illa*, etc., as given in the Vulgate ; also other texts of Scripture the author had in view, Psalms xcvi, 13 ; xcvi, 3 ; cii, 26 ; whence David is introduced in the first stanza. II Peter iii, 7-11 ; in some versions of the hymn the name of Peter is used instead of David. The Sibyl referred to is supposed to be the Erythræan, the author of the VIIth of the Sibylline Books, containing the famous acrostical lines on the judgment (N. and Q. Vol. III, p. 137), *IESOUS CHRISTOS THEOU UIOS SOTER*. Virgil founds one of his Pastorals (Pollio vi) on these lines. Pope also reverts to it.

A bibliography of the translations of *Dies Iræ* is published in the "Bulletin" of Mercantile Library, Philadelphia, Vol. I, Nos. 9 and 10.

QUESTIONS.

1. Who was "King Ramirez," and what was the legend concerning him? "King Ramirez" is the subject of a striking painting, by one of the best known modern Spanish artists.

W. E. MOORE, Manchester, N. H.

2. Who was "Marechal Neil"? and why was the celebrated rose named for him?

W. E. MOORE.

3. Many persons whose ancestors came to America 150 to 200 years ago, speak of large inheritances due them in the land of their ancestors' nativity. As such instances, take the Jennings heirs of England, and the Graf heirs of Holland. Are these claims due to self deceptive vanity in general, or, is there any basis for the claims. What is the law of limitation as to time regarding these claims.

I. B.

4. What is the origin of the expression, "Sound on the goose question"?

A. HAMILTON, Toronto, Can.

5. Whose last dying words are the following quotations.

(a) "Adieu, my dear Morand. I am dying."

(b) "He is the kindest, best man in the world." (Referring to her husband).

(c) "The South! The Poor South! God knows what will become of her!"

(d) "Jesus." (Tracing a cross with his blood, and kissing it).

(e) "Oh Lord God Almighty, as thou wilt."

(f) "Dei me nun katheudin." (The dying man was not a Greek, but deceased in the present century).

R., JUNIOR, Boston, Mass.

6. When was Fort Ticonderoga built, and by whom?

S. F. C., JUNIOR.

7. In Mansfield Merriman's bibliography of writings relating to "The Method of Least Squares," p. 224, quoting from Galton "on Statistics by Intercomparison," he says the equation: " $y = ce^{-h^2x^2}$ " is called an *ogive*, and the curve is regarded as more likely to be approximately true of a statistical series than any other that can be specified *a priori*." What is the shape of the "ogive"? TYRO.

7. "Or those eighteen upon whom the tower in Siloam fell, and slew them."—*Luke XIII, 4*. Where can be found an account of the catastrophe referred to and the names of the "eighteen slain"?

STUDENT.

8. What gave the name *ampersand* (&) to the body of water in the Adirondacks called "Lake Ampersand"?

JONATHAN.

1. What is the shape of the solid called "a circular groin," mentioned by Docharty, page 291, "Analytical Geometry and Calculus" ?
TYRO.

2. Please explain the word *Deucalion* as applied to a flood, i. e. "Deucalion's Flood." Does it mean the "second deluge" ? as Deuteronomy, "the second law ;" deuterogamy, "the second marriage" ?
LEWIS G. HOLDEN.

3. Where can be found an account of "The Wandering Jew" ? Some writers refer to John the Apostle as being the man, from the text of John XXI, 22. Others say it is Ahasuerus, before whose door Jesus halted to rest when bearing his cross to Golgotha, Jesus saying, "I shall stand and rest, but thou shall go till the last day," this being a reply to the Jew's request to Jesus to "move on."

WELLINGTON HOWARD.

4. Where can be found the legend of the Ass's broken leg, referring to the miracle performed by Jesus making whole the leg when he rode into Jerusalem.

WELLINGTON HOWARD.

5. In Abraham Cole's "Latin Hymns, with original translations," the second stanza of *Stabat Mater*, has these two lines :

"O how mournful and distressed
Was that favored and most blessed
Mother of the Only Son !"

The grave accent (è) is used in the terminal of the first two lines.

Other writers in these and similar words use the acute accent (é). Which is the correct accent ?
X. Y. Z.

6. What is the origin of, or legend, connected with the words "Kyrie eleeson," (Lord, have mercy upon us) ?
X. Y. Z.

7. Some philosopher a few years ago published his theory that the earth is "lopsided," with other claimed novel discoveries. Where can the account be found, or who can explain his theory ?

ANDREW SMITH.

8. What is the history and religious veneration connected with the well *Zem Zem* often mentioned by Mohammedan writers.

J. PAYSON SHIELDS.

9. In the Apocrypha, Book of II Esdras VI, 49, we read this : "Then didst thou ordain two living creatures, the one thou calledst Enoch and the other Leviathan."

What animal is meant by the *Enoch* ? Does it mean the *Behemoth*, mentioned in Job XL, 15 ; with Leviathan, Job XLI, 1 ; Ps. CIV, 126 ? Why did Thomas Hobbes of Malmesbury call some of his books Volume VI, *Leviathan* ; Volume XIII, *Behemoth* ?
'OMERUS.

Expressions for the Area of a Plane Triangle.

By B. F. Burleson, Onalda Castle, N. Y.

In April, 1883, Mr. James Main, formerly of the U. S. Coast and Geodetic Survey, published in the *Mathematical Magazine** forty-six formulæ expressing the area of a plane triangle. This collection was classified and reprinted with one additional formula by M. Ed. Lucas in *Mathesis*†. It was also copied into the Danish mathematical journal, *Tidsskrift for Mathematik*‡. In 1885, Mr. Marcus Baker, of the U. S. Coast and Geodetic Survey, published in the *Annals of Mathematics*§ after its reading before the mathematical section of the Philosophical Society of Washington, D. C., a still larger collection of such expressions. He gave 288 formulæ classified under 6 groups, as follows :

Group I contained formulæ which Mr. Lucas styled unique, that is, those in which all similar elements of the triangle entered. Hence, they do not admit of similar formulæ by permutating the letters.

Group II contained formulæ which admit of two similar expressions, giving three of a kind by permutation.

Group III contained formulæ which admit of three similar expressions, giving four of a kind by permutation.

Group IV contained formulæ which admit of five similar expressions, giving six of a kind by permutation.

Group V contained one formula which admits of eleven similar expressions, giving twelve of a kind by permutation.

SUMMARY.

Group I	31	formulæ.	By permutation, 31
Group II	41	"	" " 123
Group III	11	"	" " 44
Group IV	10	"	" " 60
Group V	1	"	" " 12
Miscellaneous	16	"	" " 18
Total,	110		286

Each group was subdivided into two parts, the first not containing, and the second containing trigonometric functions of the angles.

In 1886, the Parisian *Journal de Mathématiques*,|| published, in con-

* The Mathematical Magazine, edited and published by Artemas Martin, Erie, Pa. 1883, April, Vol. I, No. 8, pp. 94-96.

† *Mathesis*. Publié par F. Mansion et J. Neuberg, Gand, 1883, Juin, Vol. III, pp. 136-138, 167-170.

‡ *Tidsskrift for Mathematik* Udgivet af J. P. Gram og H. G. Zeuthen, Kjøbenhavn, 1883, Vol. 5th, series first year, No. 3, pp. 82-94; No. 4, p. 128.

§ *Annals of Mathematics*, edited by O. Stone and W. H. Thornton, Charlottesville, Va., 1885, January, Vol. I, No. 6, pp. 134-138; Vol. II, No. 1, pp. 11-18.

|| *Journal De Mathématiques*, published by M. Henry Vuibert, Paris, 1886, Février, No. 10, pp. 78-80.

nection with a large collection of formulæ appertaining to the triangle, 50 unclassified expressions for the area of the triangle, many of which were different from any previously given.

The number of such possible expressions for the area of the triangle is obviously very great. Were it of practical moment the possible number might be determined in accordance with the elements assumed of the triangle. We think that the various trigonometrical functions of the angles constitute not one, but many elements of the triangle.

The formulæ in NOTES AND QUERIES, Vol. V, pp. 17-19, will be found useful in finding various expressions for the area of a triangle as well as for other purposes. A few of these formulæ the writer has discovered, since their publication, are erroneous. Those that were found to be wrong we here append in accurate terms.

$$32. \quad P_a P_b + P_a P_c + P_b P_c = s^2 \div 4n.$$

$$33. \quad P_a P_b P_c = t^3 \div 8n.$$

$$34. \quad m_a^2 + m_b^2 + m_c^2 = (3s^2 - 6m) \div 4.$$

$$35. \quad m_a^2 m_b^2 + m_a^2 m_c^2 + m_b^2 m_c^2 = (9m^2 - 18sn) \div 16.$$

$$36. \quad m_a^4 + m_b^4 + m_c^4 = (9s^4 - 36s^2 m + 36sn + 18m^2) \div 16.$$

$$42. \quad \cos A \cos B \cos C = (s^4 t^2 - 8snt^2 - t^4 - 16s^2 n^2) \div 16s^2 n^2.$$

$$48. \quad \cos^2 A + \cos^2 B + \cos^2 C = (24s^2 n^2 + 8snt^2 + t^4 - s^4 t^2) \div 8s^2 n^2.$$

$$50. \quad \cos 2A + \cos 2B + \cos 2C = (12s^2 n^2 + 8snt^2 + t^4 - s^4 t^2) \div 4s^2 n^2.$$

By the aid of these formulæ we have found over 30 new expressions for the area of a triangle not found in any of the collections referred to. We append them without classification. We think they may all properly be placed under Mr. Baker's Group I. Had we the time at our disposal, and space were permitted, we are confident we could extend the list to several hundred. We leave to the reader the pleasant task of lengthening the roll of the expressions, for himself.

$$\Delta =$$

$$1. \quad \frac{1}{4} \sqrt{[4(a+b+c)(a^2b+b^2c+a^2c+ab^2+bc^2+ac^2+abc) - (a+b+c)^4]}$$

$$2. \quad abc P_a P_b P_c \div 8rr_a r_b r_c.$$

$$3. \quad 4Rrr_a r_b r_c \div abc.$$

$$4. \quad \frac{1}{2}(a+b+c)(r_a+r_b+r_c-4R).$$

$$5. \quad \frac{1}{4}(a+b+c)(r+r_a+r_b+r_c-4R).$$

$$6. \quad (a+b+c) P_a P_b P_c \div 2(P_a P_b + P_a P_c + P_b P_c).$$

$$7. \quad \frac{1}{8} \sqrt{[abc(P_a P_b + P_a P_c + P_b P_c)] \div \sqrt{(a+b+c)}}.$$

8. $abc(m_a^2 m_b^2 + m_a^2 m_c^2 + m_b^2 m_c^2) \div 9R^2(P_a^2 + P_b^2 + P_c^2).$
9. $\sqrt{[P_a P_b P_c (3r_a r_b + 3r_a r_c + 3r_b r_c - m_a^2 - m_b^2 - m_c^2)]} \div \sqrt{6(P_a + P_b + P_c)}.$
10. $abc(P_a + P_b + P_c) \div 2(ab + ac + bc).$
11. $abcR(P_a^2 + P_b^2 + P_c^2) \div (a^2 b^2 + a^2 c^2 + b^2 c^2).$
12. $(r_a r_b + r_a r_c + r_b r_c) \tan \frac{1}{2} A \tan \frac{1}{2} B \tan \frac{1}{2} C.$
13. $\frac{1}{2} R(a + b + c) (\cos A + \cos B + \cos C - 1).$
14. $(a + b + c) (ab + ac + bc) (\sin \frac{1}{2} A \sin \frac{1}{2} B \sin \frac{1}{2} C) \div (P_a + P_b + P_c).$
15. $\sqrt{[abc(\sin 2A + \sin 2B + \sin 2C)]} \div \sqrt{(32 \sin \frac{1}{2} A \sin \frac{1}{2} B \sin \frac{1}{2} C)}.$
16. $abc \sin A \sin B \sin C \div 4(a + b + c) (\sin \frac{1}{2} A \sin \frac{1}{2} B \sin \frac{1}{2} C).$
17. $P_a P_b P_c \div 4(a + b + c) \sin \frac{1}{2} A \sin \frac{1}{2} B \sin \frac{1}{2} C.$
18. $4R^2 r(1 + \cos A) (1 + \cos B) (1 + \cos C) \div (a + b + c).$
19. $\sqrt{P_a P_b P_c (a + b + c)} \div 2\sqrt{(\sin A + \sin B + \sin C)}.$
20. $2R(a + b + c) (\sin \frac{1}{2} A \sin \frac{1}{2} B \sin \frac{1}{2} C).$
21. $(a + b + c)^2 (\sin A \sin B \sin C) \div 2(\sin A + \sin B + \sin C)^2.$
22. $abc(\sin A \sin B \sin C) \div (a \cos A + b \cos B + c \cos C).$
23. $(a^2 + b^2 + c^2) (\sin A \sin B \sin C) \div 2(\sin^2 A + \sin^2 B + \sin^2 C).$
24. $abc\sqrt{(\cos A \cos B \cos C + 1)} \div \sqrt{(2a^2 + 2b^2 + 2c^2)}.$
25. $abc(\sin A \sin B + \sin A \sin C + \sin B \sin C) \div 2(P_a + P_b + P_c).$
26. $2RR_1 r(a + b + c) (3 - \cos 2A - \cos 2B - \cos 2C) \div (a^2 + b^2 + c^2).$
27. $\frac{1}{2} R^3 \sqrt{[2P_a P_b P_c (\sin 2A + \sin 2B + \sin 2C)]}.$
28. $r_a r_b r_c (\tan \frac{1}{2} A + \tan \frac{1}{2} B + \tan \frac{1}{2} C) \div (r_a + r_b + r_c).$
29. $R^2(3 - \cos^2 A - \cos^2 B - \cos^2 C) \div (\cot A + \cot B + \cot C).$
30. $2r^3 \cot^2 \frac{1}{2} A \cot^2 \frac{1}{2} B \cot^2 \frac{1}{2} C \div (a + b + c).$
31. $4Rr^3(\frac{1}{2} \cos^2 \frac{1}{2} A + \frac{1}{2} \cos^2 \frac{1}{2} B + \frac{1}{2} \cos^2 \frac{1}{2} C).$
32. $r(r_a + r_b + r_c) \div 4R(\frac{1}{2} \sin^2 \frac{1}{2} A + \frac{1}{2} \sin^2 \frac{1}{2} B + \frac{1}{2} \sin^2 \frac{1}{2} C).$

BEN. FRANKLIN'S LETTER TO MR. STRAHAN. Abram Hall of West Chester, Pa., possesses an interesting relic of Benjamin Franklin, in the shape of a letter written by him to a member of the British Parliament. Mr. Hall found the letter several years ago among a lot of waste paper. It reads as follows :

PHILADELPHIA, July 5, 1775.

Mr. Strahan. You are a member of Parliament, and one of that majority which has doomed my country to destruction. You have begun to burn our town and murder our people. Look upon your hands. They are stained with the blood of your relations. You and I were long friends. You are now my enemy, and I am yours.

B. FRANKLIN.

MISCELLANEOUS

NOTES AND QUERIES,

WITH ANSWERS.

He who "lived long ago, in the morning of the world, when earth was nearer heaven than now." — BROWNING.

VOL. V.

MAY, 1888.

No. 5.

"PERIODICITY." BY DR. IVAN SLAVONSKI. (Vol. V, p. 25).

1. The discussion on permutations and combinations is rather elementary; but there is no harm in it.

2. The statement that motion is inherent in matter is sound and good, and needs to be taught.

3. (Line 1, p. 28): "An atom is capable of being divided." The word should be "*incapable*." This is a vexatious error. The etymology of "atom" shows its meaning. It is, if literally translated, "uncut"—that is, undivided, and indivisible, and the rest of the discussion requires "*incapable*" instead of "*capable*."

4. (That the number of atoms is limited.) This is not so easily shown, unless it can be shown that space is limited. But so far as we know, and according to the accepted views of scientists, space is filled with atoms; and a limit to space is unthinkable. You can not conceive of yourself going away in a right line in any direction and coming to a point beyond which there is no space. Therefore, you can not conceive of any boundary to space, that is, to the place in which atoms are. That is, you can not conceive of any limit to the number of atoms. That is, the number of atoms is infinite to minds constituted as ours are.

5. "To speak of an unlimited number is to be unintelligible." Very true, and so it is to speak of unlimited space, but as I have just shown, we *must* conceive of space as unlimited, and so we must of

the number of atoms. The fact that we do not comprehend infinity does not hinder us from conceiving it.

6. This reasoning of course destroys Dr. Slavonski's conclusions about the universe coming around again to exactly the state in which it is now.

7. But besides, there is a difficulty about the doctor's conception of immortality. He gives this name to a repetition, at enormous distance of time, of a relatively short period and phase of existence, without any consciousness in the individual of this repetition. But it will be found on examination that immortality in the accepted sense of the term is said of one and the same personality, continuous and conscious. There is no propriety in applying the term to two or more similar but not identical existences which take place at remotely distant times. The person who is immortal in this new way can know nothing of his immortality, and nobody else can know anything of it. No doubt it is possible to conceive of such a mode of existence; but it is not immortality in any received sense of the term.

Lastly. These objections are altogether different from those stated on your p. 31.

PRIGGLES.

"KYRIE ELEESON." (Vol. V, p. 72.) George Sale says, in the "Introduction to the Korân," that the Jews of Hamyar challenged some neighboring Christians to a public disputation, which was held for three days before the king and his nobility and all the people, the disputants being Gregentius, bishop of Tephra (which he takes to be Dhafâr) for the Christians, and Herbanus for the Jews. On the third day, Herbanus, to end the dispute, demanded that Jesus of Nazareth, if he was really living and in heaven, and could hear the prayers of his worshippers, should appear from heaven in their sight, and they would then believe in him, the Jews crying out at the same time, "Show us your Christ, alas! and we will become Christians." Whereupon, after a terrible storm of thunder and lightning, Jesus Christ appeared in the air, surrounded with rays of glory, walking on a purple cloud, having a sword in his hand, and a diadem on his head, and spake these words over the head of the assembly: "Behold, I appear to you in your sight, I who was crucified by your fathers." After which the cloud received him out of their sight. The Christians then cried out, "Kyrie eleeson" (Lord, have mercy upon us). The Jews, the account says, were stricken blind and recovered not till they were all baptised.

MANUFACTURING—MANCHESTER, N. H. Who originated the manufacturing enterprises in Manchester, N. H. ? G.

From the work of "The Stickney Family, a Genealogical Memoir," by Matthew A. Stickney, Salem, Mass., 1869, page 270, we find it stated that Thomas Stickney, born in Haverhill, Aug. 1, 1777, died in Boston, July 13, 1814. He was a student at Leicester Academy, and in common with his brothers, his father proposed to give him a collegiate education, but he preferred the pursuits of active business. After his marriage he was engaged in business in Boston, but on the death of his grandfather, the Hon. Samuel Blodget, at Manchester, N. H., in 1807, he went to Manchester (then Derryfield), and became either the owner of, or largely interested in the Blodget Estate and Canals at that place. He originated the first manufacturing enterprise other than Blodget's Saw Mills, on the Manchester side of the river, and at a town meeting, held in 1810, was appointed chairman of a committee to procure a change of name for the town. [See Potter's "History of Manchester."] He was accustomed to remark that Amoskeag would be the future "Manchester of America," and his sanguine anticipations in regard to the growth of the manufacturing interests there led to the adoption of "Manchester" as the name of the town. He was a man of cheerful disposition and courteous manner, of sanguine temperament and great energy of character. Had his life been spared he might have realized for himself and family the advantages that had been anticipated from his grandfather Blodget's important interests at Amoskeag Falls, but his health was declining during the last year of his life, and he died at Boston, July 13, 1814, and was buried there in the Granary Burial Ground.

HOW THE ENGLISH KEEP CHRISTMAS.

O plethora of beef and bliss !
 Monkish feaster, sly of kins !
 Southern soul in body Dutch !
 Glorious time of great Too-Much !
 Too much heat, and too much noise,
 Too much babblement of boys ;
 Too much eating, too much drinking
 Too much ev'rything but thinking.
 Solely bent to laugh and stuff,
 And trample upon Good-Enough.
 Oh, right is thy instinctive praise
 Of the wealth of Nature's ways !
 Right thy most unthrifty glee,
 And pious thy mince-plety !

VOLAPÜK—The Universal Language.

The article on Volapük in the March No. 1888 (N. AND Q.), has produced quite an interest in the subject of a universal language, and a call for more on the subject, with examples of elucidation. While we have not room to publish the entire construction of it, which can be learned from elementary grammars on the same, we will give a few more illustrations of this, with some from other systems which have been proposed for a world-speech. The pronunciation of the vowels and consonants in the Volapük system are as follows :

VOWELS.

a	as in <i>father</i> .
â	as in <i>care</i> .
e	as in <i>they</i> .
i	as in <i>machine</i> .
o	as in <i>stone</i> .
ô	as in <i>word</i> .
u	as in <i>rude</i> .
ü	as in <i>bureau</i> (French).

CONSONANTS.

c	sounds like j in <i>judge</i> .
g	sounds like g in <i>God</i> .
j	sounds like sh in <i>shade</i> .
y	sounds like y in <i>yes</i> .
z	sounds like ts in <i>cats</i> .
All other consonants, as in English. There is no x nor w.	

LEADING COUNTRIES OF THE WORLD.

Africa,	Fikop.	China,	Lusän.
America,	Melop.	England,	Nelij.
Asia,	Sikop.	Europe,	Yulop.
Australia,	Talop.	France,	Flent.
Austria,	Löstakin.	Germany,	Deut.
Bavaria,	Bayän.	Holland,	Nedän.
Belgium,	Beljän.	Italy,	Täl.
Canada,	Kanadän.	United States,	Pebaltats.

MONTHS OF THE YEAR.

January,	Balul or Yanul.	July,	Velul or Yulul.
February,	Telul or Febul.	August,	Jölul or Gustul.
March,	Kilul or Mäzul.	September,	Zülul or Setul.
April,	Folul or Apul.	October,	Balsul or Otul.
May,	Lulul or Mayul.	November,	Babul or Novul.
June,	Mälul or Yunul.	December,	Batul or Dekul.

DAYS OF THE WEEK.

Sunday,	Soldel.	Thursday,	Dödel.
Monday,	Mundel.	Friday,	Flidel.
Tuesday,	Tusdel.	Saturday,	Zädel.
Wednesday,	Vesdel.		

Ci, 1; Twi, 2; Tri, 3; Kwi, 4; Kwin, 5; Tritri, 6; Tritrin, 7; Kwikwi, 8; Kwikwin, 9; Tinti, 10; Tinci, 11; Tintwi, 12.

VISONA, by Arthur Merton (Sivatha), was developed by the author in 1870, and has been published in Chicago by the School of Culture. Visona is a universal language based on natural laws. It is based on unity as a center, called Mastona or Omniverse, and from this grows the stem words. The circle illustrating it includes five series, containing 144 words. For each of these words there is a new word of two letters, and these are the stem-words of the entire language. There are 36 postfixes for attached syllables, and the words are self-defining. The first 8000 words are produced by 240 syllables. Thus in Visona the noun for organizing is *Su*. Then we have :

Noun,	organizing,	<i>su</i> .	Verb,	organizing,	<i>arsu</i> .
Adjective,	organic,	<i>älsu</i> .	Negative,	not organizing,	<i>sikarsu</i> .
Adverb,	organically,	<i>änsu</i> .	Passive,	being organized,	<i>ekarsu</i> .

The author claims it is twenty times easier to learn than English, French, or German. It leads to the classification of every branch of knowledge. The visonal word have no more than three syllables of six letters each. It is far more uniform than Volapük, and can be memorized much easier.

"ENOCH," OR "TRAINUP"? We read in the authorized version Proverbs xxii, 6, this: "Train up a child in the way he should go."

There is another translation of this verse which, we are told, the original language will bear, as follows :

"Enoch hath been made into a boy, according to his path."

Will some of your linguistic readers give a literal translation, and state if the original word CHNVK can be vocalized as Chanokh (Enoch), or should CHNVK be vocalized as Chanekh ("to instruct," "to train up")? If it will bear the italicized rendering, does it imply that Enoch was re-incarnated without experiencing death?

FIDES.

3. We are informed that there is only four recorded instances that "Jesus wept," namely :

1. At the grave of Lazarus (John xi, 35).
2. In the garden of Gethsemane (Matt. xxvi, 38; Mark xiv, 34).
3. Over Jerusalem (Matt. xxiii, 37; Luke xiii, 34).
4. On the Cross (Matt. xxvii, 46; Mark xiv, 34).

Is there record, canonical or apocryphal, that he ever laughed?

ROBERT RAIKE

OLD PARR'S LAST WILL AND TESTAMENT. Amost singular document was brought to light, a number of years ago, written by the celebrated Old Parr who attained the almost incredible age of 152 years. It is written on parchment, and although upwards of 200 years of age, is in an excellent state of preservation. The following is an extract :

"These do certifie yt ye undermentioned is ye method of preserv-
ing health, which by ye grace of Almighty God, has caused me to at-
tain to my miraculous old age. Albeit in my youth I was afflicted
with ye bloody flux and King's Evil, but which all have left me by us-
ing some days ye herbs as herein written."

Then follows the receipt.

"Moreover, I bequeath to my second Great Grandson ye method I
employ for preparing ye medicament. Given this day, and in ye 147th
year of my age. THOMAS PARR.

Winnington, Salop, January 17, 1680."

Thomas Parr was born 1483, and died 1635. This singular man, with one exception, is the oldest man that England ever produced. His biographer says : "He married his first wife at the age of 88 ; and he again married at the amazing age of 120 ; at 130 he used to thrash corn, and to do any laborious work. He had seen ten Kings and Queens of England.

QUEER NAMES. A woman who has been indexing deeds in Maine has made a list of the queer given names she found. Here are some of them : Ledoc, Generous, Passchal, Lupina, Mighil, Araunah, Squire, Deluva, Barzillai, Calvary, Hartson, Zophau, Philander, Mo-ries Axiel, Hopestill, Piram, Jerathmael, Rancil, Hazareman, Sprout, Demeric, Bana, Angler, Uzza, Lilia, Cad, Luton, Cyprian, Ivory, Jacon, Kilah, Orra, Cadwallader, Galon, Loven, Diodamia, Grinfil, Mesbach, Liberty, Autumers, Haddassah Esek, Sahra, and Rispah.

A GOOSE-HARE SWAN. Recently a swan was cooked strictly ac-
cording to the metrical recipe in Yarrell's "History of British Birds,"
and the dish is described as tasting something between a goose and a
hare. The recipe for this dish is as follows :

Take three pounds of beef, beat fine in a mortar,
Put into the swan — that is, when you've caught her ;
Some pepper, salt, mace, some nutmeg, an onion
Will heighten the flavor in gourmands' opinion.
Then tie it up tight with a small piece of tape,
That the gravy and other things may not escape ;
A meal paste, rather stiff, should be laid on the breast,
And some whity-brown paper should cover the rest.
Fifteen minutes at least ere the swan you take down,
Pull the paste off the bird that the breast may get brown.
To a gravy of beef, good and strong, I opine,
You'll be right if you add half a pint of port wine ;
Pour this through the swan, yes, quite through the belly,
And serve the whole up with some hot currant jelly.
N. B.—The swan must not be skinned.

Common Names of Chemical Substances.

Common Name.	Chemical Name.
Aqua Fortis.....	Nitric Acid.
Aqua Regia.....	Nitro-Muriatic Acid.
Blue Vitriol.....	Sulphate of Copper.
Cream of Tartar.....	Bitartrate of Potassium.
Calomel.....	Chloride of Mercury.
Chalk.....	Carbonate Calcium.
Caustic Potassa.....	Hydrate Potassium.
Chloroform.....	Chloride of Gormyle.
Common Salt.....	Chloride of Sodium.
Copperas, or Green Vitriol.....	Sulphate of Iron.
Corrosive Sublimate.....	Bi-Chloride of Mercury.
Dry Alum.....	Sulphate Alluminum & Potassium.
Epsom Salts.....	Sulphate of Magnesia.
Ethiops Mineral.....	Black Sulphide of Mercury.
Fire Damp.....	Light Carburetted Hydrogen.
Galena.....	Sulphide of Lead.
Glauber's-Salt.....	Sulphate of Sodium.
Glucose.....	Grape Sugar.
Iron Pyrites.....	Bi-Sulphide of Iron.
Jeweler's Putty.....	Oxide of Tin.
Laughing Gas.....	Protoxide of Nitrogen.
Lime.....	Oxide of Calcium.
Mosaic Gold.....	Bi-Sulphide of Tin.
Muriate of Lime.....	Chloride of Calcium.
Nitre of Saltpetre.....	Nitrate of Potash.
Oil of Vitriol.....	Sulphuric Acid.
Potash.....	Oxide of Potassium.
Red Lead.....	Oxide of Lead.
Salmoniac.....	Muriate of Ammonia.
Slacked Lime.....	Hydrate Calcium.
Soda.....	Oxide of Sodium.
Spirits of Hartshorn.....	Ammonia.
Spirit of Salt.....	Hydro-chloric, or Muriatic Acid.
Stucco, or Plaster of Paris.....	Sulphate of Lime.
Sugar of Lead.....	Acetate of Lead.
Verdigris.....	Basic Acetate of Copper.
Vermilion.....	Sulphide of Mercury.
Volatile Alkali.....	Ammonia.
White Vitriol.....	Sulphate of Zinc.

MOTION OF A CARRIAGE WHEEL. The old question as to whether the upper part of a carriage wheel in motion goes along faster than the lower part seems to have been settled by instantaneous photography which givee the top spokes indistinct, and the bottom distinct.

A FEW DEFINITIONS. *Definition.* A definition is the resolution of a complex idea into the simple elements which compose it.

Boil. A diminutive circumscribed subcutaneous eruption characterized by a pointed pustular tumor and suppurating around a central core.—*Johnson.*

Dandy. In modern usage, a male of the human species who dresses himself like a doll and who carries his character on his back. — *Webster's First Edition.*

Excise. A hateful tax levied upon commodities and adjudged not by the common judges of property, but by wretches hired by those to whom excise is paid.—*Johnson.*

Garret. A room on the highest floor of the house; *Cock-loft*, the room over the garret.—*Johnson.*

Generous. In modern usage, a generous person is one who gives away useless articles he is anxious to get rid of.

Gentility. A servant who prided herself of having always lived with genteel families, was asked the meaning of the term; "where they drink a great deal of wine, keep late hours, and the gentlemen gamble and swear," she explained.

Gentry. In conversation with an American, an Englishman defined "the gentry" as those who never had done any work, nor their fathers before them. The American retorted: "We have that class in the United States, but call them tramps."

Journalist. A grumbler, a censurer, a giver of advice, a regent of sovereigns, a tutor of nations.—*Napoleon Bonaparte.*

Martial bearing. A constable in Delhi arrested some deserters, and explained to the magistrate that he recognized them by their martial bearing. "What do you mean by martial bearing?" asked His Honor. "Why, the men were very free with their money, were drunk, swore a great deal, and wanted to fight," explained the knowing officer of the peace.

Network. Anything reticulated or decussated at equal distances with interstices between the intersections.—*Johnson.*

Oats. A grain which in England is generally given to horses, but in Scotland supports the people.—*Johnson.*

Pathology. The art of road-making.

Pension. An allowance made to any one without an equivalent. In England it is generally understood to mean pay given to a state hireling for treason to his country.—*Johnson.*

Pensioner. A slave of state hired for a stipend to obey his master. [Johnson published his Dictionary in 1755. In 1762, with character-

istic defiance of Mrs. Grundy, he accepted a pension of £300 *per annum* as a "reward of literary merit!"]

Tory. A cant term, derived, I suppose, from an Irish word signifying a savage. One who adheres to the ancient constitution of the state and the apostolic hierarchy of the church of England ; opposed to a whig.—*Johnson.*

Whig. The name of a faction.—*Johnson.*

Window. An orifice in an edifice for the intromission of illumination. (*Johnson, modified.*) DJAFAR.

MONUMENT TO HANK MONK. The citizens of Nevada are raising money for a monument to Hank Monk, the famous stage driver, whose body lies in a lonely defile in the Colorado mountains, near the Clear Creek road. The monument will bear these words :

HANK MONK
THE WHITEST, BIGGEST HEARTED AND BEST KNOWN
STAGE DRIVER OF THE WEST
WHO WAS KIND TO ALL AND THOUGHT ILL
OF NONE.
HE LIVED IN A STRANGE ERA
AND WAS A HERO
AND THE WHEELS OF HIS COACH ARE NOW
RINGING ON GOLDEN STREETS.

IS THIS PLANET LOPSIDED ? (Vol. V, p. 72.) A correspondent of the *New York Sun*, wrote to that paper a few years ago, from Baldwin, Wisconsin, stating that the southern hemisphere of our earth is denser than its northern ; or, what is the same thing, the center of gravity is situated in a plane passing through the earth south of the equator. From this he deduced the consequences :

1. This is the cause of the inclination of the equinoctial to the ecliptic, and consequently the change of the seasons.

2. It is the cause of the deviation of the magnetic meridian. Let us demonstrate by an experiment. In case the theory is true, a stone let fall from a tower north of the equator would fall in a southerly direction and at the same latitude south of the equator would fall due east. At the equator a stone let fall from a tower would fall in a more southerly direction than farther north of the equator.

3. If true, the earth should contain the greatest ocean on its southern hemisphere.

4. If true, the velocity of the moon in its orbit should be slightly greater when south of the equinoctial, than when north of it.

QUESTIONS AND ANSWERS.

THE LEGEND OF EUCLID. Where can be found what is known as "The Legend of Euclid"? I find him referred to in the legend as "Worthy Clarke Evvlyde." HIERONYMOUS.

Nearly all the old manuscript constitutions in the Masonic archives contain what is known as the Legend of Euclid, whose name is presented as the Worthy Clerk. It has come down to us in several forms, no doubt corruptions of some early traditions. The so-called Dowland manuscript has the form as here given. It has the appearance of having been written in the 17th century, but it is believed to be only a copy, clothed in more intelligible language, of an early manuscript of the year 1530. It is as follows:

"Moreover, when Abraham and Sara his wife went into Egypt, there he taught the Seaven Sciences to the Egyptians; and he had a worthy Scoller that height Evvlyde, and he learned right well, and was a master of all the vij Sciences liberall. And in his dayes it befell that the lord and the estates of the realme had soe many sonnes that they had gotten some by their wives and some by other ladyes of the realme; for that land is a hott lande and plentiful of generacion. And they had not competent livehode to find with their children; where they made much care. And then the King of the land made a great counsell and a parliament, to witt: how to find their children honestly as gentlemen. And they could find no manner of good way. And then they did crye through all the realme, if there were any men that could enforme them, that he should come to them, and he should be soe rewarded for his travail, that he should hold him pleased.

After that this cry was made, then came this worthy clarke Ewlyde, and said to the King and to all his great lords: 'If yee will take me your children to governe, and to teach them one of the Seaven Sciences, wherewith they may live honestly as gentlemen should, under a condition that ye will grant me and them a commission that I may have power to rule them after the manner that the sciences ought to be ruled.' And that the King and all his counsell granted to him anone, and sealed their commission. And then this worthy clarke tooke to him these lords's sonnes, and taught them the science of Geometrie in practice, for to work in stones all manner of worthy worke that belongeth to buildinge towers, temples, castells, and houses, and all manner of buildings; and he gave them a charge on this manner."

Thus endeth the legend. If considered historically it is absurd; the anachronism which makes Euclid contemporary with Abraham also makes it more absurd. But if interpreted as all Masonic legends

should be interpreted, to show Masonic truths in symbolic language, it loses its absurdity, and becomes invested with an interest to the craft at large.

LEGEND OF THE ASS'S BROKEN LEG. (Vol. V, p. 72.) Thorpe's "Northern Mythology," Vol. I, p. 23, gives the Christian form of the legend as follows :

NORWEGIAN VERSE.

"Jesus reed sig til Heede,
Der reed han syndt sit Folebeen.
Jesus stgide af og lægte det;
Jesus lagde Morv i Morv,
Ben i ben, Kjød i Kjød;
Jesus lagde derpaa et Blad,
At det skulde blive i samme stad."

ENGLISH VERSE.

"Jesus rode to the heath,
There he rode the leg of his colt in two;
Jesus dismounted and healed it;
Jesus laid marrow to marrow,
Bone to bone, flesh to flesh;
Jesus laid thereon a leaf
That it might remain in the same place."

This version corresponds exactly with the giant Skinner, when Thor traveled to Utgord, as related in the Edda. It has been adapted, by almost every nation, to some local tradition, and hence we see it exemplified in the nursery tale of Jack and the Bean Stalk. Grimm discovered and published a version which is new to us, and we give it here, with its translation :

NORWEGIAN VERSE.

"Phol endi Wodan,
Vuoru si holma;
Du wart demo Balderes volon,
Sin vuos btrenkit;
Thu biguolen Sinthgunt,
Sunna era Siueter;
Thu biguolen Frua,
Volla era Sulster;
Thu biguolen Wodan
So he wola conda,
Soes bewrenki,
Soes blutrenki,
Soes lidirenki,
Ben si bena,
Blut si bluoda,
Lid si geliden,
Soes gellimda sin."

ENGLISH VERSE.

"Phol and Wodan,
Went to the woods;
Then was a Balder colt
His foot wrenched;
Then charmed it Sinthgunt,
And Sunna her sister;
Then charmed it Frua
And Volla her sister;
Then charmed it Wodan
As well he could,
As well the bone-wrench,
As well the blood-wrench,
As well the joint-wrench.
Bone to bone,
Blood to blood,
Joint to joint,
As if glued together."

This version preserves current tradition in Norway how Wodan and Balder went out to hunt, and Balder's horse dislocated its foot, and how that he used charmed words, and set it and healed it.

A modern version of the tradition, current in Norway, makes the accident happen to the horse of Jesus, and Jesus dismounting performed the cure, and the verse is used as a formula for the healing of a person's limbs, as well as those of horses. The operation is described in Chambers's "Popular Rhymes of Scotland." "When a person has received a sprain, it is customary to apply to an individual

practiced in casting the 'wresting-thread.' This is a thread spun from black wool, on which are cast nine knots, and tied around a sprained leg or arm. During the operator is putting the thread around the affected limb, he says, but in such a tone of voice as not to be heard by the lookers-on, and not even by the person being operated upon, the following verse :

" Our Lord rode,	Bone to bone,
His foal's foot alade;	Sinew to sinew,
Down he lighted,	Blood to blood,
His foal's foot righted.	Flesh to flesh."

" In the name of the Father, Son, and Holy Ghost."

There are many other versions, all based on the same legend that the colt's leg was broken by accident when Jesus rode into Jerusalem (Matthew XXI, 7-8). From the same event the name *Palm Sunday* is perpetrated from strewing palm branches along the way as he passed.

" *SUBLIME* " APPLIED TO MASTER'S DEGREE." (Vol. V, p. 56.) The word "sublime," says R. Kenneth MacKenzie, is usually applied to the Third Degree, but like many other terms, the words "Sublime Degree of a Master Mason" signify nothing, and are without authority. Hutchinson, Smith, and Preston do not use it. Hutchinson speaks of "the most sacred and solemn order," and of the "exalted" but not "sublime degree." Since the introduction of the Royal Arch degree, the word Sublime has been used, and the word Exalted appropriated to the Arch. In the Constitutions, Dublin, 1769, the Master's degree is called "most respectable," and the term "high and honourable" has also been employed. The word sublime first occurs in Dr. T. M. Harris's "Discourses," Boston, U. S., 1801. It was also used by Cole in 1817; and Jeremy L. Cross introduced it in his Hieroglyphic Chart. 'As it has been adopted in the modern English lectures, it is too firmly established to be removed.

THE POET'S "ESSAY ON MAN." (Collected and arranged by James Monk.) Mrs. H. A. Deming, of San Francisco, Cal., is said to have occupied a years in searching out and fitting together thirty-eight lines from as many different English and American authors, and arranging the lines into a poem. (See N. AND Q., Vol. IV, p. 304.)

The following fifty-two lines, from as many different authors, occupied five months of the leisure hours of Mr. Monk :

The Mosaic Poem.

1. What starnge infatuations rule mankind !
2. What different spheres to human bliss assigned !
3. To lotlier things your find impulses burn,
4. If man would but his finer nature learn.
5. What several ways men to their calling have,
6. And grasp at life though sinking in the grave !
7. Ask, what is human life ! The sage replies :
8. Wealth, pomp, and honor are but empty toys ;
9. We trudge and travel, but from pain to pain,
10. Weak, timid landmen on life's stormy main ;
11. We only toll who are the first of things ;
12. From labor, health ; from health contentment springs.
13. Fame runs before us as the morning star.
14. How little do we know that which we are !
15. Let none, then, his certain knowledge boast,
16. Of fleeting joys too certain to be lost ;
17. For over all there hangs a cloud of fear ;
18. All is but change and separation here.
19. To smoothe life's passage o'er life's stormy way,
20. Sum up at night what thou hast done by day.
21. Be rich in patience, if thou in " gudes " be poor ;
22. So many do stoop to sights unsure.
23. Choose out the man to virtue best inclined,
24. Throw envy, folly, prejudice behind ;
25. Defer not till tomorrow to be wise ;
26. Wealth heaped on wealth, nor truth nor safety buys ;
27. Remembrance worketh with her busy train ;
28. Care draws on care, woe comforts woe again.
29. On high estates huge heaps of care attend ;
30. No joy so great but runneth to an end ;
31. No hand applauds what honor shuns to hear,
32. Who casts off shame should likewise cast off fear.
33. Grief haunts us down the precipice of years,
34. Virtue, alone, no dissolution fears ;
35. Time, loosely spent, will not again be won ;
36. What shall I do to be forever known ?
37. But now the wane of life comes darkly on,
38. After a thousand mazes overgone ;
39. In this brief state of trouble and unrest,
40. Man never is, but always to be blest ;
41. Time is the present hour, the past is fled ;
42. O, thou futurity, our hope and dread !
43. How fading are the joys we dote upon !
44. Lo, while I speak, the present moment's gone.
45. O, thou eternal arbiter of things,
46. How awful is the hour when conscience stings !
47. Conscience, stern arbiter in every breast,
48. The fluttering wish on wing that will not rest,
49. This, above all, to thine own self be true ;
50. Learn to live well that thou mayst die so too.
51. To those that list the world's gay scenes I leave,
52. Some illa we wish for, when we wish to live.

Chatterton.
 Rogers.
 Charles Sprague.
 R. H. Dana.
 Ben. Johnson.
 Falconer.
 Cooper.
 Ferguson.
 Quaries.
 Burns.
 Tennyson.
 Beattie.
 Dryden.
 Byron.
 Pomfret.
 Waller.
 Flood.
 Steele.
 Timothy Dwight.
 Herbert.
 Dunbar.
 Goff. Whitney.
 Rowe.
 Langhorne.
 Congreve.
 Dr. Johnson.
 Goldsmith.
 Dryden.
 Webster.
 Southwell.
 Thomson.
 Sheridan Knowles.
 W. S. Landor.
 Edward Moore.
 Robert Green.
 Cowley.
 Joanna Baillie.
 Keats.
 Bernard Barton.
 Pope.
 Marsden.
 Elliot.
 Blair.
 Oldham.
 Akenside.
 J. G. Percival.
 J. A. Hillhouse.
 Mallet.
 Shakespeare.
 Sir J. Penham.
 Spenser.
 Young.

THE "MAD POET." (Vol IV, p. 650.) MacDonald Clarke, an eccentric American poet, is familiarly known by this sobriquet. He adopted it as a pseudonym. The following quotation is credited to MacDonald Clarke. What work of his is it from and where found? "Night drops her sable mantle down and pins it with a star." E.

KINNEY'S STATUE OF ETHAN ALLEN. (Vol. V, p. 56.) I know little about Kinney's Statue of Ethan Allen. I have seen it stated, however, that the statue of him at Montpelier was modelled, so far as the body is concerned, from the figure of General Ethan A. Hitchcock, his worthy grandson. This would hardly be the case, except there was a close resemblance. General Hitchcock was hardly a man to permit such a thing on any other ground. There is a picture of General Hitchcock in Frank Moore's "Diary of the Rebellion." He was a man, as I remember, about five feet ten inches high, perhaps a little less; well-formed body, and a benignant countenance. He had a strong proclivity for mystic, philosophic, and other literature closely relating to that. The little monograph on "Alchemy, or the Hermetic Philosophy," which I published in 1869, was a synopsis of his book entitled "Alchemy, and the Alchemists," and met his approval. He died in Florence, Georgia, in 1870.

I do not suppose that this meets Mr. Waggoner's wishes very closely; but if it prompts any one else to speak who knows more about it, it will not have been out of place.

A. WILDER.

PELASGI—PELASGOS. (Vol. IV, p. 402; V, p. 36.) I desire to remark on the paragraph about Pelasgi. The statement that *pelasgos* means the sea, in the previous volume, cannot be proved. *Pelagos* is the word which means sea, and the insertion of an *s* in the word makes all the difference in the world. The derivation of *Pelasgos* is in fact wholly unknown. Again: that the "Philistines or *Pelesti* were probably a cognate people" with the Pelasgi is not well founded. The names do not correspond. The *t* and *g* in the two last syllables throw the two names widely apart. There is not the least historical or philological basis for the assertion that the Philistines were Pelasgi. And the remark, "there is no other conjecture more plausible," is not a wise remark. If we cannot find a good solution of a problem, shall we therefore take up with a bad one? not at all, we should wait. To adopt a bad explanation rather than to wait for a good one is exactly the process of savage minds, and is unworthy of a civilized philosopher. Lastly: The word *Pelesti* is not a proper representative of the Hebrew name which is translated in the authorized version "Philistines." That word, if transliterated from the Hebrew, is not *Pelesti*, but *Pelishitim*; and the word "Pelethites," if transliterated in like manner, is not *Pelesti*, but *Pelethi*. This inaccuracy, however, makes no difference with my statement about the *t* and *g* in the final syllables.

PRIGGLES.

QUESTIONS.

COMMONWEALTH. Why is the term *Commonwealth* applied to Massachusetts and to no other state?
CONCORD, N. H.

J-E-R-K-S-. Can any one give a minute history of the peculiar manifestations called "Jerks," supposed to have originated about the year 1796, or 1797, in Bourbon county, Kentucky, among a religious sect called "New Lights." Was that the origin of this very strange affection of this class of people, and how long has it existed since; and is it at the present time known to exist anywhere? Shall be glad to have all there is known about the same.

M. O. WAGGONER, Toledo, O.

HYERONIMUS. A clerical appearing old gambler, at a county fair, in Indiana, had a booth erected in which he open up a game called "Hyeronimus." At different places on a counter extending around the booth, were the numbers 1, 2, 3, 4, 5, 6. The old fellow sat in the center, and from a box threw three dice. The players put their money on such numbers as they chose. It a number upon which the money was laid was thrown by the gambler, the player was paid the amount of his bet; if not he lost. If doublets were thrown, he was paid two for one, and if threes were thrown, three for one.

What were the chances against the player? Explain the process for calculating them. I have seen half a dozen solutions, and no two of the answers alike.

Q., Terre Haute, Ind.

BENJAMIN FRANKLIN AND HIS SON. Some twenty years ago, a newspaper published an account, the authorship of which was attributed to Bishop White of the Protestant Episcopal church. It stated substantially that the Bishop was lodging at a public house, and after retiring for the night, became incidently the listener to a conversation. A father and a son, the former a "whig," and the latter a "tory," at the outbreak of the American Revolution, had each conveyed his property to the other, to save it from confiscation, with the implied understanding that the one belonging to the successful party should afterwards restore to the other his part. In the dispute which the Bishop overheard it transpired that the two were there, and the son was pleading with his father to make the promised restitution, which the latter refused. Next morning the Bishop learned that his fellow lodgers were no other than Dr. Franklin and his son Governor Franklin of New Jersey.

This story has the plausible characteristic of being in keeping with Dr. Franklin's Yankee thrift; but in most other respects, is hardly creditable. Can any of your readers give light, or the truth?

A. W.

New Books, Pamphlets, etc., Received.

SWEDENBORG THE BUDDHIST, OR THE HIGHER SWEDENBORGIANISM, ITS SECRETS AND THIBETAN ORIGIN. - By Philangi Dàsa. "I love the Gentiles more than I love the Christians." - SWEDENBORG. 8vo. pp. 322. Los Angeles, Cal. Price, \$1.50. Sent postpaid by Carl Casso & Co., Santa Cruz, Cal., U. S. A.

It is an interesting and valuable book.—*The Path.*

Written in the sarcastic style of a Carlyle, and bristling with useful information, it is a death-blow to the "New-Church" materialistic doctrine.—*The Platonist.*

It is a work that can be read through, and then open it at random, every day, for a passage to meditate upon, and the price is cheap.—*The Hermetist.*

The net result is a very excellent compendium of the "Esoteric Doctrine" as set forth by recent theosophical writers and supported by apt references to ancient works.—*The Theosophist.*

The author states the motive that underlies the book is to lead to truth and to goodness, and invokes upon all to whom it may come, "the blessings of the Guardians of the Lost Word."—*Banner of Light.*

The inner meaning of much that underlies the surface of the "Swedish Seer's" work is here given in an entirely "new light," and this work will be an incentive to a renewed study of Emanuel's works.

DIVINE HEALING, OR THE ATONEMENT FOR SIN AND SICKNESS. By Capt. R. Kelso Carter. "The Scriptures cannot be broken."—*John x, 32.* "Who his own self bore our sins in his own body on the tree."—*I Peter II, 24.* "Himself took our infirmities and bore our sicknesses."—*Matthew VIII, 12.* New edition, rewritten and enlarged. 8vo. pp. 189. A Full Salvation for Soul and Body. Price, cloth, 50 cents; paper, 25 cents, postage, 7 cents. John B. Alden, 393 Pearl St., New York City.

THE HISTORICAL JESUS AND MYTHICAL CHRIST, OR NATURAL GENESIS AND TYPOLOGY OF EQUINOCTIAL CHRISTOLATRY. By Gerald Massey. 12mo. pp. 236. Price, cloth, 75 cents; paper, 50 cents, postage, 6 cents. Star Publishing Co., Springfield, Mass. Accompanied by an explanatory vocabulary of names, references, etc. Christian symbolism, Gospel narratives analyzed, etc.

THE SCIENCE OF CORRESPONDENCE ELUCIDATED; THE KEY TO THE HEAVENLY AND TRUE MEANING OF THE SCRIPTURES. By Rev. Edward Madeley, edited by his son; revised and greatly enlarged by B. F. Barrett. Fifth American edition. 8vo. pp. 742. Presented to clergymen and students of theology by the Connecticut New Church Association, New Haven, Conn.

THE TRUE SCIENCE OF THE WORKING OF THE NATURAL LAWS OF NATURE. William Peckham, Middletown, R. I. Price, 25 cents. A research into the modes and methods of Nature, by comparisons, etc.

MONISM AND MELIORISM; A PHILOSOPHICAL ESSAY ON CASUALTY AND ETHICS. By Dr. Paul Carus, Ph. D. (Tübingen), now editor of *The Open Court*, Chicago, Ill. 8vo. pp. 84. Published by F. W. Christern, 37 West 23d Street, New York City. Price, 75 cents. The contents of this learned metaphysical monograph are:

1. Kant's Philosophy; 2. Casualty; 3. First Cause and Final Cause; 4. The Trinity of Monism; Ethics; 5. Definitions and Explanations. Monism is defined as a conception of the world which trace all things back to one source, thus explaining all problems from one principle; and Meliorism as a contemplation of life, which refusing optimism as well as pessimism, finds the purpose of living in the aspiration of a constant progress to some higher state of existence; in one word, in perpetual labor for amelioration. The pamphlet should be read by all philosophers and studied by those who would keep up with the onward march of thought in the present age. *The Open Court* is the exponent of the philosophy of Monism, and should also be read regularly by all those who desire to see the discussions on this subject, and the conciliation of Religion and Science. Terms, \$3.00 a year. Address "THE OPEN COURT," P.O. Drawer F, (Nixon Building, 175 La Salle St., Chicago.

SANCTA CROCE; A NICOTIAN TREATISE, WITH ILLUSTRATIVE AN TITHESSES. "Sublime tobacco!"—BYRON. "Filthy stink!" KING JAMES I. "ATHANASIA." Second edition. 12mo. pp. 86. Edition limited to 125 copies. Copyright, 1887. Publisher's private press. To the members of the Quinsigamond Boat Club the pages are respectfully dedicated. Worcester, Mass., Franklin P. Rice, publisher. Prosper SANCTA CROCE was the name of a cardinal prince of the Catholic Church who introduced tobacco into Italy.

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A BOOK OF POEMS. By Moses Gage Shirley, Goffstown, N. H. Including "The Tipping Rock," "Uncanoonuc Mountains," "Amoskeag Falls," "The Pulpit," etc., etc., Price 50 cents. Portrait. 12mo. pp. 77. 67 poems. "From grave to gay, from lively to severe." Original, humorous and sentimental. Ocean poems, lyrics of labor, memorial tributes, sonnets, odd fancies, etc. Several of his productions have been widely copied. Many possess historical interest, and preserve local legends and traditions. Many of them are up to the standard of more preerentious volumes. He should be encouraged, and we hope his volume will have a large sale. Send postal notes, or orders, payable at Manchester, N. H.

THE TRIAL OF THE JUDGMENT; A REVIEW OF THE ANARCHIST CASE. By Gen. M. M. Trumbull. 8vo. pp. 75. Chicago, 1888. This is a review of the whole case of the anarchists' trial and an appeal to the bar and the people of Illinois for a reversal of the judgment and a restoration of the law. For sale at the office of "*The Alarm*, price, 25 cents. Dyer D. Lum, Room 23, No. 169 Washington St., Chicago.

THE FUTURE RULERS OF AMERICA; A PHYSICIANS'S ADVENTURE. Arranged by W. P. Phelon, M. D. Hermetic Manuscript No. 1, pp. 28. Price, 25. Hermetic Pub. Co., 629 Fulton St., Chicago.

ON THE NTH-POWER OF NUMBERS WHOSE SUM IS AN NTH POWES. By Artemas Martin, LL.D. Read before the Washington Philosophical Society, Mathematical Section, Nov. 30, 1887. pp. 6.

ON SYMBOLS. By Edward Macbean. Printed for private circulation. pp. 30. Glasgow.

AN ACCOUNT OF THE RECENT PROGRESS OF ASTRONOMY. By W. C. Winlock. pp. 144. From Smithsonian Institution.

STATEMENT AND EYPOSITION OF CERTAIN HARMONIES OF THE SOLAR SYSTEM. By Stephen Alexander, LL.D. 4to. pp. 94. From Smithsonian Institution.

1. **BIBLIOGRAPHY OF THE SIOUAN LANGUAGES.** 2. **BIBLIOGRAPHY OF THE ESKIMO LANGUAGES.** By James Constantine Pilling. Two pamphlets, pp. 88+116. 3. **WORK IN MOUND EXPLORATIONS OF THE BUREAU OF ETHNOLOGY.** By Cyrus Thomas. pp. 16. 4. **PERFORATED STONES FROM CALIFORNIA.** By Henry W. Henshaw. pp. 34. 5. **THE USE OF GOLD AND OTHER METALS AMONG THE ANCIENT INHABITANTS OF CHIRIQUI, ISTHMUS OF DARIEN.** By William H. Holmes. pp. 28. Five pamphlets from Bureau of Ethnology, J. W. Powell, Director, Washington.

CATALOGUE OF THE PRIVATE LIBRARY OF CHARTES L. PULLEN, of Memphis, Tenn. pp. 30. A valuable collection of literature, rich in works of reference.

WHAT IS THE HUMAN SOUL? From the Glasgow Series of Christian Tracts. Swedenborg Publication Society, Philadelphia.

A CHAPTER FROM THE BOOK CALLED THE INGENIOUS GENTLEMEN DON QUIXOTE DE LA MANCHA, which by some mischance has not till now been printed. George Redway, London. From Occult Pub. Co., Room 55, 120 Tremont St., Boston, Mass.

A COLLECTION OF 110 FORMULÆ FOR THE AREA OF A PLANE TRIANGLE. Two articles in the *Annals of Mathematics*, (January and September, 1885). By Marcus Baker, Washington, D. C. pp. 13.

THE HEALER. A song of Christian Science. Words by John G. Whittier. Music by M. J. Messer. Dedicated to A. B. Dorman, C. S. D. Published by S. W. Blair, Boston. From A. B. Dorman, Worcester, Mass.

New Exchanges.

THE TWO WORLDS. A Journal of Spiritualism, Occult Science, Ethics, Religion, and Reform. Edited by Emma Hardinge Britten. Weekly, 6 shillings, 6 pence, per annum; 61 George St., Cheetham Hill, Manchester, England.

THE BUDDHIST RAY. "Hail to thee, Pearl, hidden in the Lotos!" Monthly. Buddhism in general, and to the Buddhism in Swedenborg in particular. Fifty cents a year. Santa Cruz, Cal.

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THE SOUL. Monthly. Devoted to the theories and phenomena of Soul, Mind and, Intellect. Fact Publishing Company, (P. O. Drawer 5323) Boston, Mass. \$1.00 a year. L. L. Whitlock, editor.

THOUGHT OF THE TIMES. A monthly devoted to stirring topics of to-day. S. H. Preston, editor, \$.00 a year. 1398 Broadway, New York.

THE PUZZLER. Monthly. Devoted to draughts, chess, enigmas, puzzles, anagrams, rebuses, etc. \$1.20 a year. N. D. C. Hodges, 47 Lafayette Place, New York.

CHRISTIAN METAPHYSICIAN. A guide to health and happiness. Bi-monthly. Fifty cents a year. George B. Charles, editor. Central Music Hall, Chicago.

THE TRESTLE BOARD. A monthly Masonic magazine. Royal 8vo. \$1.00 a year. C. Moody Plummer, editor. Trestle Board Association, 414 Clay St., San Francisco, Cal.

THE DAVENPORT MONTHLY. Monthly quarto. Practical education; Mathematical Department. Thirty cents a year. J. C. Duncan, editor, Davenport, Iowa.

THE OCCULTIST. A monthly journal of Psychological and Mystical Research. J. Thomas, F. T. S., publisher, Kingsley, Warrington, England. Terms, 1 shilling 6 pence in England; 2 shillings in the United States.

THE ANGLO-SAXON. The interest of the Anglo-Saxon race in Canada. Monthly. 50 cents a year. A. Spencer Jones, A. O. E., editor, Ottawa, Canada.

THE ALARM. Fortnightly. Dyer D. Lum, editor, (Room 23) 106 Washington St., Chicago, IL. Equality of opportunities for all. Free land, mutual credit, and equitable commerce. Sovereignty of the individual. Liberty. Terms, \$1.00 a year.

THE IRISH ECHO. Monthly. A. J. O'Daly, editor. Philo-Celtic Society Organ. 50 cents a year. 187 Washington St., Boston, Mass.

BELKNAP REPUBLICAN, AND LAKE VILLAGE (N. H.) TIMES. L. M. Gould, editor and publisher. Terms, \$1.00 a year. Weekly county paper. Politics, news, general intelligence, etc.

MISCELLANEOUS

NOTES AND QUERIES,

WITH ANSWERS.

"Who offends against Heaven has none to whom he can pray."—CONFUCIUS.

VOL. V.

JUNE AND JULY, 1888.

Nos. 6 & 7.

Notes.

HIPPOCRATES. The father of physic and prince of physicians was the first man who laid down precepts concerning physic. . It would be endless to transcribe the many things that have been said of him, or to relate honors that have been paid to his memory ; with the Grecians he passed for a God and his-day was kept as a festival. He taught his art as he practiced it, with candor and liberality, a singular proof of which was his mistaking a fracture of the skull for a natural suture, and being ingenuous enough to confess it, and even leave it record. This circumstance is noticed by Celsus, who seemed greatly upon delighted with it. This, says he, was acting like a truly great man, ready to make a frank acknowledgement of his errors, and especially in a profession where it is of importance to posterity to record the truth. The most singular specimen of his ingeniousness, however, is that medical curiosity called

THE OATH OF HIPPOCRATES.

"I swear by Apollo the Physician, by Æsculapius, by his daughters Hygeia and Panacea, and by all the Gods and Goddesses, that to the last of my power and judgment, I will faithfully observe this their oath and obligation. The master that has instructed me in this art, I

will esteem as my parent, and supply as occasion may require, with the comforts and necessities of life. His children I will regard as my own brothers, and if they desire to learn, I will instruct them in the same art without any reward or obligation. The precepts, the explanations, or whatever else belongs to the art, I will communicate to my own children, to the children of my master, or to such other pupils as have subscribed to the Physician's oath, and to no other persons. My patients shall be treated by me to the best of my power and judgment, in the most salutary manner without any injury or violence. I will neither be prevailed upon by any other to administer pernicious physic, or be author of such advice myself. Cutting for the stone I will not meddle with, but leave it to the operators in that way. To whatever house I am sent for, I will always make patient good my principal aim, avoiding as much as possible all voluntary injury and corruption. And whatever I hear or see in the course of a case, or otherwise, relating to the affairs of life, nobody shall even know it, if it ought to remain a secret. May I be prosperous in life and business and forever honored and esteemed by all men, as I observe this solemn oath; and may the reverse of all this be my portion if I forswear myself."

M. O. WAGGONER, Toledo, O.

ANCIENT SYMBOL OF THE SUN. The flat pieces of iron, like the letter S, that are frequently seen on the walls of old brick buildings, are said to be ancient symbols of the sun. Their origin may be traced back to Asia where they were in use in prehistoric times, and the same sign was once employed on the official seals of Sicily and the Isle of Man.

J. B. P.

DR. GEORGE CHEYNE, M. D., was a North Briton, and a physician who enforced his doctrines by personal example. This course on his part created a host of enemies who attacked but never defended their intrepid antagonist, as the following tends to prove :

DR. WYNTER TO DR. CHEYNE.

Tell me from whom, fat-headed Scot,
Thou didst thy system learn;
From Hippocrates thou hadst it not,
Nor Celsus, not Pitcairn.

Suppose we own that milk is good,
And say the same of grass;
The one for babes is only food,
The other for an Ass.

So, one new prescription try,
(A friend's advice forgive);
Eat grass, reduce thyself, and die,
Thy patients then may live.

DR. CHEYNE TO DR. WYNTER.

My system, doctor, is my own,
No tutor, I pretend;
My blunders hurt myself alone,
But yours, your dearest friends.

Were you to milk and straw confined,
Thrice happy might you be;
Perhaps you might regain your mind,
And from your wit be free.

I cant your kind prescription try,
But heartily forgive;
'Tis natural you should wish me die,
That you yourself should live.

M. O. WAGGONER, Toledo, Ohio.

THE "MOONLESS MONTH." The following "wonderful" item appears in Marysville (Cal.) *Budget*, March, 1888, credited to a public school journal. It has been seen in other educational journals.

"A MOONLESS MONTH. The month of February, 1886, was in one respect the most remarkable in the world's history. It had no full moon. January had two full moons, and so had March, but February had none. Do you realize what a rare thing in nature that was? It had not occurred since the time of Washington, nor since the beginning of the Christian era, nor since the creation of the world! And it will not occur again, according to the computation of astronomers, for—how long do you think?—2,500,000 years. Was not that truly a wonderful month?—*Public School Journal*."

Now, what are the facts? The same "wonderful" thing occurred in 1771, 1779, 1790, 1798, 1809, 1828, 1847, 1866.

"This occurrence," says a correspondent of the *Boston Journal*, "depends upon the following principle: The moon makes a revolution in 29 days, 12 hours, 44 minutes. If we reduce this to minutes we get 42,524 minutes. Now in 19 common years there are 6935 days; but as every fourth year has 366 days, then in a period of 19 years after any leap year, there are 4 days more. Adding, therefore, 4 days for leap years, we have 6939 days. But if this period is added to any common year, there will always be five days, (there being five leap years in the period), or 6940 days. During this period the moon makes 235 complete revolutions, and 7 hours and 40 minutes on another revolution; thus it will be apparent it returns, within a few hours, every 19 years, to the same place. This, however, does not occur every 19 years, unless it is a common year. As this period is not exactly a complete one, it will not become inaccurate in more than three periods."

THE TOWER IN SILOAM. (Vol. V, 68.) We appear to be without historic evidence in relation to the falling of the tower in Siloam. The fountain there was particularly celebrated as sacred, and the peculiar ebbing and flowing of its waters were also notable. Anciently beside the sacred wells were set up pillars of upright stone, or towers—the latter being symbols of the Divine Father, and the other of the Mother. Thus, Adonijah the elder son of King David was crowned by the stone pillar of Zohemoth, which was by En-Rogel, as the Fountain of Rogel. Judaea was subject to earthquakes; and several occurred during the reign of Tiberias. Probably one of these overthrew the fire-tower of Siloam. It bore Phœnician inscriptions.

A. W.

THE BENEDICTION OF (ST.) PATRICK ON THE PEOPLE OF IRELAND
Where can be found what is known as the "The Blessing of St. Patrick on the Irish people?"

JOHN ANDERSON.

A translation of the blessing from the ancient orthography of the Irish language was published in the *Irish Echo*, March, 1888, and as it is brief, we give it here :

" THE BLESSING OF GOD upon you all.

Men of Eire, sons, women,

And daughters, prince-blessing,

Good blessing, perpetual blessing,

Full blessing, superlative blessing,

Eternal blessing, the blessing of heaven,

Cloud-blessing, sea-blessing,

Fruit-blessing, land-blessing,

Produce-blessing, dew-blessing,

Blessing of the elements, blessing of prowess,

Blessing of chivalry, blessing of voice,

Blessing of deeds, blessing of magnificence,

Blessing of happiness, be upon you all,

Laics, clerics, while I command

The blessing of the men of heaven,

It is my bequest, as it is a perpetual blessing."

A POEM OF DISPUTED AUTHORSHIP. The following poem on "My Grandmother's Elm," under the name of Mrs. Mary Ann Sullivan, as author, is found in a collection of literature entitled "The New Hampshire Book, (p. 185,) being specimens of literature of the Granite State," published by Charles T. Gill, Nashua, 1842. This poem was copied into a work entitled "The Poets of New Hampshire, p. 768,) being specimen poems of three hundred poets of the Granite State, with biographical sketches," compiled by Bela Chapin, published by Charles H. Adams, Claremont, 1883. Mr. Chapin says; "Mrs. Sullivan was a native of this state. Further information in regard to this writer the compiler has been unable to obtain."

The manuscript copy of this poem is in the possession of the editor of *Notes and Queries*, with many others of her productions, being written by Miss Harriet M. Gillet, at eighteen years of age. She was a native of Weare, N. H., and daughter of John Gillet, who died in 1872, who also left several manuscript poems. The elm was planted by Susan Burnham, about one-half mile from the East Village in Weare, near "the mill stream" called Choate Brook, and the "south-

easter raging by," was the September gale of 1815. This article was suggested by the reading of the poem from the manuscript of Harriet M. Gillet by a relative, Miss Annie L. Gould (second removed), on Arbor Day, April 28, at the Lincoln-street School, Manchester, when the authorship was questioned. Who was Mrs. Mary Ann Sullivan? Here is the poem as published in the collection mentioned :

My Grandmother's Elm.

BY HARRIET M. GILLET, EAST WEARE, N. H.

—O—O—

If ever you visit my native town,
Will you seek out the vale where the mill stream comes down?
Even the villagers' children will point you the road,
And the very old house where my grandsire abode.

But the pride of the vale which I wish you to see,
Is my grandmother's elm, the old mammoth tree;
How widely its graceful and spherical crown
Flings over the valley a shadow of brown !

When the fierce south-easter was raging by,
Filling with clamor the gentle blue sky;
Then a lofty branch like a forest oak,
From the noble old tree by its fury was broke.

Of my grandmother told us, as pondering we stood,
How, three scores years since, from a neighboring wood,
She carried that elm in her little right hand,
And her father planted it firm in the land.

Her grave is grown smooth on the green hill side,
But the elm still lives in its towering pride;
And the spring's gayest birds have a colony there,
And they gladden with carols the midsummer air.

And gay as the wild bird's melody,
Are the sports I have led beneath that tree ;
The old elm tree—oh, would it were mine
In the shade of that tree even now to recline.

DEUCALION. (Vol. V, p. 69.) The name Deucalion has probably no numeral reference whatever. Sanskrit scholars derive it from the designations *Deva* and *Kala*, which would indicate the god Siva, the primal nature-god of India, whose worship, as Hyde Clarke, Forlong, and others show, was once universal. A. WILDER.

CLAIMS OF DESCENDANTS. (Vol. V, p. 68.) The claims of descendants from ancestors in Europe or England constitute the poorest kind of romance. To use an Hibernicism : 1. The courts and governments will not let these estates go out of the country ; and 2d, there are none to go out. I am very grateful to my venerable ancestor who left England just 250 years ago, that she gave a quit-claim to all the family estates. I have therefore refrained from going unshod while waiting for shoes from Purley Hail. A. WILDER.

ABNER KNEELAND'S BLASPHEMY. What was the blasphemy said to have been uttered by Abner Kneeland? WELLINGTON HOWARD.

The so-called blasphemy said to have been uttered by Mr. Kneeland was that he wrote and published an article in his liberal paper containing the following language — the word "they" referring to some church in Boston :

" They believe in a God which I do not."

This was construed by the court as blasphemy, infidelity, and rank atheism.

Mr Kneeland showed to the court, producing the original manuscript copy sent to the printer, that he wrote the following :

" They believe in a God, which I do not."

The printer by error had omitted the comma (,) after God. This, one will see, changed the meaning entirely ; the church's God and Mr. Kneeland's God were not the same God, but both believed in a God.

A similar instance was the burning of Servetus at the stake at the instance, it is said of John Calvin. When all was ready for the torch, Servetus was told to say the following and save his life :

" I believe that Jesus Christ was the eternal son of God."

This he refused to say, but said he could truly say,

" I believe that Jesus Christ was the son of the Eternal God."

This would not satisfy Calvin and Servetus was burned. For fuller details consult Owen's " Debatable Land."

ZEM ZEM. (Vol V, p. 69.) Wells have always been a necessary feature to ancient temples. The well of Zem Zem situate near the boundary of Yemen or Southern Arabia, was remarkable for its constant supply of not over-pure water, and was a great resort of caravans, when the peninsula was rich and fertile in prehistoric periods. After the change of the routes of commerce the region was abandoned, but some fourteen centuries or more ago, was occupied anew and everything restored. The goddess Al Haua was worshipped ; the black stone and holy well were her symbols. This was in keeping with ancient practice. The Venus-Aphrodite of Paphos was represented by an oval stone ; the Great Mother on Mount Pessinus in Asia Minor was commemorated in like manner ; and we are told that Astarte finding a star or meteoric stone, consecrated it and placed it in the " Holy Island," Tyre. The black stone at Mekka and Holy Well were rep-

representations of the Goddess, and the Kaba or mystic cone or traph was her sanctuary. The more modern succeed the ancient religions, chiefly by changing of names, while retaining the things signified. So we have the crescent of Venus as the standard of Islam; the Kaba is still the resort of pilgrims, as in pagan times, and the sacred well Zem Zem is as holy in the present faith as it ever was in the palmy days of the former rites.

Wells appear so universal that every little tribe appears to have had its holy fount. The three Urd-sisters of Norse mythology—the Weird sisters of Macbeth—sit by the Urd fountain, water the roots of the world-tree Ygdrasil, and parcel out to mortals their allotments. In the bottom of the well of Mimir lay truth, wisdom and knowledge—doubtless “the knowledge of good and evil.” Ingenious scholars derive the name Athena Pallas from *Aith* and *ain*, the Fountain of the Sun, which would intimate the Athenian goddess to denote the personified well of the Akropolis.

A. WILDER.

FRANKLIN'S LETTER TO STRAHAN. (Vol. V, p. 72.) “You are now my enemy, and I am yours.”

J. B. McMaster says: “Another incident in his life that is commonly misunderstood, is the famous Strahan Letter; we mean, ending, ‘you are now my enemy, and I am yours.’ We know of no collection of his works and letters in which this document is not treated as a piece of spirited and sober writing. Yet it was no more than a jest. Had this not been so, all friendship, all correspondence, between the two would have ended the day the letter was received. But no such falling-out took place, and they went on exchanging letters long after the war had seriously begun.”—*Atlantic Monthly*, October 1887, p. 325.

A. WILDER, M. D., Newark, N. J.

ORIGIN OF DRUGGISTS' COLORED BOTTLES FOR SIGNS. Why are such used in drug-store windows for signs? DAVID.

It is due, like the symbolical figures often seen upon the bottles in question, to those of the most ancient chemists, the Moors, inhabitants of Arabia and Old Spain. They generally made their own chemicals, and for that purpose, as also for experimenting, they used retorts, and the like, many of which were in the shape of bottles; and these vessels became connected in the public mind with the men who used them, and hence became the sign of a chemist's shop.

D. M. DRURY, Brooklyn, N. Y.

QUESTIONS.

1. In what nation and at what date did married women first assume the name of their husbands? (Miss Mary Smith became Mrs. Mary Doe).
OLD BACHELOR.

2. What was the Hanseatic League?
CALCHAS.

3. How many ways has this country been governed and what were the forms called?
CALCHAS.

4. How came purple to be adopted as the imperial color?
D. M. DRURY.

5. Why does anxiety turn the hair gray?
D. M. DRURY.

6. What river in Italy has its name spelled with one letter?
JONATHAN.

7. An elderly lady from the Province of Quebec residing now in the States, has lost the year of her birth; she remembers well at eight years of age of some rebellion, insurrection or invasion taking place in the Province, and of the armed militia passing her home, which would be from 80 to 90 years ago. Who can give any account of any such Canadian disturbance?
JOSEPH. F.

8. What is the meaning of the Indian name Piscataquog as applied to the river running through this town? Was there a Piscataquog tribe of Indians?
M. G. S., Goffstown, N. H.

9. Has any other person, beside Lord Timothy Dexter, mentioned in a previous number, written and published a book without any punctuation?
J. PAYSON SHIELDS.

10. How many editions of Euclid's Elements of Geometry have been published, that is by different persons? "The Imitations of Christ," and the works of Shakespeare have been similarly inquired for in previous numbers.
J. PAYSON SHIELDS.

11. In a mathematical work by William A. Myers, published in Cincinnati, 1874, he quotes the following:

"And the stone which the builders rejected was composed of three triangles."

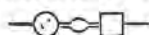
From what is this quoted, as my researches in the Scriptures show the reading quite different? (See Ps. cxviii, 22; Isaiah xxviii, 16; Matt. xxi, 42; Mark xii, 10; Luke xx, 17; 1st Peter ii, 6-7).
STONE-SQUARER.

12. What is the secret of those persons who are prodigies in memory whereby many, by some system of mnemonics, repeat long decimals of hundreds of place accurately?
F. K. GOLDSMITH.

12. What is the legend of the Seven Golden Cities? L. E. IEYES.

13. What city was destroyed by silence? L. E. IEYES.

14. What is the origin of the word Mascot? L. E. IEYES.

Cyclometry — Quadrature — Rectification.

During the past six years as editor of the *American Miscellaneous Notes and Queries*, we have received many kinds of questions involving the value of π , and such questions have been discarded from the magazine on account of the endless discussion they engender. But of late the literature on "Cyclometry" having been inquired for, we at once decided to publish a bibliography and brief review of such works as our library furnished and a few mentioned in our serial literature.

CYCLOMETRY is the science of *circle-measuring*; a quadrature is the *making of a square* equivalent to a given circle; rectification of the circle is the *finding of a straight line* equal to the circumference of a given circle. These problems are one and the same in the sequel, and have engaged the attention of geometers from the earliest ages. The object of this paper is not to discuss the various methods devised to solve the famous problems, but to give a brief account of some of the quite numerous productions on the subject, and this in answer to many inquiries from all parts of the world, as to what has been written on the perplexing problems.

The secret key to the problems is the true value of the ratio of the diameter to the circumference of any circle, which ratio is denominated by the Greek letter π (*pi*), the initial of the word *periphēreia*, the circumference of a circle.

The first recorded instances of a value of π are found in the Bible. One used by King Solomon in the making of vessels for the Temple :

"And he made a molten sea, ten cubits from one brim to the other: it was round all about, and his height was five cubits; and a line of thirty cubits did compass it round about."

[*I Kings* vii, 23.]

"Also he made a molten sea of ten cubits from brim to brim, round in compass, and five cubits the height thereof; and a line of thirty cubits did compass it round about."

[*II Chron.* ii, 2.]

The translation of Julia E. Smith gives these texts slightly different, the latter of which is as follows :

"And he will make the molten sea ten by the cubit from its lip to its lip, rounded round about; and five by the cubit its height; and a cord thirty by the cubit will surround it round about."

King Solomon's ratio (3) can be explained only that he measured the diameter from the outside, and the circumference on the inside, of the cord encircling the top of the molten sea.

There is another obscure allusion to a value of π found in the name

Eliezer (which in Hebrew numerals is 318), the steward of Abram's house (*Gen.* xv, 2); this is a circumference value to a diameter 100. Eliezer was the "instructor" of *three hundred and eighteen* "trained servants" (*Gen.* xiv, 13). Josephus (*Ant.* Bk. I, viii, 2) says Abram "communicated arithmetic and delivered the science of astronomy to the Egyptians." See J. R. Skinner's "Sources of Measure," p. 208, for more information on this value of π .

The earliest work giving an account of the many attempts to square a circle is that by J. E. Montucla, entitled *Histoire des Recherches sur la Quadrature du Cercle*, Paris, 1754. He adds to the title, "A Book intended to make known the Real Discoveries concerning this Celebrated Problem, and to serve as a Preventative against new attempts at its Solution." How far he has succeeded will appear in the following pages. From Babin's translation of this work we mention some of the earlier attempts to discover the quadrature.

Archimedes, about 250 B. C., applied himself to the problem and showed that the value of π was less than $3\frac{1}{7}$ and more than $3\frac{1}{8}$. Campanus, author of the work "Tetragonismus," published in 1503, one of the earliest of two *printed* books on the quadrature, claims that the ratio of Archimedes was exactly $3\frac{1}{7}$, or 3.142857 $\frac{1}{7}$. Archimedes' work was entitled *De Dimensione Circuli*.

Aristotle mentions two of his contemporaries, Antiphon and Bryson, who worked on the problem. Antiphon's method was to find the area of the circle by adding to the inscribed square the area of four isosceles triangles in the four segments, also the sum the eight similar triangles in the remaining segments, and so on till the circle was exhausted. Bryson's method resulted in the ratio, $3\frac{1}{3}$, or 3.75.

Sextus, a disciple of Pythagoras, claimed to have solved it, but his method has not come down to us. Aristophanes, in his "Comedy of the Clouds," ridicules Meton of Metonic-Cycle fame, for endeavoring to find the value of π .

Nicomedes and Apollonius made researches on the problem; the former by means of the curve called *the quadratrix*, the discovery of which has been ascribed to Dinostratos. Eutocius tells us that Apollonius had approached nearer the true ratio than Archimedes did. Philo of Gadara had approached still nearer, so that his ratio differed by less than $\frac{1}{100000}$ from the usually accepted ratio. Anaxagoras, while in prison, spent much time on the problem. Hypocrates of

Chios while searching for the ratio was led to the discovery of the exact area of the *lune* or crescent-shaped figure, which can be demonstrated to be exactly equivalent to a given square.

Cardinal Nicholas de Cusa rolled a wheel on a plane, and then he measured the path of one revolution of the wheel and made the ratio to be the $\sqrt{10} = 3.1622776+$. He also conceived of the curve made by a point in the rim of the wheel passing through space, called the cycloid, and believed with Charles Bovillus, in the next century, that it was the arc of a circle.

Oronce Finée, a Royal professor in 1544 published a quadrature a little more ingenious than Bovillus; Monantheuli, another Royal professor, in 1600, published his ratio. In 1592, Joseph Scaliger published his *Nova Cyclometria*, giving the ratio, 3.14098+; being shown his error by five geometers, he would not surrender. The only quadrator on record who, it is said, was convinced of his error, and acknowledged the same, was Richard White (Albinus), a Jesuit; his book is called *Chrysepsis seu Quadratura Circuli*.

Montucla mentions many others who have spent much time and labor to discover the value of π , bringing the history of the subject down to the publication of his work.

Montucla says, speaking of France, that he finds three objects prevalent among cyclometers :

1. That there was a large reward offered for the solution
2. That the longitude problem depended upon the solution.
3. That the great end and object of geometry depended upon it.

Dr. Charles Hutton says, in writing on this subject, that he divides the writers on this problem into two classes : The first, consisting of able geometers not led away by illusions, are those who seek only for the approximation more and more exact, whose researches have often terminated in discoveries in almost every part of geometry. Second, those who are less acquainted with the principles of geometry and try to solve the problem by analogies and paralogisms.

However this may be, the results of many of them greatly differ, and that too among some able geometers. We think the object in view is to find a *finite* ratio which shall be the *true* value of π . All desire to find a ratio that shall be finite. The names of many are given, and the results of some are stated.

J. E. Montucla's Cyclometers.

From Babin's translation of Montucla's "History of the Quadrature," we compile the names of writers on the circle. The list could be extended by including many others who wrote against the *quadratores*.

Mr. Babin gives only 14 of the results of Montucla's cyclometers.

Archimedes, between $3\frac{1}{8}$ and $3\frac{1}{4}$	Duchesne, Simon,
Bryson, 3.75	Falcon, Sir James, 1587,
De Bovillus, Charles, 3.1622776+	Falconet (the abbot), 1740,
De Cusa, Cardinal, 3.1622776+	Finæus, Orontius,
Hobbes, Thomas, 3.1622776+	Fondee, of Nangis,
Leistner, 3.137959148	Gephirander, Thomas,
Longomontanus, 3.14185	Gregory, James,
Lowenstein, Christian, 3.1426+	Hanow,
Metius, Peter, 3.1415929+	Hipocrates, of Chios,
Scaliger, Joseph, 3.14098+	La Costa, Bertrand, 1677,
Wayvel, S. Daniel, 3.142	La Frenaye,
Romanus, Adrianus, (16 decimals)	Lambert,
Petrus, Cornelius, (32 decimals)	Mallemant, of Messange,
Van Ceulen, Lud., (36 decimals)	Marinoni,
Anaxagoras,	Mathulon, 1728,
Antiphon,	Meton, of the Meton-cycle,
Appolonius,	Monantheuil,
Bachon, John, of Lyons, 1657,	Nicoli,
Basselin,	Nicomedes,
Cano, Alpheus, of Molina,	Oudart, S., of Ogen, Erance,
Christman,	Philo, of Gadara,
Clavius,	Roerberg, G. A., 1713,
Clerget,	Scotto, Benoit,
Cluvier, Dethleu,	Sextus, disciple of Pythagoras,
De Causans,	Snellii, Willibrordi,
De Culant,	Sullamar, Henry,
De Gregoire, St. Vincent, 1647,	Tardi, 1754,
De Laleu, of Rochelle,	Vieta, Francis,
De Vausenville, Rohberger,	Wallis,
	White, Richard (Albinus).

The Academy of Sciences gave notice it would examine no more quadratures, no more trisections, no more duplications, and no more perpetual motions. De Vausenville asked this question: "Would the quadrature be found if means could be devised for determining the center of gravity of a sector of a circle in common parts of the radius and circumference of the same circle?" Dr. Hutton answered "Yes."

Peter Metius, (15—-1636)	6	places.
Francis Vieta, (1540-1603)	10	"
Adrianus Romanus,	16	"
Cornelius Petrus,	32	"
Ludolph Van Ceulen,	36	"
Abraham Sharp, (1651-1742)	72	"
James Machin, (16—-1751)	100	"
Thomas F. de Lagny, (16—-1734)	128	"
(Radcliffe Library, Manuscript, Oxford,)	155	"
Clausen and Dase, of Germany, independently,	200	"
William Rutherford, 1843,	441	"
William Shanks, 1853,	607	"
William Shanks, 1873,	707	"

$\pi=3.$	141592	653589	793238	462643	383279	502884	197169	399375
	105820	974944	592307	816406	286208	998628	034825	342117
	067982	148086	513282	306647	093844	609550	582231	725355
	408128	481117	450284	102701	938521	105559	644622	948954
	930381	964428	810975	665933	446128	475648	237866	783165
	271201	909145	648566	923460	348610	454326	648213	393607
	260249	141273	724587	006606	315588	174881	520920	962829
	254091	715364	367892	590360	011330	530548	820466	521384
	146951	941511	609433	057270	365759	591953	092186	117381
	932611	793105	118548	074462	379834	749567	351885	752724
	891227	938183	011949	129833	673362	441936	643086	021395
	016092	448077	230943	628553	096620	275569	397986	950222
	474996	206074	970304	123668	861995	110089	202383	770213
	141694	119029	885825	446816	397999	046597	000817	002963
	123773	813420	841307	914511	839805	70985±		

Common logarithm of π	$\pi = 0.49714987269413385435$
Naperian logarithm of π	$\pi = 1.14472988584940017414$
Reciprocal of π	$\pi = 0.318309886183790671537767526745$
Square of π	$\pi = 9.869604401089358618834490999876$
Square root of π	$\pi = 1.772453850905516027298167483341$
Naperian base, e	$e = 2.718281828459045235360287471352$
Common logarithm of e	$e = 0.434294481903251827651128918916$
Naperian logarithm of e	$e = 1.000000000000000000000000000000$

$$\sqrt{\varepsilon^\pi} = 4.810477481 +$$

Arithmetical Coincidences.

1. In a circle of diameter 4, the *perimeter* of the circumscribed square is equal to *area* of the circumscribed square.
 2. In a circle of diameter 4, the *circumference* is equal to the *area*.
 3. In a circle of circumference 4, the *diameter* is equal to the *area*.
 4. In a circle of diameter π , the *circumference* is equal to *area* of circumscribed square.
 5. In a circle of circumference π , the *diameter* is equal to *area* of circumscribed square.
 6. If diameter of a sphere is 6, the *surface* is equal to *solidity*.
 7. If surface of a sphere is 6, the *diameter* is equal to *solidity*.
 8. If diameter of a sphere is 1, the *circumference* is equal to *surface*.
 9. If circumference of a sphere is 1, the *diameter* is equal to *surface*.
 10. The *side* of the inscribed equilateral triangle is exactly equal to the *area* of the circumscribed hexagon. } $\sqrt{.75}$
 11. The *altitude* of the inscribed triangle is exactly equal to the *area* of the inscribed dodecagon. } $.75$
 12. The *side* of the inscribed square is exactly equal to the *area* of the inscribed octagon. } $\sqrt{.50}$
 13. Twice the *area* of the inscribed equilateral triangle is exactly equivalent to *area* of the inscribed hexagon. } $\sqrt{.421875}$
 14. The *side* of the inscribed hexagon is exactly equal to the *area* of the inscribed square. } $.50$
- | | | |
|----------------------------|---------------------------------|------------------------------|
| Area of inscribed triangle | to circumscribed triangle is as | 1 to 4 |
| " " square | " square | 1 to 2 |
| " " hexagon | " hexagon | 3 to 4 |
| " " octagon | " octagon | $\sqrt{5}$ to $\sqrt{(8)-2}$ |

Let π = the diameter of a circle.	π^3 = convex surface of cylinder.
$\pi \div 2$ = radius.	$\pi^3 \div 4$ = area of circle.
π^2 = circumference.	$\pi^4 \div 6$ = solidity of sphere.
π^2 = area circumscribed square.	$\pi^4 \div 4$ = solidity of cylinder.
4π = perimeter of circum. square.	$\pi^4 \div 12$ = solidity of cone.
$\pi^2 \div 2$ = inscribed square.	$6\pi^3$ = surface of hexahedron.
$\sqrt{\pi^2 \div 2}$ = side of inscribed square.	$3\pi^3 \div 2$ = surface of cylinder.
$4\sqrt{\pi^2 \div 2}$ = perimeter of in. square.	$\pi^2 \div 4$ = arc of quadrant.
π^3 = hexahedron.	$\pi^2 \div 2$ = semicircle.
π^3 = surface of sphere.	$\sqrt{2\pi^2}$ = diagonal of square.

D'Israeli has arranged the "six follies of science," as follows:

1. The quadrature of the circle. 2. The duplication of the cube.
3. The perpetual motion. 4. The philosopher's stone. 5. Magic.
6. Astrology.

De Morgan says he ought to have added the trisection of an angle, so to have made the mystic number seven.

Another anonymous author has arranged the 12 follies as follows:

MATHEMATICAL.

1. The discovery of *prime* numbers.
2. The *duplication* of the cube.
3. The *trisection* of an angle.
4. The *quadrature* of the circle.
5. The *irreducible* case.
6. The theory of *parallels*.
7. The *rotation* of the moon.
8. The *perpetual* motion.

MYSTICAL.

1. The *elixir* of life.
2. The philosopher's *stone*.
3. The making of *gold*.
4. Natural *magic*.

A bibliography of books on, and inventions for, perpetual motion was published in London, 1861, 8vo., entitled "Perpetuum Mobile: or Search for Self-Motive Power," by Henry Dircks.

Gen. T. Perronet Thompson has published in his "Geometry without Axioms," a list of thirty titles on the "Theory of Parallels," the heads of which are in the "Penny-" and "English-Cyclopædias," *Art. "Parallels."*

Lagrange, in one of the later years of his life, imagined that he had overcome the difficulty. He wrote a paper, which he took with him to the Institute, and began to read it; but in the first paragraph he saw something he had not before observed; he muttered "*Il faut que j'y songe encore,*" and put the paper in his pocket.

Johannes Von Gumpach has published his work on "The Moon's Rotation on her Axis," London, 1856, and gives 34 titles on the discussion of the subject. He says her rotation is "a bare physical impossibility."

Chambers' Encyclopædia, *Article*, "Quadrature of the Circle," says:

"If an equation could be discovered for $\sqrt{a} + \sqrt{b}$, a and b representing irrational quantities, it would be welcomed as the solution of the grand problem."

Theodore Faber proposed the following equation as that desideratum: $\sqrt{a} + \sqrt{b} = \sqrt{a + b + \sqrt{4ab}}$. The result is however an

irrational quantity as the area of a circle and equal to a parallelogram and convertible into a square by the usual rules, but not a *square* by his New Law in Geometry. That square will forever lack one square unit, however infinitesimal the measure-unit may be assumed.

In 1872, a work was published in London, entitled "A Budget of Paradoxes," by Prof. Augustus De Morgan, of Trinity College, Cambridge. It is composed of the collected articles, correspondence, reviews of books, etc., by Mr. De Morgan, published in the London *Athenæum* from 1863 to 1870. In this work of 512 pages there are mentioned the names of 75 writers on the subject of "Cyclometry." Mr. De Morgan has reviewed the works of 42 of these writers, giving the results of their search for the value of π , bringing the subject down to 1870. The entire list has been compiled and tabulated by the writer of this monograph, which will accompany this paper. An examination of the compilation does not reveal the name of a single American author or book on the subject of "Cyclometry."

Of the 100 titles given in this bibliography, 52 are bound volumes, 32 are pamphlets, 7 are broadsides, and the remaining 9, including one manuscript, are communications to the press. These books have not been collected as a specialty, but are what naturally find their way on a variety of subjects into a mathematical collection of 700 or 800 volumes, and 500 or 600 pamphlets on "the bewitching science" of mathematics.

Those who desire to investigate these works, and the ingenious methods proposed to find the value of π , can fully satisfy themselves that there are many roads to Rome. Many of the works are elaborate, and accompanied with artistic plates, and ample diagrams.

The results of the writers of the 100 titles are tabulated and classified at the end, with other tables for comparison :

Errata. The following figures should be corrected in the following pages :

Page 110, sixth line from bottom, make the fifth decimal figure a 9.

Page 112, eighth line from bottom, strike out the seventh decimal figure 8 from both decimals.

Page 130, tenth line from bottom, strike out the fifteenth and sixteenth decimal figures 46 ; also, insert figure 1, after the third figure 1 in the denominator of the fractional series.

Bibliography — Cyclometry and Quadratures.

ADORNO, JUAN NEPOMUCENO. Introduction to the Harmony of the Universe; or Principles of Physico-Harmonic Geometry. Plato said, "The Great Geometrician is God." The harmony of the universe proves the truth of this sublime sentence. Royal 8vo, cloth, pp. 160. 72 elaborate diagrams. London, 1851.

This is a very elaborate work on harmony, proportion, analogy, and ratio. The author says that he is convinced that "the circumference of any circle to its diameter is precisely as 22 to 7, a proportion considered by Archimedes as an approximation only." His ratio corresponds with that of William A. Myers, 3.142857 $\frac{1}{7}$.

ANGHERA, DOMENICO, REV. Quadratura del Cerchio. 8vo. cloth. Malta, 1858.

This priest says: "The circle is four times the square inscribed in its semicircle." Hence his area is .80, and his ratio is $8\frac{1}{2}$, or 3.2.

BADDELEY, WILLIAM. Mechanical Quadrature of the Circle. — *London Mechanics' Magazine*, August, 1833.

"From a piece of carefully rolled sheet brass was cut out a circle $1\frac{9}{10}$ inches diameter, and a square $1\frac{7}{10}$ inches diameter. On weighing them they were found to be of exactly the same weight, which proves that, as each are of the same thickness, the surfaces must also be precisely similar. The rule, therefore, is that the square is to the circle as 17 to 19."

Hence this would make his ratio, $3.202216\frac{24}{881}$; area, $.800554\frac{8}{881}$.

ANONYMOUS. Resumé for Analytic Exercise. 4to. Construction:

To determine the point towards which an infinite descending series of triangles tend to a final term, being the limit of that segment of spiral which is the evolute of the quarter-circle.

To show the relations of lines representing the third root of quantities which are to each other as one and two, and the angle of the radius with the spiral which results from constructing the equation of the "two mean proportionals."

To transfer to any portion of the arc the conditions for its division into the same proportional parts as those of the semi-circle divided by the radius.

The author presents diagrams of circles and triangles combined, and shows that the radius of one circle is " $AB = \frac{1}{8}\pi + 4$," (which, if we understand him rightly,) = $26179387+$, the ratio, $3.1415926535+$.

BENNETT, JOHN. Original Geometrical Illustrations ; or the Book of Lines, Square, Circles, Triangles, Polygons, &c., showing an easy and scientific analysis for increasing, decreasing, and altering any given circle, square, triangle, ellipse, parallelogram, polygon, &c., to any other figure containing the same area, by plain and simple methods, laid down agreeably to mathematical demonstrations ; intended as a complete instructor to the most useful science of Geometry and Mensuration. 4to. cloth, pp. text, 70 ; plates, 54. Frontispiece, a diagram—The Circle, Square, and Triangle—primitive geometrical figures. London, 1837.

[Second Book.] The Arcanum, Comprising a Concise Theory of Practical Elementary and Definite Geometry ; exhibiting the Various Transmutations of Superfices and Solids ; obtaining also their Actual Capacity by the Mathematical Scale ; including Solutions to the yet Unanswered Problems of the Ancients—The Circle, Square, and Rectangle of Similar Areas. 8vo. cloth. pp. 48. 176 diagrams. Frontispiece, a diagram—The Problem of Napoleon Buonaparte to his Staff, resolved and drawn by John Bennett. London, 1838.

Mr. Bennett says that the problem of corresponding areas of the square and circle "has remained altogether in obscurity ; although rewards were offered by Charles V, of 1000 crowns ; and the States of Holland a similar sum, to any person effecting it ; but it does not appear to ever have been performed." He quadrates the circle thus :

"The transverse of the circle being divided into 26 equal parts, 21 of those parts are found to occupy one-fourth of the circumference."

Then he constructs the equi-areal square by intersecting the circumference at the 8 points of the 84 parts in the circumference, leaving 12 parts without the circumference and then 9 parts within the circumference, alternately. This is a mechanical quadrature, and give for a ratio, $\frac{34}{18}$, or $3.280769\frac{3}{18}$; area, $.807692\frac{18}{18}$, which is not in accord with his elaborate and artistic diagrams throughout his works.

BENSON, LAWRENCE SLUTER. Scientific Disquisitions concerning the Circle and Ellipse ; a Discussion of the Properties of the Straight Line and the Curve, with a critical examination of the Algebraic Analysis. "If a better *system's* thine, impart it frankly, or make use of mine." 12mo. cloth, pp. 94. Aiken, S. C., 1862.

Prof. Benson has published some twenty pamphlets, more or less on the area of the circle, three volumes of philosophic essays, and one geometry—"The Elements of Euclid and Legendre, Excluding the *Reductio ad Absurdum* Reasoning." He endeavors to demonstrate

that the area of the circle is equal to $3R^2$, or the arithmetical square between the inscribed and circumscribed squares. His theorem is: "The $\sqrt{12} = 3.4641016+$ is the ratio between the diameter of a circle and the perimeter of its equivalent square." The ratio between the diameter and circumference, he believes, is not a function of the area of the circle. He accepts the value of $\pi = 3.141592+$; but the area of the $\bigcirc$, he believes, is $\bigcirc 3R^2$, or .75.

BROWER, WILLIAM., M. D. *The Quadrature of the Circle ; being a full Exposition of the Problem.* 8vo. pamphlet, pp. 16. 4 plates. Philadelphia, 1874.

The entire pamphlet is devoted to geometrical constructions and algebraic equations. According to his demonstration, he says :

"The circle is equal to the inscribed square, $+2\frac{1}{2}(\text{side of inscribed square}) \times (\text{width of quadrantal segment})$, $+2(\text{side of inscribed octagon}) \times (\text{width of octagonal segment})$, $-2(\text{width of octagonal segment}) \times (\frac{1}{2}\text{side of inscribed square} - \frac{1}{2}\text{side of inscribed octagon} - \text{width of quadrantal segment})$."

Dr. Brower is ingenious and goes through many demonstrations, but the two triangles which he calls analogues are not similar, as he supposes, and therein lies his error. His first trial for the ratio results in $3.152075+$, which he finds greater than the accepted ratio, and he concludes that a certain segment is less than x , an unknown quantity.

BOYAI, JANOS. *La science absolue de l'espace.* 8vo. Paris, 1868.
We have never seen this work.

BOUCHÉ, CHARLES P. *The Regulated Area of the Circle, and the Area of the Surface of the Sphere.* 8vo. pamphlet, pp. 64. Cincinnati, Ohio, 1854.

Mr. Bouché says in the year 1823 he fixed the ratio to be $3\frac{1}{11}$, or $3.160498827\frac{1}{11}$; but "in 1833 he found himself constrained to correct it to $3.1684+$; and later he found himself compelled to correct this." He finally made the ratio, $3.17124864+$. The first ratio ($3\frac{1}{11}$) was first developed by M. de Fauré in his "*Dissertation, Découverte, et Démonstrations de la Quadrature Mathématique du Cercle*," Geneva, 1747; and "*Analyse de la Quadrature du Cercle*," Hague, 1749, mentioned by De Morgan in his "*Budget of Paradoxes*," p. 89. This same ratio was developed by Theodore Faber in 1865.

B., G. W. Squaring the Circle ; the Exact Circumference. — *Manufacturer and Builder*, Vol. III, No., 2, p. 31, February, 1871, Mr. G's constructed diagram, and proposition amounts to this :

"When we draw an equilateral triangle, of which each side is equal to the diameter of a given circle, one-fourth of the circumference will be equal to the radius plus one-third of the perpendicular of this triangle."

This proposition gives for the ratio, $3.1547005+$, a number larger than a circumscribed polygon of 48 sides.

CARRICK, ALICE. The Secret of the Circle ; its Area Ascertained. Second edition. 8vo. pp. 48. London, 1876.

Mr. Carrick, with the help of ten diagrams, some colored, concludes that the ratio is $3\frac{1}{2}$, or $3.142857\frac{1}{2}$; and its area, $.785714\frac{1}{2}$. He ends his essay with these words ; *Patet omnibus veritas, multam ex illis etiam futuris relicta est.*

CART, FRANCIS GUERIN. The Problem of Centuries ; What is the True Relation of Circumference to Diameter ? Diagrams.—*News and Courier*, (Charleston, S. C.) August 2, 1876.

Mr. Cart denies the universal correctness of the "47th of Euclid." He took out a copyright of his new discoveries, September 14, 1875. under the title, "New light on an old subject, or an analysis of the present received science of geometry, showing its errors and revealing the truth." His proposition is as follows :

"The area of the circle is equal to the area of its circumscribed square minus the area of a rectangle whose height is one-half the radius and whose side is the altitude of an equilateral triangle having the diameter for its base."

Hence his area of circle is $1 - \frac{1}{4}\sqrt{75}$, or $.78849364+$; this makes the ratio, $3.18397456+$. He deduces it from $3\frac{200}{18880}$, or $3.1839745+$.

CARTER, R. KELSO CAPT. The Quadrature of the Circle ; an Answer to Prof. Lawrence S. Benson's Proof that the Area of the Circle is Equal to Three Times the Square of the Radius. 8vo. pamphlet, pp. 16. Chester, Pa., 1876.

Capt. Carter says, "Prof. Benson's method of proof is so ingeniously conducted that a very close study is necessary to discover its fallacy." Prof. Benson believes that the area of a circle is equal to $3R^2$, or $.75$, and that the area is not a function of the ratio.

CHASE, PLINY EARLE, LL.D. Approximate Quadrature of the Circle. Published June 16, 1879. Haverford, Penn.

"On the rectangular co-ordinates X, Y , lay off, from a scale of equal parts, $AB=3, AC=20, AX=60, AD=9$. Join DC , and draw DE parallel to DC . Take $EY=AC$, and join XY . Then
 $XY : AC :: \text{circumference} : \text{diameter, nearly.}$ "

This gives the ratio, $3.14158499+$.

CLARYVANCE, J. Geometrical Approximations of the Quadrature of the Circle. 8vo. London, 1852.

We have never seen this work neither a notice nor review, only a catalogue announcement.

CRABB, NORMAN. Geometrical Square Root; a Circle Quadrated, and other problems. 16mo. pamphlet, pp. 29. Chicago, Ill., 1879.

Mr. Crabb says the "rule he has adopted for quadrating a circle has never been published or taught." He gives twelve problems and ten diagrams in his little work and finds the ratio to be $8\frac{1}{7}$, or $3.142857\frac{1}{7}$. This is the same ratio that William A. Myers, and Juan Nepomuceno Adorno arrived at in their elaborate treatises.

CRAIGE, JOHN. Methodus Figurarum Lineis, Rectis and Curvis, comprehensarum Quadratus determinandi. 4to. pp. 43. London. 1685.
 This work seems to be a discussion of quadratures in general.

DAVIES, CHARLES, LL.D. An Examination of the Demonstrations of Davies' Legendre, showing how the Polygon becomes a Circle, by the Methods of Newton. 12mo. pamphlet, pp. 36, New York, 1873.

Prof. Davies reviews his own edition of Legendre, elucidating various methods by the principles of the Calculus, and makes them the foundations of mathematical science. He demonstrates the usually accepted ratio, $3.141592+$, sometimes designated "the orthodox ratio."

DAVIS, JOHN. The Measure of the Circle. The Use and Importance of the Measure, discovered in January, 1845. 8vo. cloth, pp. 156. Providence, R. I., 1854.

Mr. Davis says: "In confidence, I have found the point; to find the circumference of any circle, great or small: multiply the diameter by $9\frac{1}{7}$, and divide the product by 8; this gives you the perfect circumference, in all cases." Hence his ratio is $\frac{1}{8}$, or $3.16666\frac{1}{8}$.

DEMEDICI, CHARLES. The New Science—Mathematical Commensuration. 12mo. cloth, pp. 196. 50 diagrams. Chicago, 1883.

DEMEDICI, CHARLES. The Medician Theorem; a Scientific Exposition of the Geometric Paradox; founded on newly discovered facts. 4to. pp. 4, chart. New York, 1885.

The Theorem—"Sides of inscribed squares are to sides of circumscribed squares, as sides of any squares are to the diagonals of the same square; and the number $\frac{7}{4}$ expresses finitely the exact ratio common to the sides and the diagonals of any square."

Mr. DeMedici's work is a full exposition of the subject. He quotes Bernoulli's proposition :

"If the number 4 be divided by 1, 5, 9, 13, and every fourth number in succession, and afterwards by 8, 7, 11, 15, and every fourth number thereafter, the difference between the sum of the first set of quotients and that of the second is equal to the ratio of diameter to circumference." Ratio, $\frac{208}{88}$, or $\frac{26}{11}$, or $3.1418685\frac{26}{11}$.

DINGLE, EDWARD. Balance of Physics. Square of the Circle, and the Earth's True Solar and Lunar Distances discovered and demonstrated, as by astronomical facts in the Eclipses.—"The secret of the Lord is with them that fear him, and it is for them to know."—PSALM XXV, 14. 8vo. cloth, pp. 246. London, 1885.

This work, like J. N. Adorno's and Wm. A. Myers's, is very elaborate in its computations applied to the universe in all its ramifications. His demonstrations are that the ratio is $3\frac{1}{4}$, or $3.142857\frac{1}{4}$.

DIRCKS, HENRY, LL.D. Chimeras of Science: Astrology, Alchemy, Squaring the Circle, Perpetuum Mobile, etc. 12mo. cloth, pp. 48. 6 plates. London, 1869.

He says, referring to Arago, that "the area of the space included within a circle of thirty-eight millions of leagues radius, may be determined with such a degree of precision that the probable error shall not exceed the space of a mite." He presents James Smith's diagram and demonstration of the ratio, $3\frac{1}{4}$, or 3.125 , claiming to be a simple and exact method and sufficiently demonstrative.

DRACH, S. M. On the Circle-Area, and Heptagon-Chord. 8vo. Plate.

"From 3 diameters deduct 8-thousandths and 7-millionths of a diameter; to the result add five per cent. The ratio, $3.14156265+$."

"DURHAM," (N. H.) How to Square the Circle.—*The Sun*, (N. Y.), August, 1878.

Proposition—"Let it be assumed that the area of the circle is equal to the excesses of four squares over four circles described within the squares whose diameters and sides are equal. If this proposition can

be geometrically demonstrated, the area of a circle can be deduced as a corollary from said demonstration, for it makes the area of five circles equal to the area of four squares, and consequently the area of a circle equal to four-fifths of the square of its own diameter."

Hence his area is .80, and his ratio, 3.2.

FABER, THEODORE. *Mathematical and Philosophical Manifesto*, declaring numerous theorems, problems, postulates, corollaries, axioms, propositions, rules, and facts, hitherto unknown in science, and naturally growing out of the Extraordinary and Most Significant Discovery of a Lacking Link in the demonstration of the world-renowned Pythagorean Problem, utterly disproving its absolute truth, although demonstrated as such for twenty-three centuries; and by this discovery establishing the fact of the Perfect Harmony between Arithmetic and Geometry as a Law of Nature; and calculated to settle forever the famous dispute between the two Great Philosophic Schools. 8vo. pamphlet, pp. 34. New York, 1872.

Mr. Faber published his "New Mathematical System" first in 1865. In 1879, he published his third pamphlet, "A New Law in Geometry, leading to the Solution of Unsolved Problems." "An eternal geometrical difference between a square and a so-called irrational quantity." He denies the universality of the "47th problem of Euclid," the only few cases of its exact application being special cases or coincidences; that a circumscribed square is not equal to two inscribed squares. He demonstrates the ratio to be $3\frac{1}{3}$, or $3.160493827\frac{1}{3}$, the same as that of M. de Fauré, in 1747, and that of Charles P. Bouché, in 1823, which after ten years he abandoned. Mr. Faber's ratio, $3\frac{1}{3}$, is a square whose root is $1\frac{1}{3}$, which root also is a square whose root is $\frac{1}{3}$, or $1\frac{1}{3}$. His area of the circle, $.790128456\frac{1}{3}$, is a square whose root is $.88888\frac{1}{3}$. Circumscribed square being 1; inscribed square = $(.7\frac{1}{4})^2 - \frac{1}{16}$.

FERREL, WILLIAM. *Converging Series expressing the Ratio between Diameter and the Circumference*. 4to. pp. 6. (Smithsonian Contributions to Knowledge, No. 233). Washington, 1871.

He says the paper is "a method for obtaining converging series expressing the value of π , and the series obtained, are thought to be new." The result produced is the accepted value of the ratio, $3.141592+$.

FLEMING, PETER. *Geometrical Solutions of the Quadrature of the Circle*. Large 4to. cloth, pp. 10. 6 plates. Montreal, 1850.

Mr. Fleming says: "When the length of the circumference of a given circle can be found, or resolved into a straight line, the quadra-

ture of the circle is accomplished. It is now the solution of this problem which the writer presumes to lay before the public."

FLEMING, PETER. Geometrical Solutions of the Length and Division of Circular Arcs ; the Quadrature of the Circle, Trisection of an Angle, Duplication of the Cube, and the Quadrature of the Hyperbola. 8vo. cloth, pp. 40. 5 plates. Montreal, 1851.

This is a new edition of the former work elaborated with additions.

"FINALITY, A." The Circle Squared. — *Courier*, Boston, Mass., January 28, 1872.

This cyclometer says that "the arc of each six equal segments gains $\frac{1}{8}$ of each chord in length ; therefore, the proportion is $\frac{1}{8}$, and hence his ratio is 8.16666 $\frac{2}{3}$." Area, .791666 $\frac{2}{3}$.

FISHER, THOMAS. Mathematics Simplified and made Attractive ; or the Laws of Motion Explained. 8vo. cloth, pp. 128. 19 plates. Philadelphia, 1853.

Mr. Fisher devotes pages 56-76 to the subject of the circle. He says no other method has been devised, and he believes never will be, that the area of a circle can be obtained, than that by the "method of exhaustions." He concludes that the ratio is the usual orthodox value, 8.141592+. He closes his book with a poem of sixteen stanzas on the "The Creation of Light."

"FUTURUS." The Quadrature of the Circle ; a Puzzle for Mathematicians. Glasgow journal, May, 1853.

Construction of diagram : "Make ABC a right angle, angle at B . Make $AB = \frac{1}{2}$ diameter, $BC = \frac{1}{2}$ diameter, $BD = \frac{1}{2}$ diameter, $BE = \frac{1}{2}$ diameter, and $BF = \frac{1}{2}$ diameter, (the latter BF on perpendicular.) Join AC , AD , AE , and draw through F a straight line cutting AE at H and meeting AC at G , so that $HG = ED$. Then $2BC + FG = \pi \times \text{diameter} \div 4$, whence may be derived the square."

Therefore, his ratio is 8.1288098 $\frac{1}{11}$, and the area, .7809528 $\frac{3}{4}$.

GEE, WILLIAM F. A New System of Geometry successfully applied to the Solution of the Square of the Circle ; published as a Supplement to the Geometry of the present time. 12mo. cloth, pp. 68. Charleston, S. C., 1859.

Mr. Gee's calculations result in a combination of the commonly received ratio and the decimal of one-seventh. His ratio seems to be 8.141592697774542 $\frac{1}{7}$. Area, .785398174443635 $\frac{1}{7}$.

GIDNEY, CHARLES T. The Ratio of Circumference to the Diameter of the Circle.—*Troy* (N. Y.) *Standard*, October 2, 1878.

Mr. Gidney works by a series of algebraic equations numbering 1350, from which he develops the ratio, 3.185135+.

GOODSELL, SAMUEL C. A Book of Stubborn Facts; appreciating unknown conditions at the Base of Construction of Plane-Figures; the Square the only Regular Polygon of Known Area, and the reason why; proving circumference $\div$ diameter to be the consequent of dividing 4 times the least by $\frac{1}{10}$ the greatest diameter of the square; and the circumference of the greatest diameter of the square to be $\frac{1}{10}$ the sum of the four sides. Also, the area of the circle to be circumference² $\times$.08, or diameter² $\times$ $\frac{8}{11}$, and solidity of the sphere = diameter³ $\times$ $\frac{1}{11}$. The ratio of diameter to circumference being a sequent of diameter, line and area, we may safely lay aside the Geometer's Approximate for the more delicate Ratio of Pure Mathematics; Containing valuable tables, such as natural sines, tangents, etc., etc., of improved exactness. Tables of equal line and relative area — of equal area and relative line — of unknown figures. Also, round and square diameters of numbers; area and circumference of circles, solidities of the spheres, etc., etc.; short comprehensive formulæ pertaining to line and area, illustrating the maxim, — "Truth may languish, but never die." 8vo., New Haven, Conn., 1875.

Diameter of $\square$ being 1, the D. = $\sqrt{1 \text{ area}}$, L. = $\sqrt{16 \times \text{area}}$;

$$R. = \sqrt{16 \times 1}.$$

Diameter of $\circ$ 1, the D. = $\sqrt{\frac{8}{11} \text{ area}}$; L. = $\sqrt{12\frac{1}{2} \times \text{area}}$;

$$R. = \sqrt{12\frac{1}{2} \times \frac{8}{11}}.$$

The title-page of the prospective work indicates the results of his formulæ. His ratio is 3.1426968+. Area, .7856742+.

GOULD, LUCIUS D. A Practical and Mathematical Demonstration of Finding the Circumference, and Squaring the Circle, when the Diameter is given.—From "The Carpenter's and Builders's Assistant and Wood-Worker's Guide." 8vo. pp. 2. New York.

"To find the side of a square, the area of which shall be equal to the area of the circle, divide the diameter of the circle by 14 and multiply the quotient by 11; add to the product $\frac{1}{10}$ of the diameter, and annex the first figure of the quotient."

This rule results from the ratio $\frac{2}{3}$, or 3.142857+. Mr. DeForest P. Lozier, of Newark, N. J., also supports this ratio.

GRAY, J. H. A General Formula for Inscribed Polygons. — In the *Ohio Educational Journal*.

Prof. Gray's reduction fills a full page, and the last result is this :

$$2^7 \times \sqrt{2} - \sqrt{2} + \sqrt{2} + \sqrt{2} + \sqrt{2} + \sqrt{2} + \sqrt{2} = 128 \times .024543 = 3.1415 +.$$

GROSVENOR, CYRUS PITT. The Quadrature of the Circle Perfected, or the Circle Squared ; in which the method is stated and demonstrated for determining with perfect accuracy the area of any circle of a given radius, and the length of its circumference ; and consequently the length of any arc of the circumference ; which is done according to geometrical principles, and not on the schemes hitherto employed by mathematicians, by which only approximation to the truth has ever been accomplished. Together with rules for practical mensuration of curvilinear figures, both plain and solid. 4to. pamphlet, pp. 10. Plates and diagrams. New York, 1868.

His rule for the area is stated as follows :

"Square the diameter of any circle, multiply the square by two, extract the square root of the product, from the root subtract the diameter of the circle, square the remainder, multiply this square by five-fourths, subtract the product from the square of the diameter of the circle."

Rev. Mr. Grosvenor's ratio is $3.142135623730905068 +$, and the area, $.785533905932726267 +$.

HARBORD, H. The Circle Squared, From *Hull and Eastern Counties Herald*, (England), February 27, 1868.

Mr. Harbord's calculations are to find the *finite* value of π . His results are as follows :

Ratio : $3.14159265358938193239974916$.

Square root of ratio : 1.7724538509054 .

Side of a square : $.8862269254527$.

Area of circle : $.78539816339736548309993729$.

HART, DAVID S. Quadrature of the Circle. The sum of the infinite series, $\frac{8}{1 \times 3} + \frac{8}{5 \times 7} + \frac{8}{9 \times 11} + \frac{8}{13 \times 15} + \frac{8}{17 \times 19} \&c.$,

ad infinitum, if it can be found, will solve the problem. Proposed in the *Yates County Chronicle*.

James Smith says this series calculated to 50 terms makes the ratio less than $3.133 +$, and to whatever number of terms carried the sum can never be made to reach 3.14 .

HARRIS, JOHN. (Kuklos.) The Circle and Straight Line. Parts I, II, III. Plates. 3 Volumes, and Supplement. 8vos. cloth, pp. 42, 56, 26, 26. Montreal, 1874.

These volumes are elegantly executed mechanically, the plates being in separate volumes. He demonstrates the ratio to be $3.142696+$. Area, $.785674+$.

HERSCHEL, A. S. (Collingwood, Eng.) On an Approximate and Graphical Rectification of the Circle. — *The Mathematical Monthly*, Vol. III, No. 5, pp. 152-155, February, 1861. (From the London *Quarterly Journal of Pure and Applied Mathematics*, October, 1868.

The value of the ratio is founded on the singularly close relation that is made by the angle $\tan^{-1}(\frac{1}{4}\pi)$ to a root of the equation $\sec x = \cot x$. This results in the form $\cos x = \tan x = \sqrt{\frac{\sqrt{(5)}-1}{2}} = .7863+$. While $\frac{1}{4}\pi = .7853+$.

HILL, THOMAS. An Elementary Treatise on Curvature ; also, a Fragmentary Essay on Curves. 8vo. pamphlet, pp. 30. Boston and Cambridge, 1850.

Prof. Hill's treatise is a specialty on curves discussing first principles of curves. He deduces the usually accepted ratio, $3.141592+$. The essay is exemplified by the problem found in Gill's *Mathematical Miscellany*, May, 1839, p. 43, and solved by Prof. Benjamin Peirce, the proposer: "Find a curve which is its own evolute." The involute and evolute of the circle are correlate, and the evolute of any algebraic curve is rectifiable.

HORNISH, J. K., President and General Manager of the Vulcan Smelting and Mining Company, Denver, Col., 1885. MS. 4to.

Mr. Hornish's Ratio is $3\frac{6}{8}$, or 3.15625 . We are not aware that he has yet published his demonstration.

HOBBS, THOMAS, of Malmsbury. *Decameron Physilogium*; or, The Dialogues on Natural Philosophy; to which is added the Proportion of a Straight Line to Half the Arc of a Quadrant. 12mo. pamphlet, pp. 136. London, 1678.

The author says of his proposition "for the demonstration whereof, we must assume certain known Truths, and Dictates of common Sense." His value of the ratio is $\sqrt{10} = 3.1622777+$.

HOULSTON, WILLIAM. *The Circle Secerned from the Square, and its Area Gauged in terms of a Triangle common to Both ; also, an Original, Simple and Exact Method pointed out approximating as closely as possible to the numerical value of the Triangle, and the consequent veritable Content of the Inscribed Circle, in Relation to any given Square.* 4to. pamphlet. pp. 22. London, 1862.

Mr. Houlston's treatise is unique, being interspersed with seventy-four quotations from the poets of all past ages. He makes the ratio, $3.14213562373+$. Area, $.78553390593+$.

HUDSON, W. H. *New and Demonstrative Solution of the Geometric Quadrature of the Circle and the Geometric Mean.* Indian Chronological Tables. Portrait. 8vo. 3 plates. Calcutta, 1831.

JACKMAN, ALONZO, LL.D. *The Circle Squared.* 12mo. pamphlet, pp. 8. Northfield, Vt., 1876.

Prof. Jackman of the Norwich University, also published these geometrical demonstrations in quarto form first in 1872, second in 1873 ; hence this pamphlet is the third edition. He substantiates the commonly received ratio, $3.1415926535+$.

JACKSON, EDWIN W. *A Geometric System for the Measurement of The Area of a Circle, or any of its Sectors.* 8vo. pp. 22. 21 plates. New Brunswick, 1826.

He demonstrates that "the circle is conceived to be a polygon of an infinite number of sides and equal to a triangle, the base being equal to the periphery, and its altitude to the radius, therefore, the square, when thrown into an angle of this description, will give the periphery."

MAY, JOHN. *The Theory and Construction of the Quadrature of the Circle ; also the Globe or Ball reduced to the Cube, and two New Measures—The Octans, with the Inclination of the Perpendicular Line.* 8vo. pamphlet, pp. 20. 4 plates. Philadelphia, 1866.

Mr. May finds the ratio to be $3\frac{1}{25}$, or 3.24 | Area of circle=.81.

MERCERON, D. S. *The Square Root of Surds ; The Solution of the XLVIIth Problem of Euclid, and Square of Circle, with True Method of Finding the Circumference.* 8vo. pp. 13. Baltimore, 1848.

Mr. Merceron's rule is : "Multiply the chord of the arc of 90° by 5, and divide the product by 4, and the quotient will be the circular square-root, which, when multiplied (squared) will give the square area of the circle." He makes the ratio to be $3\frac{1}{8}$, or 3.125. Area of circle, .78125. This ratio is the same as that of James Smith who had an elaborate discussion with several of the leading mathematicians

of Europe. Mr. Smith published this correspondence in five octavo volumes, a total of 1988 pages, the correspondence beginning in 1859 and ending in 1872, a period of 13 years. He was reviewed at length by De Morgan in his "Budget of Paradoxes."

MORTON, JAMES. The System of Calculating Diameter, Circumference, Area, and Squaring the Circle; together with interest, miscellaneous tables, and other information. 12mo. cloth, pp. 144. Philadelphia, 1879.

Mr. Morton says that it is not his purpose to introduce to the public any new principle, but "the result of laborious calculations culminating in the final elucidation of facts." He finds, therefore, the ratio to be $\frac{402,123,859,659,493,567}{128} +$ or $3.141592653589793 +$.

MURDOCK, W. D. C. A Demonstration of the Quadrature of the Circle. pp. 8. Without date or place of publication. Announced in *The Mathematical Monthly*, Vol. III, No. 11, p. 356, August, 1861. We have never seen a copy of this quadrature.

MYERS, WILLIAM ALEXANDER. The Quadrature of the Circle, the Square Root of Two, and the Right-Angled Triangle. First Ed., 1873. "Where is the wise."—1st Cor. 1, 20. "Now the serpent was more subtle than any of the beasts of the field which the Lord God had made."—Gen. III, 1. Second edition. 16 plates. 8vo. cloth, pp. 164. Cincinnati, Ohio, 1874.

The introduction comprises 64 pages giving a history of the problem and attempts at the solution, translated from the French of Montucla, by J. Sabin, Louisville, Ky. The author then proceeds to the "geometrical and final solution of the quadrature of the circle by an entirely new method, together with ample proofs of the same," as he says. He finds the ratio to be $3\frac{1}{2}$, or $3.142857\frac{1}{2}$.

PARKER, JOHN A. Quadrature of the Circle, containing Demonstrations of the Errors of Geometers in finding the Approximations in Use; with an appendix, and practical questions on the quadrature, applied to the astronomical circles; to which are added lectures on polar magnetism, and non-existence of projectile forces in nature. 27 plates, and diagram. Second edition. 8vo. cloth, pp. 304. New York, 1874. [First edition, 8vo, cloth, pp. 212. New York, 1851].

Mr. Parker sums up his demonstrations and says, "the true ratio of circumference to diameter of all circles is four times the area of an

inscribed circle for a ratio of circumference to the area of the circumscribed square for the ratio of diameter." He finds the ratio to be $\frac{30812}{8881}$, or $3.1415942+$. Seba Smith of New York published his "New Elements of Geometry," in 1850, and says in the preface of that work that he is convinced of the truth of Mr. Parker's ratio.

PIERCE, GEORGE W. Squaring the Circle.—*Advertiser* (Boston, Mass.) January 2, 1883.

Mr. Pierce replies to a statement made in the same paper, December 26, 1882, saying that M. Lindemann had proved that the usually accepted value of π "cannot be the root of any algebraic equation whatever with rational coefficients." This Mr. Pierce denies, and says that

$$\pi = 2^{\text{nth}} \times \sqrt{2 - \sqrt{2 + \sqrt{2 + \sqrt{2 + \sqrt{2 + \sqrt{2 + \sqrt{2 + \sqrt{2}}}}}}} \&c.$$

to n radicals, when n is equal to infinity, each radical sign covering all that follows, this being the perimeter of an inscribed regular polygon of 2 to the n th power sides, this expression being the root of an algebraic equation with rational coefficients."

This expression is the same in result as that of J. H. Gray.

PLAYFAIR, JOHN. (Supplement to Elements of Geometry, containing the First Six Books of Euclid.) On the Quadrature of the Circle. 8vo. pp. 164-194. New York, 1854.

A demonstration of the method of inscribed and circumscribed polygons, or method of exhaustions, resulting in the ratio, $3.141592+$.

PRATT, HENRY F. A., M. D. The Mutual Relations of the Circle, the Square, the Cube, and the Sphere. 8vo. pp. 32. Appendix to "Eccentric and Centric Force. a New Theory of Projection." "All things are double, one *against* another." London, 1862.

Dr. Pratt by many analogies and comparisons finds the ratio to be $3\frac{1}{5}$, or 3.2.

"QUADRATOR." The Square of the Circle, and the True Ratio of the Diameter to the Circumference.

This is a communication to a newspaper. He says that sexagenary arithmetic is in harmony with revolution, rotation, cycles: and circles. He adds the two extremes of the circle and then takes the geometrical mean, thus: $\sqrt{360 + 1} = 19$. Then this divided by the hexagonal number, 6, because perfect, gives the ratio, $3.166666\frac{2}{3}$, and the area, $.791666\frac{2}{3}$.

ROLLWYN, J. A. S. *Elementary Difficulties in Geometry: The Duplication of the Cube; The Trisection of an Angle; The Quadrature of the Circle.* Chapter XXXIII, of "Astronomy Simplified, for general reading with numerous New Explanations and Discoveries." London, 1871. 8vo. pp. 10.

"The area of a circle is equal to three-fourths of the square of its diameter, or three-fourths of the area of the circumscribed square; and that concurrently, twice the area of the circle is equal to three times the area of the inscribed square."

Rule—Multiply the diameter of the circle by itself and deduct one-fourth of the product; the remaining quantity is the area of the circle.

Mr. Rollwyn's area is the same as that of Prof. L. S. Benson—that it is the arithmetical square between the inscribed and circumscribed squares.

ROSSI, GAETANO, of Catanzaro. *Soluzione Esatta, e Regolare del Difficilissimo Problema della Quadratura del Circolo; Produzione Sintetica, ed Analitica. Hæc qui spernit, id esi Semitas Sapientia, ei denuncio non recte philosophandum.*—BOETIUS. Seconda edizione. Londra, 1805. 8vo. pamphlet, pp. 108. 8 diagrams; portrait.

The author's demonstrations result in the ratio, $3\frac{1}{2}$, and area, 80.

SCHOLFIELD, NATHAN. *On the Rectification and Quadrature of the Circle.* Part Fourth of a Series on Elementary and Higher Geometry, Trigonometry, and Mensuration; containing many valuable Discoveries and Improvements in Mathematical Science, especially in relation to the Quadrature of the Circle, and some other Curves. 8vo. pp. 108-139. New York, 1845.

Mr. Scholfield's treatise is a learned and searching analysis on the subject of curves, segments, spirals, cycloids, revoloids, etc. He substantiates the orthodox ratio, $3.141592653589793238462643+$.

SKINNER, J. RALSTON. *A Criticism on the Legendre Mode of the Rectification of the Curve of the Circle.* 8vo. pamphlet, pp. 22. Cincinnati, 1881.

The author says the orthodox value of π obtained by the Legendre method from the sides of the interior polygons is *numerical*, and not *geometrical*. The circumference of a circle is a *curve* which finally re-enters on itself and forms the boundary of the circle. The numerical values of the polygons are not indicative of the circle penned up between them. Mr. Skinner's demonstrations substantiate the ratio as found by John A. Parker, namely, $\frac{20812}{8881}$, or $3.1415942+$.

SHANKS, WILLIAM. Contributions to Mathematics, comprising chiefly the Rectification of the Circle to 607 Places of Decimals. Royal 8vo. pp. 95. London, 1853.

Mr. Shanks here publishes the value of π to 607 decimal places. He gives the value of e (Naperian base) to 137 decimal places, the value of M (Modulus) to 137 decimal places, and the powers of 2 as far as 2^{791} . He was assisted by Dr. William Rutherford in the verification of the first 441 decimals of π . Since the publication of this work, Mr. Shanks has found errors in the last 14 places of the 607 decimals, as printed in this book, corrected the errors, and then extended the decimals to 707 places, and they are printed by the Royal Society of London, in their Proceedings, Vol. XXI, 1873, as follows:

$\pi=3.141592\ 653589\ 793238\ 462643\ 383279\ 502884\ 197169\ 399375$
 $105820\ 974944\ 592307\ 816406\ 286208\ 998628\ 034825\ 342117$
 $067982\ 148086\ 513282\ 306647\ 093844\ 609550\ 582231\ 725359$
 $408128\ 481117\ 450284\ 102701\ 938521\ 105559\ 644622\ 948954$
 $930381\ 964428\ 810975\ 665933\ 446128\ 475648\ 233786\ 783165$
 $271201\ 909145\ 648566\ 923460\ 348610\ 454326\ 648213\ 393607$
 $260249\ 141273\ 724587\ 006606\ 315588\ 174881\ 520920\ 962829$
 $254091\ 715364\ 367892\ 590360\ 011330\ 530548\ 820466\ 521384$
 $146951\ 941511\ 609433\ 057270\ 365759\ 591953\ 092186\ 117381$
 $932611\ 793105\ 118548\ 074462\ 379834\ 749567\ 351885\ 752724$
 $891227\ 938183\ 011949\ 129833\ 673362\ 441936\ 643086\ 021395$
 $016092\ 448077\ 230943\ 628553\ 096620\ 275569\ 397986\ 950222$
 $474996\ 206074\ 970304\ 123668\ 861995\ 110089\ 202383\ 770213$
 $141694\ 119029\ 885825\ 446816\ 397999\ 046597\ 000817\ 002963$
 $123773\ 813420\ 841307\ 914511\ 839805\ 70985\pm$

- SMITH, JAMES. Relations of a Circle inscribed in a Square. pp. 6
 Commensurable Relations between a Circle and other
 Geometrical Figures. 1860. pp. 32
 Quadrature of the Circle; Correspondence with an "Eminent Mathematician." 1864. pp. 188
 Nut to Crack for the Readers of De Morgan's "Budget of Paradoxes." 1863. pp. 72
 True Ratio between Diameter and Circumference, Geometrically and Mathematically Demonstrated. 1865. pp. 102
 British Association in Jeopardy and Prof. De Morgan in the Pillory without hope of escape. 1866. pp. 96
 Quadrature and Rectification of the Circle. 1867. pp. 74
 Euclid at Fault, in Theorem, Proposition 8, Book VI; and Theorems, Propositions 12 and 13, Book II. 1868. pp. 12

- SMITH, JAMES. Geometry of the Circle and Mathematics as applied by Geometers and Mathematicians, shown to be a Mockery, Delusion, and a Snare. 1869. pp. 416
 Curiosities of Mathematics, Instruction of Mathematicians. pp. 98
 The Ratio between Diameter and Circumference Demonstrated by Angles, and Euclid's Theorem, Proposition 23, Book I, Proved to be Fallacious. 1870. pp. 524
 Cyclometry and Circle-Squaring in a Nutshell. 1871. pp. 44
 Why is Euclid Unsuitable as a Text-book of Geometry ? Theorems, Propositions of Euclid, 8 and 13, Book VI, Proved to be Erroneous, by Heterodox Geometers. 1871. pp. 56
 Quadrature and Geometry of the Circle Demonstrated. Portrait. London and Liverpool, 1872. pp. 268

These works are profusely illustrated with plates, diagrams, extracts, and examples. He demonstrates the ratio to be $3\frac{1}{8}$, or 3.125. He credits Joseph Lacomme with finding this ratio, in 1886, who is found in De Morgan's list. Mr. Smith's works totalize 1988 pages on this subject.

SMITH, SEBA. New Elements of Geometry. Three Parts. I. The Philosophy of Geometry. II. The Demonstrations in Geometry. III. The Harmonies of Geometry. 8vo. pp. 200. New York, 1850. London edition, pp. 200, 1850.

Mr. Smith examined John A. Parker's manuscript quadrature, became convinced of the truth of it, and published his own Geometry the year previous to the publication of Mr. Parker's "Quadrature of the Circle."

SMOOTH, EPHRAIM. Measuring of Circles; the Proportion which the Diameter bears to the Circumference—*Register of Arts and Sciences*, July 8, 1826. London.

Mr. Smooth illustrates both his and Archimedes' ratio by examples, and claims that the ratio is $3\frac{1}{8}$.

SOMERSET, (Duke of). A Treatise in which the Elementary Properties of the Ellipse are deduced from the Propertise of the Circle, and geometrically considered. Illustrated. 8vo. London. 1843.

STACY, JOSEPH. Squaring the Circle.—*Boston Herald*, April 4, 1874.

Mr. Stacy says he "has no more difficulty in obtaining the ratio than in obtaining the diagonal of a square. The circumference of a circle, as near as can be expressed in so many figures, is 3.152955+; the error is less than 1 in 75,000,000; or it makes a difference of 91 miles in the circumference, or 29 miles in the diameter of the earth."

STEELE, JAMES. Exact Numerical Quadrature of the Circle effected regardless of the Circumference, and the Commensurability of the Diagonal and Side of the Square. 8vo. pp. 75. London, 1881.

The author finds the exact area of a circle in the nonary scale, but just how he does not explain: "The circle is equal to 9 square units nonarily expressed as 10. When the circumscribed square is = 2, the circle is 1.570796+." We do not comprehend this statement.

TAGEN, JOANNEM Nep. Quadratura circuli tandem inventa, et mathematicè demonstrata; cum II tabulis. Folded diagrams. 8vo. pp. 75. Cassoviæ, 1832. [His methods are very complex.]

TERRY, CONSTANT. A Problem for the World; the Circle Squared. Eagle Pass, Texas, January 20, 1871. Published in *The Investigator*, Boston, Mass., February 22, 1871.

"I demand the solution of a circle whose area, diameter, and circumference are each perfect squares."

1. Circumference 1, diameter=.316912650057057350374175801344.
2. Circumference 1, area=.79228162514264337593543950386.
3. Diameter 1, circumference=3.1554436208840472216469142611-3114491869282574043609201908111572265625.
4. Area 100, diameter=11.25899906842624.
5. Area 100, circum.=35.52713678800500929355621837890625.
6. Area 100= $\frac{1}{2}$ circumference $\times\frac{1}{2}$ diameter.
7. Multiply area, when circumference is 1, by area, when diameter is 1, and the product is .0625.
8. Multiply diameter, when circumference is 1, by the circumference, when diameter is 1, and the product is 1.
9. Multiply square of diameter by square of circumference, when area is 100, and the product is 160,000.

Square root of (1) is .562949953421312.

Square root of (2) is .281474976710656.

Square root of (3) is 1.7763568394002504646778106689453125.

Square root of (4) is 3.3554432.

Square root of (5) is 5.9604644785390625.

THOMPSON, G. H. The Discovery of the Quadrature; announced to the world by the Divine Assistance.—In *Coram's Champion*, 1826.

Mr. Thompson's quadrature was the forerunner of that developed by Augustus Young nineteen years later in his first edition of "Ration-

al Analysis," 1845. The prime formula upon which it was based is

$$\frac{1}{1} \frac{1}{2} \frac{3}{1} \frac{1}{2} \frac{1}{1} \frac{1}{3} \frac{2}{1} \frac{6}{4} \frac{1}{1}$$

We do not comprehend this formula as published in *Scientific Tracts and Family Lyceum*, Vol. I, p. 157, by Augustus Young, the champion of Mr. Thompson.

THORNTON, EDWARD. *The Circle Squared*. 8vo. London, 1868.

Mr. Thornton's quadrature agrees precisely with Lawrence S. Benson's, in making the circle-area, $3R^2$, or .75.

UPTON, WILLIAM, B. A. *The Circle Squared*. Three famous Problems of Antiquity, Geometrically Solved. The Quadrature of the Circle; Diameter definitely expressed in terms of the Circumference; Circumference equalized by a Right Line. The whole rendered intelligible for arithmeticians as well as for geometers; adapted for the higher classes in schools of both sexes, private students, collegians, &c. "*Mutans quadrata rotundis*."—HORACE. 8vo. pamphlet, pp. 24. Supplement: *The Circle Squared*; First—Arithmetical Summary; Second—Geometrical Confirmation. "*Finis coronat opus*." Plates. pp. 8. London, 1872.

The author demonstrates the orthodox ratio, 3.14159265+, by several methods not found in our text-books.

VANDERWEYDE, PHILIP H., M. D. *The Philosopher's Stone: Four Essays, containing the Answer of Positive Science to the Question, What is known at present, about the Quadrature of the Circle?* 8vo. pamphlet, pp. 40. New York, 1861.

Dr. Vanderweyde, for many years editor of *The Manufacturer and Builder*, has given in this essay an epitomized account of what the subject is, and then endeavors to answer it. The rectification of the circle is answered by several methods of demonstration, resulting in the ratio 3.1415926535+.

WEATHERBY, J. G. To find a Straight Line equal to the Semi-circumference of the Circle.—*Barnes' Teacher's Monthly*, Vol. I, p. 384, July, 1875.

Mr. Weatherby's geometrical construction and equation makes the semi-circumference of a circle of diameter 60, to be 94.6 (nearly). Hence, the ratio, 3.15833½ (nearly).

YOUNG, AUGUSTUS. Unity of Purpose or Rational Analysis; being an Exposition of the Quadrature of the Circle, and the Law of Gravity.

"These are not, perhaps, very attractive speculations; they disturb old and favorite associations; they serve to reduce many cherished traditions, much painfully acquired knowledge, to obsolete lore; but these things are so, and we must accustom ourselves to regard them and their consequences without shrinking." Second edition. 8vo. pamphlet, pp. 36. Burlington, Vt., 1853. [First edition was published in Boston, Mass., 1846. 8vo. cloth, pp. 292].

He says his "purpose is to prove to the satisfaction of the world, that the circumference of the circle, whose diameter is unity or 1, is the third or cube root of 32, and hence that the area is the cube root of .5." He finds the ratio, 3.1748020+, and the area, .7937005+.

ZIELINSKI, AUGUST. Quadrature of the Circle. Augusta, Ga.—Published in *The Analyst*, Vol. II, No. 4, pp. 77-78, July, 1875.

Prof. Zielinski's quadrature is a mechanical one; he says "by means of a single cycloid we can transform any circle into a square."

ADDITIONAL TITLES.

ANDREWS, J. B. The Squared Circle; or the True Area of the Circle Ascertained and Demonstrated. 8vo. Belfast, 1884.

"CANTAB, A." A Hole in Smith's Circle. 8vo. pp. 15. London, 1859.

GLAISHER, J. W. L. An Approximate Numerical Theorem Involving e (Napierian Base) and π (the Ratio). 8vo. pp. 4. London, 1877.

GLAISHER, J. W. L. Numerical Values of the First Twelve Powers of π , and their Reciprocals, and of certain other related quantities. 8vo. pp. 6. London, 1877.

Five tables are given. I. $\pi, \pi^2, \pi^3, \dots, \pi^{12}$, to twenty-two or more decimal places. II. $\pi^{-1}, \pi^{-2}, \pi^{-3}, \dots, \pi^{-12}$ to twenty-two or more decimal places.

LINDEMANN, M. F. Sur le Rapport de la Circonférence au Diamètre, et sur les logarithmes népériens des nombres commensurables ou des irrationnelles algébriques. (10 Juillet, 1882). 4to. pp. 4.

He says, "the number π , or ratio of circumference to diameter, is a transcendent number."

O'BYRNE, JOHN. An Essay on the Quadrature of the Circle. 8vo. Norfolk, Va.

A two-column review of John A. Parker's work on the "Quadrature of the Circle" appeared in the *Independent Democrat*, Concord, N. H., May 6, 1852, written by W. L. B., of Charlottesville, Va.

Comparison of Ratios, or Values of π .

Names.	Ratio.	Names.	Ratio.
ANONYMOUS		Parker,	
Benson,		Skinner,	
Carter,		Smith, Seba,	$\left. \begin{array}{l} 3.1415942+ \end{array} \right\}$
Davies,		Baddely,	$3.202216+$
Ferrel,		Bennett,	$3.230769\frac{3}{8}$
Fleming,		Brower,	$3.152075+$
Fisher,		Bouché,	$3.17124864+$
Glaisher,		B., G. W.,	$3.1547+$
Hart,		Cart,	$3.1339786+$
Herschel,		DeMedici,	$3.1418685\frac{85}{188}$
Hill,	$\left. \begin{array}{l} 3.141592653589+ \end{array} \right\}$	Drach,	$3.14159265+$
Jackman,		Faber,	$3.160493827\frac{7}{81}$
Morton,		FUTURUS,	$3.123809\frac{1}{11}$
Pierce,		Gee,	$3.14159269777454\frac{1}{2}$
Playfair,		Gidney,	$3.15135+$
Rollwyn,		Goodsell,	$3.1426968+$
Scholfield,		Chase,	
Shanks,		Gray,	$\left. \begin{array}{l} 3.1415+ \end{array} \right\}$
Upton,		Grosvenor,	
Vanderweyde,		Houlston,	$\left. \begin{array}{l} 3.14213562373+ \end{array} \right\}$
Adorno,		Harbord,	$\left\{ \begin{array}{l} 3.1415926535893- \\ 8193239974916 \end{array} \right\}$
Carrick,		Harris,	$3.142696+$
Crabb,	$\left. \begin{array}{l} 3.142857\frac{1}{2} \end{array} \right\}$	Hornish,	3.15625
Dingle,		Hobbes,	$3.1622777+$
Gould, L.D.,		May,	3.24
Myers,		Stacy,	$3.152965+$
Angherà,			$\left\{ \begin{array}{l} 3.15544362088404- \\ 72216469142611- \\ 31149186928257- \\ 40436092019081- \\ 11572265625 \end{array} \right\}$
DURHAM,		Terry,	
Pratt,	$\left. \begin{array}{l} 3.2 \end{array} \right\}$	Thompson,	$3.174802+$
Rossi,		Weatherby,	$3.15333\frac{1}{2}$ (nearly).
Smooth,		Young,	$3.174802+$
Davis,		Benson,	
QUADRATOR	$\left. \begin{array}{l} 3.166666\frac{2}{3} \end{array} \right\}$	Rollwyn,	
FINALITY,		Thornton,	$\left. \begin{array}{l} \text{Area, } 3R^2=.75 \end{array} \right\}$
Dircks,			
Merceron,	$\left. \begin{array}{l} 3.125 \end{array} \right\}$		
Smith, Jas.,			

Andrews,	} Ratios not stated.	Dircks,	Supports James Smith.
Boyai,		Skinner,	} " J. A. Parker.
Claryvance,		Smith, Seba,	
Craige,		Bennett,	} The only 5 mentioned by James Smith.
Hudson,		Benson,	
Jackson,		Harbord,	
Murdock,		Lacomme,	
O'Byrne,		Thornton,	
Steele,		Baddely,	} Mechanical quadratures
Tagen,		Bennett,	
Thornton,		Zielinski,	
Zielinski,			
ANONYMOUS,	} Noms de plume.	Angherá,	} The only 7 mentioned by A. De Morgan.
DURHAM,		Drach,	
FINALITY,		Hobbes,	
FUTURUS,		Houlston,	
QUADRATOR,		Rossi,	
Baddely,	} $\pi = \text{a square.}$	Shanks,	
Faber,		Smith, Jas.	
Harbord,		Hobbes,	} $\pi = \sqrt{10}$
May,		Young,	
Terry,			} $\pi = \sqrt[3]{32}$

Augustus De Morgan's Cyclometers.

(From the "Budget of Paradoxes.")

The ratios of these are not stated by De Morgan.				B. P.	
Name.	Year.	Page.	Name.	Year.	Page.
Beaugrand,	1826	73	JESUIT, So. America,	1844	9
Brauardini, Thomas,	1511	136	Larriva, D. J.,	1856	459
CIVIL ENGINEER,		458	Lausbergii, Philippi	1616	46
Cusa, Nicholas,	1464	33	Macalcarne,	1825	71
De Causans,	1753	179	Philo, of Gadara,		30
De Messange, Mal.,	1686	471	Porta, John Baptiste,	1610	45
De Molina, Cano,		179	Pujos, M.,	1619	179
De Vausenville,	1778	9	Recalcatti, Prof.,		458
Dunbar, John,	1619	179	Scaliger, Joseph,	1694	67
Cluvier, Dethleu,	1695	470	Snellii, Willibrordi,	1621	48
Ericius, Nicholas,	1755	97	Sullamar, Henry,	1750	179
Finæus, Orontius,	1544	35	Thompson, T. Perronet,	1856	303
Grange, Armand,		316	Valentinus, Jacobus F.,	1589	36
Gregorio, P.,	1647	71	White, Richard,	1648	9
Gregory, James,	1668	71	Yvon, Paul,		179

Augustus De Morgan's Cyclometers.

Name.	Year.	Ratio.	Page.
Angherà, Domenico,	1854	3.2	289
Peters, William,	1848	3.2	255
Rossi, Gaetano,	1804	3.2	137
Baxter, Thomas,	1732	3.0625	87
Parsey, Arthur,	1832	3.0625	176
Lacomme, Joseph,	1836	3.125	32
Smith, James,	1859	3.125	216
Dean, William,	1863	3.140625	458
JOINER,	1863	3.140625	389
Beaulieu,	1676	3.1622776+	72
Bovillus, Charles,	1503	3.1622776+	31
De Beaulieu, Sieur,	1676	3.1622776+	71
Hobbes, Thomas,	1666	3.1622776+	66
Cataldi, Di Peter A., } {	1612	3.14159265358979323846+	46
Gruenberger,	1612	3.14159265358979323846+	
Antiphon,		3.1412+	288
Borello, Pellegrino,		3.142561983 ⁵⁷ ₁₂₁	46
Bryson,		3.75	288
Campanus,	1503	3.1428574	31
De Fauré,	1747	3.160493827 ¹⁴ ₁₁	89
Dennison, Joseph,	1844	3.177777 ⁷ ₅	213
De Serres, Olivier,		3.162	288
Drach, Solomon,	1863	3.14159265+	460
Duchesne, Simon,	1558	3.14466+	35
FRIEND, (De Morgan's)		$\left\{ \begin{array}{l} 3\frac{1}{8} + \frac{8}{8} \cos (A-a) \\ (A, \text{ sun's long. ; } a, \text{ moon's long.}) \end{array} \right\}$	460
Hailes, John Davey,	1860	3.1424076+	339
Houlston, William,	1862	3.14218562878+	354
Johnson, Henry C.,	1843	3.048619 ¹ ₂₁	215
Locke, Richard,	1730	3.18897+	87
Longomontanus,	1644	3.14185+	65
McCook,	1841	3.1201937+	214
Metius, Peter, }	1640	3.1416017699+	62
Metius, Adrain, }			
Phillips, Richard,	1793	3.461016+	145
Smith, Ambrose,	1855	3.1553+	170
Hindu, <i>Viga Ganita</i> ,		3.1416+	
SPECULATOR,	1842	3.1416+	212
Ptolemy,	3.141552+	[Eng. Cyc. Art. "Quadrature."]	
Purbach,	3.141667+		

Marcelis, Jacob, $\frac{1008449087377541679894282184894}{6997188687540819440035189278702}$ 77
 Van Ceulen, Lud., $3.141592653589793238462643383279502884+$ 46

De Morgan was the author of the article on "Quadratures," in the Knight's "English Cyclopædia. He also mentions in his "Budget of Paradoxes," the works of Lipenius, Montucla, and Murhard, who have each written a work on the history of cyclometry.

He also mentions William Rutherford's extended calculations on the value of π , (p. 374). William Shanks is credited with carrying the value of π to 607 decimal places (p. 291). Since then Mr. Shanks has extended the decimal to 707 places.

De Morgan gives as an appendix to his "Budget," (pp. 495-500,) Lambert's method of demonstration that no two arithmetical numbers can express the ratio of diameter to circumference. This paper is also given in Brewster's translation of Legendre's Geometry.

There are many methods entirely independent of the circle, which produce the orthodox value of π . De Morgan gives the following series to infinity:

$$4(1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{6} + \frac{1}{8} - \frac{1}{10} + \frac{1}{12} - \frac{1}{14} + \frac{1}{16} - \frac{1}{18} + \dots) = 3.14159265358979323846 +$$

The orthodox value of π is usually demonstrated by the method of exhaustions, that is, inscribed and circumscribed polygons. This process has been rigidly criticized by some learned mathematicians. The Legendre Method has been thoroughly examined by J. Ralston Skinner in "The Crown Jewels of the Nations and their Measures," 1877.

The work, "Sources of Measures," by J. Ralston Skinner, Cincinnati, Ohio, 1876, pp. 324, is based on John A. Parker's value of π ($\frac{1008449087377541679894282184894}{6997188687540819440035189278702}$); also, the work "New Elements of Geometry," by Seba Smith, New York, 1850, pp. 200.

The arithmetical harmonies existing among the geometrical forms of triangles, squares, circles, polygons, solids, etc., were made the subject of a paper by the writer, entitled "Squares and Cubes," and read before the Scientific Chapter of the Athens Club of Manchester, N. H., February 12, 1877, especially discussing the "New Law in Geometry," as developed by Theodore Faber of Brooklyn, N. Y., and published in 1865. The paper will be revised and probably published in the near future, making a monograph of about 24 pages.

Integral Proportions Proposed for the Value of π .

Name.	Proportion.	A Value of π .
Adorno, Juan N.,	7 : 22 :: 1 :	3.142357 $\frac{7}{8}$
Baddely, William,	361 : 1156 :: 1 :	3.202216 $\frac{24}{881}$
Baxter, Thomas,	16 : 49 :: 1 :	3.0625
Bennett, John,	26 : 84 :: 1 :	3.230769 $\frac{3}{18}$
Borello, Pelligrino,	484 : 1521 :: 1 :	3.142561983 $\frac{57}{1311}$
Bryson,	4 : 15 :: 1 :	3.75
Cart, Francis G.,	1560 : 4889 :: 1 :	3.133974 $\frac{14}{83}$
Davis, John,	6 : 19 :: 1 :	3.16666666 $\frac{2}{3}$
Dean, William,	64 : 201 :: 1 :	3.140625
DeMedici, Charles,	289 : 908 :: 1 :	3.1418685 $\frac{85}{288}$
De Serres, Oliver,	500 : 1581 :: 1 :	3.162
Dennison, Joseph,	90 : 286 :: 1 :	3.1777777 $\frac{7}{4}$
Faber, Theodore,	81 : 256 :: 1 :	3.160493827 $\frac{13}{81}$
FUTURUS,	210 : 656 :: 1 :	3.123809 $\frac{11}{11}$
Goodsell, S. C.,	1 : $\sqrt{(\frac{900}{81})}$:: 1 :	3.1426968+
Grosvenor, C. P., 1 :	$\sqrt{(200)}-11$:: 1 :	3.1421356+
Hindu,	1250 : 3927 :: 1 :	3.1416
Hobbes, Thomas,	1 : $\sqrt{10}$:: 1 :	3.162776+
Hornish, J. K.,	32 : 101 :: 1 :	3.15625
Johnson, Henry C.,	21 : 64 :: 1 :	3.048619 $\frac{1}{41}$
Leistner,	1225 : 3844 :: 1 :	3.13795919 $\frac{14}{11}$
Longomontanus,	43 : $\sqrt{(18252)}$:: 1 :	3.14185+
May, John,	25 : 81 :: 1 :	3.24
McCook, 1 :	$2+2[\sqrt{(128)}-11]$:: 1 :	3.1201937+
Metius, Peter,	113 : 355 :: 1 :	3.14159292 $\frac{1}{111}$
Parker, John A.,	6561 : 20612 :: 1 :	3.14159424 $\frac{11}{111}$
Phillips, Richard,	1 : $\sqrt{12}$:: 1 :	3.461016+
Rossi, Gaetano,	5 : 16 :: 1 :	3.2
Smith, James,	8 : 25 :: 1 :	3.125
Young, Augustus,	1 : $\sqrt[3]{32}$:: 1 :	3.1748020+
William Harbord makes the ratio to be a perfect square number, or		
1 :	$\sqrt{1.7724598509054^2}$:: 1 :	π
Constant Terry makes the ratio to be a perfect square number, or		
1 :	$1.7763568394002504646778106689453125^2$:: 1 :	π

Theodore Faber makes his area, diameter, and circumference all to be perfect square numbers. His ratio is both a square and a biquadrate: $1\frac{1}{2}$, or $(\frac{3}{2})^2 = \frac{9}{4}$; and $1\frac{7}{8}$, or $(\frac{15}{8})^2 = \frac{225}{64}$, or $3.16049382671\frac{1}{8}$, or

$$1 : (1.777777777\frac{7}{8})^2 :: 1 : \pi$$

$$\text{Diameter} = (1)^2. \quad \text{Circumference} = (\frac{15}{8})^2. \quad \text{Area} = (\frac{3}{2})^2.$$

$$\text{Circumscribed square} = (1)^2. \quad \text{Inscribed square} = (.5\frac{1}{4})^2 = \frac{1}{16}.$$

The recurring decimal of Mr. Faber's ratio contains the digits, excepting the digit 5; while his area contains them, excepting the 8.

Thomas P. Stowell has produced from the digits in the form of a common fraction a value of π , now generally in use, as follows:

$$\frac{37888}{21480} = 3.1416.$$

John Bounoulli says that the sum of the following series of fractions, which has unity for numerators and the squares of the natural numbers for denominators, is finite, and equal to the square of the circumference of the circle divided by 6; or the orthodox value of π :

$$1 + \frac{1}{4} + \frac{1}{9} + \frac{1}{16} + \frac{1}{25} + \frac{1}{36} + \frac{1}{49} + \frac{1}{64} + \frac{1}{81}, \&c. = \frac{3.14159265358979823 +}{6}$$

Wallis, in his *Arithmetic of Infinites*, 1655, gives the following;

$$4 \times \frac{2.4.4.6.6.8.8.10.10.12.12, \&c.}{3.5.5.7.7.9.9.11.11.13.13, \&c.} = 3.141592653589794632384626 +$$

The Integral Calculus gives the following simple expression in terms of a definite integral:

$$\frac{\pi}{2} = \int_{-\infty}^{\infty} \frac{dx}{1+x^2} = 1.5707963267948976619281326691 +$$

Prof. Benjamin Peirce, in his work, "Linear Associative Algebra," Washington, D. C., 1870, adopted a new symbol for the root of the imaginary quantity $\sqrt{(-1)}$, and produces a result which he terms "the mysterious formula," as follows:

$$j = \sqrt{(-1)} \quad \epsilon = 2.7182818285 +. \quad \pi = 3.1415926535 +$$

$$j j = \sqrt{\epsilon}^{\pi} = 4.810477381 +.$$

The Solar Equation.

In astronomical works the Greek letter π , the initial of the word *parallaxis*, is also used to represent the solar equation :

$$\pi = 8''.86226925 +$$

The parrallactic equation here given is called "the Latimer Solar Equation," from the late Charles Latimer, Cleveland, Ohio, who produces it from the orthodox value of π (the ratio), as follows :

$$\text{Parallactic } \pi = 5\sqrt{\text{Peripheric } \pi}.$$

$$8''.86226925 + = 5\sqrt{3.14159265358 +}$$

This value, it will be observed, is ten times the side of a square equal to the area of a circle of diameter one :

$$8''.86226925 + = 10\sqrt{.785398163397448309 +}$$

The different calculations of the sun's parallax in modern times as found in works on astronomy, are as follows ;

1858	Leverrier,	.	.	8''.95	8''.85	8''.86 +
1862	Foucault,	.	.	.	.	8''.86 +
1862	Hall,	.	.	.	.	8''.84 +
1863	Stone,	.	.	.	.	8''.94 +
1863	Hansen,	.	.	.	8''.97	8''.91 +
1863	Winnecke,	.	.	.	.	8''.96 +
1864	Powalky,	.	.	.	.	8''.86 +
1867	Stone,	.	.	8''.91	8''.85	8''.916 +
1867	Newcomb,	.	.	.	.	8''.848 +
1868	Stone,	.	.	.	.	8''.91 +
1868	Faye,	.	.	.	8''.70	8''.90 +
1871	Powalky,	.	.	.	.	8''.7869 +
1872	Leverrier,	.	.	.	.	8''.86 +
1874	Cornu,	.	.	.	.	8''.794 +
1875	Galle,	.	.	.	.	8''.873 +
1875	Puiseux,	.	.	.	.	8''.879 +
1877	Gill,	.	.	.	8''.765	8''.815 +
1877	Airy,	.	.	.	.	8''.754 +
1878	Stone,	.	.	.	8''.86	8''.979 +
1878	Tupham,	.	.	.	8''.857	8''.754 +

This table gives the results of 29 calculations. The sum of all is $257''.0109 +$, which divided by 29, gives a mean value for the "solar equation," $8''.862 +$; thus far it coincides with the Latimer value.

John Taylor, in "The Great Pyramid, Why was it Built?" 1859, says the Pyramid was built for a π -Pyramid. He finds its vertical height is to twice the breadth of its base as diameter to circumference, 486.2567 : 763.81 $\times$ 2 : : 1 : 3.1415926535+

St. John V. Day, author of "Purpose and Primal Condition of the Great Pyramid of Jeezeh," 1868, computes the area of the Pyramid's right section to the area of the base as 1 to 3.14159265358979+, and adds that it is indeed most singular that the mathematical symbol π (ρ i) for the ratio, is the first letter of the two Greek words *periphreia* and *pyramis*, and intimates that the symbol was probably derived from the latter word because that ratio enters into its several proportions.

Samuel Beswick, in his monograph on "The Sacred Cubit of the Great Pyramid and Solomon's Temple," 1878, says the builders took the circular measure, 3.14159265358979+, and called it a square, and took one side of this square for the first element in the scale of length.

$\sqrt{3.1415926535897932}+ = 1.77245385+$ geometrical units.

That the common cubit was ten times these units, or 17.7245385+ geometrical inches; that the royal cubit was 20.6786286+ geometrical inches; that the geometrical inch is = 1.00118+ British inches.

The varied length of some of the cubit-rods is best seen for comparison, as follows :

	Inches.	Feet.
Beswick, Pyramid cubit,	20.7030+	1.7275+
Elephantine,	20.625	1.71875
Harris, from Thebes,	20.650	1.72083 $\frac{1}{2}$
Jomard, in Turin Museum,	20.5786+	1.7148+
Jomard, another,	20.6584+	1.7215+
Memphis,	20.4729+	1.706+
Sir Isaac Newton,	20.628	1.719
Nileometer scale,	20.7484+	1.729+
Perring, from Pyramids,	20.6280+	1.7190+
Seyffarth,	20.6111+	1.7175+
Wilkinson, in Turin Museum,	20.5730+	1.7144+

Mr. Beswick says the above approximations of the cubit-rods show they were all intended to represent the same measure, and that their makers had but one standard for a guide.

An interesting illustrated paper on Solomon's Temple by Mr. Beswick will be found in *Scribner's Monthly*, December, 1875, pp. 257-272.

MISCELLANEOUS

NOTES AND QUERIES,

WITH ANSWERS.

"All things are double, one against another."—JESUS, IN ECCL. XLII, 24.

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AUGUST, 1888.

No. 8.

Some Atmospheric Phenomena.

BY PROF. N. B. WEBSTER, Vineland, N. J.

Aristotle attempted to weigh air by weighing a bag when empty, and again when inflated, and because there was no difference in weight under the two conditions he supposed that air had no weight. It is now a frequent school-room experiment to show that a glass or metal flask of ten cubic inches capacity weighs fully three grains more when filled with air than when the air has been drawn from it with an air-pump. The weight of the whole terrestrial atmosphere is about that of a solid copper globe sixty-two miles in diameter.

The air in a room 60 feet long, 30 feet wide, and 15 feet high, weighs one ton, or two pounds to the cubic yard.

The weight of the atmosphere must be limited to where gravity will overcome the centrifugal force, and the repulsive force of the ærial molecules. Biot proved that the minimum height of the air must exceed 30 miles, and the maximum height must be less than 21,000 miles. If the air was of equal density throughout, its height would be 27,818 feet, or about 1,200 feet below the summit of Mount Everest in Asia. From this height a falling body would attain a velocity of 1,338 feet a second, which is the velocity with which air rushes into a void space. For this reason a cannon ball fired with greater initial velocity than 1,338 feet a second will leave a vacuum behind it till it is rapidly reduced to a less velocity.

One effect of the atmosphere is to lengthen the day by causing eve-

ning and morning twilight. If its height was unlimited the two twilights would blend at midnight, and we should have practically no night.

Without the atmosphere stars would be visible in the day-time from the earth, as they must be from the airless moon.

The atmosphere is indispensable to all ordinary sounds. In condensed air sounds are very loud, and in rarefied air sounds are very feeble. It is true that men, miles above the earth in balloons, hear noises made at the surface with great distinctness, but persons at the surface cannot hear any sounds from such high balloons. The loudness of sounds depends on the density of the air where they originate, and not where they are heard.

There is one reason why people "hard of hearing" can sometimes hear a sermon, or a play from a gallery, better than in the auditorium below. A few years ago the lower plane in the theaters was, too often, appropriately named the "pit." In the upper part of the room the air is usually lighter than below, and the velocity of sound waves is greater in lighter gases. Hence, sounds are a means of detecting the accumulation of fire-damp in mines, in time to take precaution to prevent explosions in mines. Loudness must not be confounded with velocity. Heavy liquids, unlike heavy gases, transmit sounds faster than those less dense.

Tyndall says that a gun fired from Chamouni is audible on the summit of Mount Blanc, but a gun fired on Mount Blanc cannot be heard at Chamouni.

Experiments have shown that a person speaking in the open air can be heard about equally well at a distance of 100 feet in front, 75 feet on each side, and 30 feet behind.

Cannon discharge can be heard further than thunder. Thus Campbell wrote truly, as well as poetically, in his "Battle of Hohenlinden,"

"And louder than the bolts of heaven
Far flashed the red artillery."

If an elephant were as altisonant, or far-sounding, as a nightingale in proportion to his bulk, his trumpeting could be heard around the world. On like conditions an ox lowing in Australia would be heard in New York about 15 hours after the Australians heard him.

In laying the foundations of the piers of St. Louis bridge over the Mississippi, by means of diving bells, so deep that the pressure was four atmospheres or 60 pounds to the inch, the ticking of a watch was painfully loud, but the occupant found it impossible to whistle.

It has been a question whether 1,000 men shouting at once could be heard farther than the loudest man among them; whether the good and earnest Wesley, who wished "for a thousand tongues to sing," could have been heard farther with them than with his monoglossol limitation. It is pretty certain that 1,000 boys together can-

not throw snowballs farther than the strongest, or longest-armed one, among them.

A trumpet sounding in the midst of a crowd of shouting men might not be heard near by, but might be heard beyond the sound limit for the men.

At the height of six and a half miles, Glaisher found the temperature to be twelve degrees below zero Fahrenheit.

The highest inhabited spot on the globe is the Buddhist cloister of Haine of Thibet, where at an elevation 16,500 feet, the good monks, having more than half the atmosphere below them, breathe air attenuated more than one-half of what the normal breath requires.

Cats die at an elevation of 13,000 feet, even if they do have "nine lives" at the surface, but dogs can follow their masters to the greatest accessible elevations. Birds and insects are better adapted to breathe

"The difficult air of the iceed-mountain top."

Dr. Arnott says the pressure of the air on the knee-joint is from 60 to 100 pounds, and is sufficient to hold it in place without ligaments. No wonder the joints are so sensitive to barometric changes. A man weighs less when the barometer is high, although the atmospheric pressure on him is more than when the barometer is low. As the pressure of air on an ordinary-sized man is about 15 tons, the rise of the mercury of the barometer from 29 to 31 inches adds about one ton to the load he has to carry. Fortunately the elasticity of the air in cells and cavities within him, corresponds to the pressure, so that a man in health is unconscious of his increased burden.

Were it not for the atmosphere there would be on the earth no whisky, or milk, or even water to dilute either, for the chemical compound known as water when liquid, ice when solid, and steam when gaseous, would not appear in its liquid state unless some chemist should bring it about by experiment as he liquefies carbonic acid.

In the receiver, as the glass bell is called which does not receive, with a vacuum of $\frac{1}{30}$ of the ordinary atmosphere, the boiling point would be as low as the freezing point. In melting, ice would flash into steam without the intermediate condition called water, as metallic arsenic jumps at once to an invisible gas without assuming a liquid state, when not under pressure.

If the moon has no atmosphere, it, *ex officio*, has no water, even if poets do call it the "watery moon." The "Man in the Moon" can neither smoke as earth-men smoke, nor drink tea, coffee, whisky, water, nor kerosene, unless above the 212 degree test.

The French gunners in Mexico, in 1864, found that formulæ for elevations of cannon for different ranges did not apply on the tableland of 6,000 feet elevation. They had been made for the denser atmosphere of the ocean level.

If a dry well could be dug 46 miles deep, the density of the air at

the bottom would be as great as quicksilver, according to the law of Mariotte. By the same law, a cubic inch of air taken from the surface of the earth to a height of the earth's radius, about 4,000 miles, would expand sufficiently to fill a sphere of the diameter of Saturn's orbit which is nearly 2,000,000,000 miles. Such air would be "too thin" for our use.

It is said that Leadville whiskey "gets in the head" quicker after it gets into the mouth at Leadville than elsewhere. Very likely, for the people up nearly two miles above the sea-level are pretty high when they drink the whisky which evaporates rapidly or "flies to the head" and "steals away their brains" quicker than it would near the salt water. At Leadville water boils at about 160 degrees, which makes it difficult to cook potatoes or beans by boiling. Saussure found he could not boil potatoes "done" on the top of Mount Blanc, nearly a mile higher than Leadville where water boiled at 180 degrees Fahrenheit. Taking advantage of the fact that the temperature of boiling water cannot (unless under pressure) be increased by increasing the fire under it, and that it varies with the pressure on it, and also of the fact that atmospheric pressure diminishes as the height above earth's surface increases, explorers have measured the height of mountains by boiling and a thermometer. Instruments have been made to show the difference between a floor and a writing-table in altitude. In this way Lieut. Herndon, U. S. Navy, brother-in-law of Admiral Maury and father-in-law of President Arthur, measured his altitude across the Andes.—*Illustrated Christian Weekly*.

BLIZZARD. The word *blizzard* is claimed to have been first used by those who first experienced it while settling the western plains. It is said to have found its way into print in the *Northern Vindicator*, of Estherville, Iowa, and the editor attributed it to a local George Francis Train, currently known as "Lightning Ellis," because of his amazing slowness. This anecdotal theory having been printed in *The Times*, the word came eastward into wider publicity. A correspondent of the latter paper says his best recollection is that the word originated in Wisconsin, in 1848.

SPELLING REFORM IN CONGRESS. The Lth Congress has considered Mr. Voorhees's bill on "an amended orthography," which provides for a simplification of spelling. The bill provides that it shall take effect upon all the schools of the Territories and those of the District of Columbia, and upon the military and naval academies and the Indian and colored schools in the Territories. The following twelve groups comprise the changes :

First—The silent e shall be dropped when phonetically useless, as in are, granite, eaten, rained, harken, and so forth. Write er for re, as in theater, meter, saber, and so forth.

Second—Drop a from ea, having the sound of e, as in feather, leather, and so forth.

Third—Drop o from eo, having the sound of e, as in jeopardy, leopard, and so forth.

Foruth—For o having the sound of u, write u in above (abuv), dozen, (duzen), some (sum), tongue (tung), and the like.

Fifth—Drop o from ou, having the sound of u, as in journal, nourish, rough (ruf), trouble, tough (tuf), and the like.

Sixth—Drop silent u after g, before a and in native English words; drop final ue, as in guarantee, guard, guess, guest, guilt, and so forth; apologue, catalogue, and so forth; demagogue, pedagogue, and so forth; league, harangue, tongue (tung), and so forth.

Seventh—Double constants shall be simplified.

Final b, d, g, n, r, t, f, l, z, as in ebb, add, egg, inn, purr, butt, baliff, dull, buzz, and so forth.

Medial before another consonant, as battle, ripple, written (writn), and so forth.

Initial unaccented prefixes, and other unaccented syllables as in abbreviate, accuse, affair, and so forth; curvetting, traveller, and so forth.

Eighth—Change d and ed, final, to t when so pronounced, as in crossed (crost), looked (lookt), and so forth, unless the e affects the preceding sound, as in chafed, chanced.

Ninth—Change gh and ph to f when so pronounced, as in cough, philosophy, and so forth.

Tenth—Change s to z in distinctive words, as in abuse, house, verse; rise, and so forth.

Eleventh—Drop t in catch, witch, and so forth.

Twelfth—Change the spelling in the following words: Ake (ache), anker (anchor), beuty (beauty), coud (could), hole (whole), parlament (parliament), receit (receipt), rime (rhyme), sent (scent), sithe (scythe), wimen (women), yoman (yeoman); drop silent b in bomb, crumb, debt, doubt, dumb, lamb, limb, numb, plumb, subtile, succumb, thumb; change c back to s in cinder, expence, fierce, hence, once, pence, scarce, since, source, thence, tierce, whence; drop the h of ch in chamomile, choler, cholera, melancholy, school, stomach; drop h in feign, foreign, sovereign, aghast, burgh, ghost; drop gh in haughty; though (tho), through (thru); drop s in aisle, demesne, island.

Provided, That the foregoing rules shall not apply to proper names.

And provided further, That where ambiguity would result from the use of the said rules the old form may be retained.

The bill was referred to the Committee on Education.

Mesmer's Code for Animal Magnetism.

A correspondent desires Mesmer's doctrines, or claims, for animal magnetism. These are best given by the discoverer himself, in what is called "Mesmer's Twenty-Seven Aphorisms."

1. There exists a reciprocal influence between the heavenly bodies, the earth, and all living beings.

2. A fluid which is everywhere, and which is so expanded that it admits of no vacuum, of a delicacy which can be compared to nothing beside itself, and which, through its nature, is enabled to receive movement, to spread and to participate in it, is the medium of this movement.

3. This reciprocal activity is subject to the operation of mechanical laws, which until now, were quite unknown.

4. From this activity spring alternating operations, which may be compared to ebb and flow.

5. This ebb and flow is more or less general, more or less complex, according to the nature of the origin which has called them forth.

6. Through this active principle, which is far more universal than any other in nature, originates a relative activity between the heavenly bodies, the earth, and its component parts.

7. It immediately sets in movement — since it directly enters into the substance of the nerves — the properties of matter and of organized bodies, and the alternate operations of these active existences.

8. In human bodies are discovered properties which correspond with those of the magnet. Also, various opposite poles may be distinguished, which can be imparted, changed, disturbed, distributed, and strengthened.

9. The property of the animal body, which renders it susceptible to the influence of the heavenly bodies, and to the reciprocal operation of those bodies which surround it, verified by the magnet, has induced me to term this property Animal Magnetism.

10. The power and operation thus designated as Animal Magnetism can be communicated to animate and inanimate bodies; both, however, are more or less susceptible.

11. This power and operation can be increased and propagated through the instrumentality of these bodies.

12. Through experience it is observed that an efflux of matter occurs, the volatility of which enables it to penetrate all bodies without perceptibly losing any of its activity.

13. Its operation extends into the distance without the assistance of an intermediate body.

14. It can be increased and thrown back again by means of a mirror, as well as by light.

15. It can be communicated, increased, and spread by means of sound.

16. This magnetic power can be accumulated, increased, and spread.

17. I have observed that animated bodies are not equally fitted to receive this magnetic power. There are also bodies, although comparatively few, which possess such opposite qualities that their presence destroys the operation of this magnetism in other bodies.

18. This opposing power permeates equally all bodies. It can also in the same manner be communicated, accumulated, and propagated ; it streams back from the surface of mirrors, and can be spread by means of sound. This is not alone occasioned by a deprivation of power, but is caused by an opposing and positive power.

19. The natural and artificial magnet is equally, with other bodies, susceptible to animal magnetism, without, in either case, its operation upon iron or upon the needle suffering the slightest change.

20. This system will place in a clearer light the nature of fire, and of light, as well as the doctrine of attraction, of ebb and flow, of the magnet, and of electricity.

21. It will demonstrate that the magnet and artificial electricity, with regard to sicknesses, possess simple qualities possessed in common with other active forces afforded by nature ; and that if any useful operation springs from their instrumentality, we have to thank animal magnetism for it.

22. From instances deduced from my firmly established and thoroughly proved rules, it will be easily perceived that this principle can immediately cure diseases of the nerves.

23. Through its assistance the physician receives much light regarding the application of medicaments, whereby he can improve their operation, call forth more beneficial crises, and conduct them in such wise as to be master of them.

24. Through this knowledge the physician will be enabled to judge of the origin, the progress, and the nature even of the most intricate diseases. He will be enabled to prevent the increase of disease, and bring about a cure without exposing his patient to dangerous effects or painful consequences, whatever be the age, sex, or temperament of the patient.

26. Women, during pregnancy, and in childbirth, receive advantage therefrom.

27. The doctrine, will at length, place the physician in such a position that he will be able to judge the degree of health possessed by any man, and be able to protect him from any disease to which he may be exposed. The art of healing will by this means attain to its greatest height of perfection.

QUESTIONS AND ANSWERS.

THE SOUTHCOTTERS. Who were the Southcoters, and who gave the name to them? A SEEKER.

Buck's "Theological Dictionary" gives an account of the Southcoters. They are well known in the south of England, and received their name from Joanna Southcott (1750?-1814). Her prophecies were published in London, 1804. She claimed to have foretold the death of Bishop Butler, and appealed to a letter she put into the hands of a clergyman whom she named. She heard a noise one night as if a ball of iron rolled down three steps, and this she declared to mean the *sword*, *plague*, and *famine* which were soon to come. She affirmed that the extraordinary harvests of 1797 and 1800, and the war later, were foretold by herself. She says in November, 1803, she was ordered to open her Bible, which she did at Ecclesiastes 1, 9 :

"The thing that hath been, it is *that* which shall be ; and that which is done, is that which shall be done ; and *there is no new thing* under the sun."

This was the text that had much to do with her doctrine and views.

Her mission began in 1792. Her last production was dated March 10, 1814. This declaration she made in reference to herself. She says :

"I here give notice, not to receive any person who may come in the name of Joanna Southcott, unless they can prove, that they stand on the will of the late James Cousins, and can produce the probate of his will ; (he died Nov. 17, 1812). I am, likewise, ordered to print the register of my age—'Joanna, daughter of William and Hannah Southcott, baptised the 6th day of June, 1750, as appears by the registry of baptism of Ottery, St. Mary's Parish, Devon.' I was born in April, but do not know the day of the month. I was inclined to have my likeness taken in order to expose any misrepresentations when I shall be no more. I was answered — 'It was the will of the Lord that it should be done !' Mr. Sharp took my likeness and engraved it. In it I had the Bible placed before me, as opened by me promiscuously at the last two chapters of Isaiah."

Joanna died Dec. 27, 1814. It was given out that she was to be the mother of a *Second Shiloh*, as Mary had been the mother of Jesus, who was claimed to be the *First Shiloh* (Genesis XLIX, 10). On a stone over her grave is this inscription :

" While through all thy wondrous days
 Heaven and earth enraptured gaze,
 While vain sages think they know
 Secrets thou alone canst show;
 Time alone will tell what hour
 Thou'lt appear in greater power."

Her proclamation was displayed " Four Hundred and Fifty Thousand." Just how numerous her followers were, we do not know. We have received, through the courtesy of J. W. Hackwood, Wednesbury, England, a copy of one of the organs of the Southcotters, and the Proclamation, for which we return our thanks. They are entitled as follows :

"The Morning Star : the Herald of the Coming Kingdom." No. 1. London, December 1, 1864.

" Truth crushed to earth shall rise again,
 The eternal years of God are hers;
 But error, wounded, writhes with pain,
 And dies amid his worshippers."

The " Proclamation, given June 3d, 1864, to the believers in the divine mission of Joanna Southcott." " Obedience is better than sacrifice." " And as the Lord is about to pour out His Spirit upon them and fulfill all those beautiful prayers that have so long been offered up to Him to destroy the works of the Devil that is come down in great wrath, because he knoweth his time is short." " The King's business requires haste."

THE MEANING OF " PISCATAQUOG." (Vol. IV, p. 96.) The word *Piscataquog*, according to the *Farmers' Monthly Visitor*, Vol. XII, p. 47, edited by Chandler E. Potter, Manchester, N. H., 1852, is a compound Indian word from *Pos* (great), *Attuck* (deer), and *Auke* (place), and meaning " The Great Deer Place "; and true to its Indian name it afforded a great supply of venison, long after the English had settled on the Merrimack; Halestown, now Weare, upon its North branch, being as celebrated for hunting grounds as Amoskeag was for a fishing place.

THE MEANING OF NEW " HAMPSHIRE." Capt. John Mason was an English naval officer, and in 1629 obtained a grant of land from the Merrimack to the Piscataqua, and sixty miles into the country, which he called " New Hampshire," he having come from the county of *Hants*, in England, known as Hampshire, a corruption of *Hantshire*, shire meaning county. Capt. Mason died in 1635 without realizing any benefit from his grant, leaving his landed estate to his grandson, Robert Tufton, upon conditions he should take the name of Mason.

New Hampshire has no motto, but her great seal bears the words, *Sigillum Neo Hantoniensis Reipublicæ*. We refer our correspondent "M. G. S." to the *Farmers' Monthly Visitor*, Vols. XII and XIII ; the "Provincial Papers of N. H.," Vols. I to XVI, for details of the seal.

EDITIONS OF EUCLID'S ELEMENTS OF GEOMETRY. (Vol. V, p. 96.) It is next to impossible to tell how many translations or edition, have been published. We give those in our collection :

Barrow, Isaac. Euclide's Elements, Books, I-XV ; with Archimedes' Theorems ; and Data by Thomas Haseldon. London, 1732.

Another edition, London, 1751.

Benson, Lawrence S. Elements, excluding the *Reductio Ad Absurdum* reasoning. New York, 1868.

Byrne, Oliver. Doctrine of Proportion, Book V, simplified and clearly developed. London, 1841.

Byrne, Oliver. Elements, Books I-VI, by colored diagrams and symbols. London, 1847.

Cresswell, D. Supplement to Elements, Books I-VI. London, 1816.

Elrington, Thomas. Elements, Books I-VI. 10th edition. Theory of Proportion, Book V, altered. Dublin, 1833.

Fenn, Joseph. Elements, Books I-VI, XI-XII. Bordered diagrams. Dublin, 1769.

Gunn, Samuel. Elements from the Latin translation of Commandine ; Books I-VI, XI-XII ; faults of Harris, Caswell, Heynes, and others corrected. 8th edition. London, 1759.

Holyoake, G. J. Beauties and Uses of Euclid. London, 2d edition.

Newton, Isaac. Appendix to the Elements with new propositions and data. Wisbech, 1825.

Phillips, George. Elements, Books I-VI ; translated from Peyrard's edition. London, 1826.

Playfair, John. Elements, Books I-VI, XI-XII ; with supplement on the quadrature of the circle ; solids. New York, 1854.

Roche, Martin. Elements, Books I-VI ; Simpson's and Playfair's corrected. Philadelphia, 1829.

Simson, Robert. Books I-VI, XI-XII ; with Data. Theon's errors and others corrected. Philadelphia, 1829.

Thompson, James. Elements, Books I-VI, XI-XII. 3d edition. London, 1845.

Whewell, William. Mechanical Euclid, with mathematical reasoning and logical deduction. Cambridge and London, 1837.

Whiston, William. Elements, Books I-IV, XI-XII ; with Archimedes' Theorems, by Andrew Tacquet. 3d edition, London, 1727.

Tenth edition, with practical corollaries. Dublin, 1775.

MNEMONICAL SECRETS. (Vol. V, p. 96.) Some prodigies have wonderful memories, while others have a key to guide their memories; especially is this true where long decimals are repeated. There is a mathematical law that governs many decimals, especially repetends. The repetends of certain primes are limited to one less than the particular prime. For instance, the prime 7 gives for a repetend six decimals, .142857. The last half of the decimals being complements of 9's of the first half; thus when the first half of the repetend is obtained the last half is immediately written down. So of many primes.

Timothy Clowes, LL.D., of New York, forty years ago used to surprise his audiences by repeating the repetend-decimal of 337. He committed the first 168 to memory and immediately followed them by their difference from nines.

No. (1) is the first 168 decimals and No. (2) the last 168 decimals:

(1) 0029673590504451038575667655786350148367952522551928783-

(2) .99703264094955489614243323442136498516320474777448071216-

(1) 38278981750741839762611275964391691394658753709198813056-

(2) 61721068249258160237388724035608308605341246290801186943-

(1) 37082195845697329376854599406528189910979228486646884272.

(2) 62917804154302670623145400593471810089020771513353115727.

Another mnemotechnist will repeat the decimal of 487. This repetend-decimal is easily written down after obtaining the first 45 decimals. Then *divide* this decimal by 2, beginning with the second figure, continuing to the 441st place:

$\frac{1}{487} = .00205\ 33880\ 90349\ 07597\ 53593\ 42915\ 81108\ 82956\ 87885$
 0102 66940 45174 53798 76796 71457 90554 41478 43942
 5051 33470 22587 26899 38398 35728 95277 20739 21971
 2525 66735 11293 63449 69199 17864 47638 60369 60985
 6262 83367 55646 81724 84599 58932 23819 30184 80492
 8131 41683 77823 40862 42299 79466 11909 65092 40246
 4065 70841 88911 70431 21149 89733 05954 82546 20123
 2032 85420 94455 85215 60574 94866 52977 41273 10061
 6016 42710 47227 92607 80287 47433 26488 70636 55030
 8008 21355 23613 96303 90143 73716 63244 35318 27515
 4004 10677 61806 98151 95071 86858 31622 17659 13757
 7

This decimal, it will be readily observed, obtained after the first 45

decimals (the first line), by halving it and each subsequent line.

The peculiar properties of this number 487 were first noticed by Desmarest who divided the periods of each number up to 1000 and tabulated them. He found that the numbers 3 and 487 were the only two below 1,000 that produced a repetend that would divide their own divisor without a remainder. All the numbers below 1,000 that limit their repetend-decimal to one less than the number itself are *fifty-four* as follows -

7	59	147	229	337	491	577	709	863
17	61	167	233	367	499	593	727	887
19	97	179	257	379	503	619	743	941
23	109	181	263	383	509	647	811	953
29	113	193	269	389	541	659	821	977
47	131	223	313	433	571	701	857	983

Some one of these repetend decimals are usually selected the result of which fall under a mathematical law.

Francis Fauvel-Gouraud, a phreno-mnemonotechnist, used to surprise his auditors forty years ago, by repeating the usually accepted value of π (ratio of circumference to diameter), to 155 decimals, which is that of the Radcliffe manuscript in the Oxford library. Even if he committed this to memory, he had 13 less figures to remember than Timothy Clowes before mentioned. Our correspondent, "F. K. Goldsmith," can find much information on mnemonics by consulting the "Phreno-Mnemonotechnic Dictionary," by Francis Fauvel-Gouraud, New York, 1844.

"THE UNPUNCTUATING DODSON." (Vol. V, p. 96.) This person was the Rev. J. Dobson, a fellow of St. John's College, Cambridge, England, who was rector of Brandesburton in Yorkshire, and died in 1847. He was also called "Death Dobson" on account of his head and aspect of countenance being not very unlike the ordinary pictures of human skulls. He published five tracts in which are no punctuation, except a period at the end of the paragraphs. No captials were used excepting at the beginning of paragraphs. Not a single proper name is in them. He published the "Elements of Geometry" in two quarto volumes, in 1814, which were treated the same way, excepting when a comma was wanted between letters representing straight lines as AB, BC.

The Secret Symbols of the Rosicrucians.

Considerable attention has been paid of late to the study of the Eastern Religions, and but comparatively few people have attempted to penetrate behind the veil which hides the sanctuary of the Christian religion. Such attempts were, however, made during the Middle Ages by the *Hermetic Philosophers* called the *Brotherhood of the Golden and Rosy Cross*, and they laid down the results of their investigations in certain Symbols, which were called "secret," because they can be understood only by those who possess the key to their understanding. This Key, which alone opens the door, is *Spirituality*, that is to say, *Reason*, unadulterated by sophistry, free from dogmatic and sectarian prejudices, free from scepticism and superstition.

Among the great majority of the followers of the Christian church this key has been lost, and sophistry has taken the place of understanding. There is, perhaps, not one in a thousand of laymen or priests who knows the true meaning of the symbols and ceremonies of the Christian church. What the modern Christian usually knows about Christianity is merely its *historical*, but not its *spiritual*, character. The Bible has been degraded into a mere history of the Jews, the universal glorious *Christ-Spirit*, the Light of the World, the divine element in Man, which lives to-day as it ever lived since the beginning of the world, has in the minds of his worshippers dwindled down to a mortal man, who lived among the Jews and was executed as a criminal.

Ever since the days of the great Reformation, when the Bible became the common property of the people who were unable to understand the secret meanings of its fables and allegories, which were known only to the initiated, the Cabalists, Alchemists, and *Rosicrucians*, the Christian religion has been studied more in its intellectual than in its spiritual aspect. Its external forms have passed through a severe scrutiny by those who could see in them nothing but the external forms, and their internal spirit was lost. The authorities of the church, being themselves unable or unwilling to explain their secret meaning, insisted that the fables and allegories of the Bible should be accepted in their literal sense, however absurd and unintelligible the latter may be. The intellect of the educated classes revolted at such an attempt to put their reason in bondage, and the consequence was that the spiritual power of the church has been lost in proportion as the latter lost sight of the eternal truth. From a religion of divine wisdom, teaching a true religion which man bears to the eternal source from which he emanated, and which it is destiny to return, modern Christianity has become almost a system of forms and ceremonies with little or no spirituality, a means to afford a comfortable living to the priesthood, a method of deceiving the ignorant and gullible with false hopes, and of restraining the wicked by fear, while the Christian places of worship have become more than ever deserted, except such as use them as places for religious amusement or for the display of fashion, and there are now very few who bring with them the living Christ, when they visit the church. Sentiment has taken the place of spiritual power, superstition and scepticism the place of the life-giving faith, and even the meaning of the terms signifying divine virtues have become unknown among the learned. The attacks of the materialist, sceptic, and arguer about the forms of Christianity are allowed to go on without any defence being made, and if such a defence is ever attempted, matters are usually rendered still worse for the church, on account of the inefficacy and unreasonableness of the argument of its defenders. Under such circumstances it must be thrice welcome to every lover of Truth, whether he be a Christian, or minister, or layman, or an infidel, as it will be to every Occultist, Theosophist, and Mason, to see the truths of religion revealed by the work called "*The Secret Symbols of the Rosicrucians.*" For three centuries these symbols have been hidden away, nor would it have been of much use to publish sooner, as they would not have been understood. Now, however, as the Light, which rose from the East, originating in the recent revival of the study of the Eastern books, has begun to radiate over the West, we may study and understand these symbols in that Light. We may thus perhaps redeem Christianity from her present state of degradation and decay, and restore to her the living spirit of Christ. To facilitate the study of these symbols, a Vocabulary has been added to the book, giving correct definitions and explanations of the occult terms used in the work. (See advertisement on the cover).

WAR OF 1812-'14. Can any of the many readers of *NOTES AND QUERIES* give the author's name, and general points and particulars of a pamphlet of which the following is a copy of the title-page :

"A short and thrilling narrative of a few of the Scenes and Incidents that occurred in the Sanguinary and Cruel War of 1812-'14, between England and the United States; written by one who in defence of his country's Rights, has faced the cannon's mouth and who passed through or was an eye-witness to every scene and incident here related. Published by the Author. Advertiser Press, Norway, (Maine). 1853."

M. O. WAGGONER. Toledo, O.

The Decimals of 81.

(1) Omits 8.	.012345679	1				.087654320	80
	.123456790	10				.876543209	71
	.234567901	19				.765432098	62
	.345679012	28				.654320987	53
	.456790123	37	Sum.	(4) Omits 1.	.543209876	44	Sum.
	.567901234	46			.432098765	35	
	.679012345	55			.320987654	26	
	.790123456	64			.209876543	17	
	.901234567	73			.098765432	8	
(2) Omits 7.	.580246913	47			.419753086	34	
	.802469135	65			.197530864	16	
	.024691358	2			.975308641	79	
	.246913580	20			.753086419	61	
	.469135802	38	Sum.	(5) Omits 2.	.530864197	43	Sum.
	.691358024	56			.308641975	25	
	.913580246	74			.086419753	7	
	.135802469	11			.864197530	70	
	.358024691	29			.641975308	52	
(3) Omits 5.	.716049382	58			.283950617	23	
	.160493827	13			.839506172	68	
	.604938271	49			.395061728	32	
	.049382716	4			.950617283	77	
	.493827160	40	Sum.	(6) Omits 4.	.506172839	41	Sum.
	.938271604	76			.061728395	5	
	.382716049	31			.617283950	50	
	.827160493	67			.172839506	14	
	.271604938	22			.728395061	59	
(7)	.037037037	3			.962962962	78	
	.370370370	30	Sum.	(10)	.629629629	51	Sum.
	.703703703	57			.296296296	24	
(8)	.740740740	60			.259259259	21	
	.407407407	33	Sum.	(11)	.592592592	48	Sum.
	.074074074	6			.925925925	75	
(9)	.148148148	12			.851851851	69	
	.481481481	39	Sum.	(12)	.518518518	42	Sum.
	.814814814	66			.185185185	15	
(13)							
	.111111111	9			.888888888	72	
	.222222222	18	Sum.		.777777777	63	Sum.
	.333333333	27			.666666666	54	
	.444444444	36			.555555555	45	

The foregoing table is constructed on the peculiar property of the number 9.

1. The square of 9 is reduced to all its repetend decimals from 1 to 80. The numerators are placed on the right.
2. Table (13) the numerators are the multiples of 9, and hence the decimals are produced in regular order.
3. Table (1) produces the digits in regular order omitting the 8, each numerator increasing by 9 while each repetend begins with 1 more.
4. Table (2) produces the digits in irregular order omitting the 7, each numerator increasing by 18; and similarly with (3), (4), (5), (6).
5. Tables (7), (8), (9), (10), (11), (12), produce by threes, while the numerators increase by 27.
6. The sum of the repetend in each table is always the middle numerator of that table.
7. If tables (1), (2), (3), (7), (8), and (9), be placed exactly upon tables (4), (5), (6), (10), (11), and (12), each sum will be 9; while the the sum of the numerators will be 81.

PROVERBS ABOUT WIND. Cats with their tails up and hair apparently electrified indicate approaching wind.

If swine be restless and grunt loudly, there will be much wind.

Pigs can see the wind.

Hunters say that the direction in which the moon flies in the morning will be the direction of the wind the next day.

Magpies flying three or four together, and uttering harsh cries, predict windy weather.

Anvil-shaped clouds are very likely to be followed by a gale of wind.

The vernal equinoctial gales are stronger than the autumnal.

If it blows during the day it usually hushes toward evening.

If small white clouds are seen to collect together, their edges appearing rough, expect wind.

A light yellow sky at sunset presages wind.

If the full moon rises red expect wind.

A very red sky in the east at sunset indicates stormy wind.

Heavy, white, rolling clouds in front of a storm denote high wind.

Always a calm before a storm.

A gale moderating at sunset will increase before midnight, but if it moderates after midnight, the weather will improve.

Wind storms usually subside about sunset, but if they do not the storms generally continue during the following day.

No weather is ill,
If the wind is still,
The sharper the blast,
The sooner 'tis past.

When the glass is low,
Look out for a blow,
Fast rise after a low, (barometer),
Precedes a stormy blow.

Wind in the west, weather is best;
Wind in the east, good for neither man nor beast.

H. W. H.

QUESTIONS.

1. What was the so-called "Triangle Controversy" ? JACOB.
2. Who were the *Dodekaphylon* ? JACOB.
3. What is known of the great floods of Greece, such as *Ogyges'*, and *Dukalion's* flood ? A. W.
4. Will some one please give the English of '*Il faut que j'y songe encore*,' as found on page 103, last number of NOTES AND QUERIES. ENGLISHMAN.
5. What are the Movable Feasts and Holy Days, and the Immovable Feasts and Holy Days ? DANIEL DIPPER.
6. Who first discovered and demonstrated the musical scale or octave ? GEO. J. WHITE.
7. Give a brief description of the Zodiac of Denderah. J. P. SHIELDS.
8. Is there trustworthy historical facts or philological evidence that that the ancient city of Thebes in Egypt derived its name *Thebes* from the same root-word that *Thibet* was derived from ? J. P. SHIELDS.
9. Swedenborg says that "The *Ancient Word*, which was in Asia before the Israelitish Word, is still preserved there among the people who dwell in Great Tartary." To what Word does he refer ? J. P. SHIELDS.
10. What is the theory of the "Polarization of Light" ? ENO.
11. How many constellations called "The Dipper" are there, what stars compose them, and where located ? JAMES HUNTER.
11. What is the *Ygdrasil*, and where is it found ? X. Y. Z.
12. What is the "Feast of Asses," and when celebrated ? H.
13. Who were "The Twelve Disciples," mentioned in Acts xix, 2-7, who "had not so much as heard whether there be any Holy Ghost," and who were first baptized by John, and second by Paul ?
14. Why do the Liberals reverse our adopted Roman numerals, I V X L C D M, and make the date MDCLXVI (1666) to be the E. M. (Era of Materialism) ? ANDREW.
15. Why are the divisions of counties in some of the States called *Hundreds* ? SCHOOL BOY.
16. What are "Fescennine Verses" ? SARAH E. BURNS.
17. Why are troops called *Dragoons* ? HAMILTON.
18. Why are persons who guide travelers and point out objects of interest called *Oicerones* ? PALEY D. OSGOOD.
19. Give the derivation of the measures, *palm*, *foot*, *cubit*, *rod*, *chain*, *fathom*, *gnot*, *league* ? JONATHAN.

MISCELLANEOUS

NOTES AND QUERIES,

WITH ANSWERS.

"Geometrical equality can do great things, among gods and men."—PLATO.

VOL. V.

SEPTEMBER, 1883.

No. 9.

WHAT IS THE HINDU COSMOGONY? Our correspondent "JOEL HENDERSON," asks for the Hindu Cosmogony. We answer that it is found in the "Asiatic Researches," Vol. V, and is as follows :

"This Universe existed only in the first idea, yet unexpanded, as if involved in darkness, imperceptible, undefinable, undiscoverable by reason, and undiscovered by revelation, as if it were wholly immersed in sleep.

When the soul self-existing Power himself undiscerned but making this world discernible, with five elements and other principles of nature, appeared with undiminished glory, expanding his idea or dispelling the gloom.

He whom the mind alone can perceive, whose essence eludes the external organs, who has no visible parts, who exists from eternity, even he, the Soul of all beings, whom no being can comprehend, *shone forth* in person.

He having willed to produce various beings from his own divine substance, first, *with a thought* created the waters.

The waters are called nara, because they are the production of Nara, the Spirit of God ; and since they were his first ayana, or place of motion, he thence is called Narayana, or "moving on the waters."

From that which is, the First Cause, not the object of sense, existing everywhere in substance, not existing to our perception, without beginning or end, was produced the Divine Mind.

He framed the heaven above, and the earth beneath ; in the midst he placed the subtle Æther, the eight regions, and the permanent receptacle of waters.

He framed all creatures.

He too assigned to all creatures distinct names, distinct acts, and distinct occupations.

He gave being to time and the divisions of time, to the stars, and also to the planets; to rivers, oceans, and mountains; to level plains and uneven valleys.

For the sake of distinguishing actions he made a total difference between right and wrong.

Having divided his own substance, the Mighty Power became half male, and half female.

He whose powers are incomprehensible, having created this universe, was again absorbed in the Spirit, changing the time of energy to the time of repose."

WHAT WAS THE SIZE AND WEIGHT OF THE TABLES OF STONE ? According to the *Nedarim*, (fol. xxxviii, col. 8), the Tables of Stone of Moses were 6 ells long, 6 broad, and 3 thick. It may perhaps help the reader to have some idea of the strength of Moses if we work out arithmetically the size and probable weight of these stone slabs according to the *Talmud*. Taking the Hebrew *a'm'a* (cubit or ell) at its lowest estimate, that is, 18 inches, each slab would be 9 feet long, 9 feet wide, and $4\frac{1}{2}$ feet thick. Reckoning 13 cubit feet to the ton, the Tables would weigh upwards of 28 tons. The figures are thus :

$$9 \times 9 \times 4\frac{1}{2} = 364\frac{1}{2} \div 13 = 28 \text{ tons, } 0 \text{ cwt., } 3 \text{ qrs., } 2\frac{1}{8} \text{ lbs. each.}$$

THE DODEKAPHYLON. (Vol. V, p. 148.) The word *dodekaphylon* is Greek and simply means the "twelve brethren," that is, the twelve sons of Jacob, or twelve tribes. Their prototypes were the twelve Apostles of Jesus.

THE TWELVE ANGELS, APOSTLES, PROPHETS, SIGNS, TRIBES, ETC. Several questions have been in stock for months all bearing on these subjects : the breast-plate of judgment, the zodiacal signs as ascribed to the tribes, the precious stones, and the angels of God. These are subjects on which there is much speculation. The most elaborate work on the zodiac, that we have seen, is entitled "Mazzaroth, or the Constellations," in four parts, by Frances Rolleston of Keswick, Eng., 4 Parts bound together, 8vo., pp. 216; with "Mizraim, or Astronomy in Egypt," pp. 30. The latter gives the ancient Egyptian Zodiac and Planisphere of Denderah, and the Zodiac of Esné with plates. The description of both of these are quite full. These subject cover a wide range, and as the tabular form conveys much of the information asked

for, we give two ; the first compiled from "Mazzaroth," and the second compiled from Barrett's "Magus." By these it will be seen that there are two arrangements. These assignments are based on certain scriptures : Gen. xxix, xxxv, and xlix ; Ex. xxviii, 15-22 ; Num. i-ii ; Deut. xxxii, 8 ; Col. i, 16 ; Rev. vii, 4-8 ; xxi, 12-21 ; xxii, 2.

The tables will suggest their own interpretation. The arrangement of the breast-plate of the high-priest was as follows, according to the "Cyclopædia" of McClintock & Strong, *Art.* "Breast-plate." Some commentators put Joseph in place of "Ephraim," and Levi in place of "Manasseh." The translations of the original words for the precious stones differ.

Judah.	Issachar.	Zebulon.
Sardonyx.	Topaz.	Emerald.
Reuben.	Simeon.	Gad.
Carbuncle.	Sapphir.e	Jasper.
Ephraim.	Manasseh.	Benjamin.
Ligure.	Agate.	Amethyst.
Dan.	Asher.	Naphtali.
Beryl.	Onyx.	Chrysolyte.

THE ORDER, EXODUS XXVIII, 18-19.

Sardis.	Topaz.	Carbuncle.	Emerald.	Sapphire.	Diamond.
Ligure.	Agate.	Amethyst.	Beryl.	Onyx.	Jasper.

THE ORDER, REVELATION XXI, 19-20.

Jasper.	Sapphire.	Chalcedony.	Emerald.	Sardonyx.	Sardius.
Chrysolite.	Beryl.	Topaz.	Chrysopraus.	Jacinth.	Amethyst.

The first arrangement by several commentators are by fours :

North,	Dan,	Winter,	Man,	Fomalhaut,	Matthew,
East,	Judah,	Summer,	Lion,	Regulus,	Mark,
West,	Ephraim,	Spring,	Ox,	Aldebaran,	Luke,
South,	Reuben,	Autumn,	Eagle,	Antares,	John.
Adam,	Cherubim,	Gen. 3,	24.	Michael,	Dan. 10, 3.
Noah,	Ophanim,	Enoch 70,	9.	Raphael,	Enoch 70, 11.
Moses,	Teraphim,	Gen. 31,	19.	Saxael,	Ex. 19, 20.
Jesus,	Seraphim,	Isa. 6,	2.	Gabriel,	Dan. 8, 16.

Aries,	Dan,	Malachi,	Matthias,	Seraphim,	Malchidial.
Taurus,	Reuben,	Haggai,	Thaddeus,	Cherubim,	Asmodel.
Gemini,	Judah,	Zachariah,	Simon Zelotes,	Thrones,	Ambriel.
Cancer,	Manasseh,	Amos,	John,	Dominations,	Muriel.
Leo,	Asher,	Hosea,	Simon Peter,	Powers,	Verchiel.
Virgo,	Simeon,	Micah,	Andrew,	Virtues,	Hamaliel.
Libra,	Issachar,	Jonah,	Bartholemew,	Principalities,	Zuriel.
Scorpio,	Benjamin.	Obadiah,	Philip,	Archangels,	Barbiel.
Sagittarius,	Naphtali,	Zephaniah,	James the elder,	Angels,	Adnachiel.
Capricornus,	Gad,	Nahum,	Thomas,	Innocents,	Hanael.
Aquarius,	Zebulon,	Habakkuk,	Matthew,	Martyrs,	Gabriel.
Pisces,	Ephraim,	Joel,	James the younger,	Confessors,	Barchiel.
Dan,	Sardonyx,	Sang,	March,	Head,	Jod he vau he.
Reuben,	Cornelian,	Upright vervain,	April,	Neck,	Jod he he vav.
Judah,	Topaz,	Bending vervain,	May,	Arms,	Jod vau he he.
Manasseh,	Chalcedony,	Comfrey,	June,	Breast,	He vau he jod.
Asher,	Jasper,	Ladies' seal,	July,	Heart,	He vau jod he.
Simeon,	Emerald,	Calamint,	August,	Belly,	He he jod vau.
Issachar,	Beryl,	Scorgion grass,	September,	Kidneys,	Vau he he jod.
Benjamin,	Amethyst,	Mugwort,	Otober,	Genitals,	Vau he jod he.
Naphtali,	Hyacinth,	Pimpernel,	November,	Hams,	Vau jod he he.
Gad,	Chrysopraus,	Dock,	December,	Knees,	He he vau jod.
Zebulon,	Crystal,	Dragonwort,	January,	Legs,	He jod vau he.
Ephraim,	Sapphire,	Aristolochy,	February,	Feet,	He jod he vau.

♈ Aries, the Ram.	Taleb, lamb sent forth,	Isa. 40, 11.	Gad, good fortune,	Gen. 30, 8.
♉ Taurus, the Bull.	Shur, coming to rule,	Job 31, 7.	Joseph, adding,	Gen. 30, 24.
♊ Gemini, the Twins.	Thaumim, united,	Ex. 26, 34.	Benjamin, right-hand son,	Gen. 35, 18.
♋ Cancer, the Crab.	Sartan, holds or binds,	Gen. 49, 11.	Issachar, recompense,	Gen. 30, 18.
♌ Leo, the Lion.	Arieh, rending,	Ps. 30, 12.	Judah, praise the Lord,	Gen. 29, 35.
♍ Virgo, the Virgin.	Bethulah, a virgin,	Gen. 24, 16.	Zebulon, dwelling,	Gen. 30, 20.
♎ Libra, the Scales.	Mozanaïm, weighing,	Isa. 40, 12.	Levi, united,	Gen. 30, 34.
♏ Scorpio, the Scorpion.	Akrab, conflict,	Ps. 91, 13.	Dan, judging,	Gen. 33, 6.
♐ Sagittarius, the Archer.	Kesith, archer,	Gen. 21, 20.	Asher, happy,	Gen. 30, 13.
♑ Capricornus, the Goat.	Gedi, kid,	Judges 6, 19.	Naphtali, wrestling,	Gen. 30, 8.
♒ Aquarius, the Waterman.	Deli, water-urn,	Num. 24, 7.	Reuben, behold a son,	Gen. 29, 32.
♓ Pisces, the Fishes.	Dagim, fishes,	Gen. 43, 16.	Simeon, heard,	Gen. 29, 33.

Simon Peter,	Michael,	Judah,	Sardonyx,	Odem, blood-red,	Ex. 12, 13.
Andrew,	Uriel,	Issachar,	Topaz,	Pitdah, reward,	Num. 3, 49.
Matthew Levi,	Raziel,	Zebulon,	Emerald,	Bareketh, shining,	Ezek. 1, 13.
Philipi Phillipi,	Zadkiel,	Reuben,	Carbuncle,	Nophek, pouring,	I Sam. 10, 1.
John Boanerges,	Gabriel,	Simeon,	Sapphire,	Saphir, numbered,	Ps. 87, 6.
Bartholemew,	Saxael,	Gad,	Jasper,	Jahalom, breaking,	Ps. 74, 6.
Thomas Didymus,	Haniel,	Joseph,	Ligure,	Leshem, tongues,	Isa. 5, 24.
James Alpheus,	Cerviel,	Levi,	Agate,	Shebo, dwelling,	Ps. 80, 1.
James Boanerges,	Raphael,	Benjamin,	Amythest,	Achlama, restoring,	Isa. 38, 16.
Simon Zelotes,	Peliel,	Naphtali,	Beryl,	Tarshish, possessing,	Num. 24, 18.
Lebbeus Thad.,	Jophiel,	Asher,	Onyx,	Shoham, strong,	Gen. 49, 20.
Judas Iscariot,	Asazel,	Dan,	Chrysolite,	Jasphe, bruised,	Gen. 3, 15.

Questions and Answers.

THE MUSIC OF THE SPHERES. (Vol. IV, p. 299.) Your correspondent "X. Y. Z." asked for the Pythagorean harmony, sometimes supposed to be the music of the spheres. This has been well, but partially, answered by the editor (Vol. IV, p. 341). I desire to add, however, some of the harmonies that have been discovered in nature. In "Burritt's Geography of the Heavens," the following are given as illustrating the coincidences of the inferior (interior) planets ;

Mercury—mean sidereal revolution—87 d. 23 h. 15 m. 43 s.

Earth—mean sidereal revolution—365 d. 5 h. 48 m. 48 s.

7 periodical revolutions of the earth are equal to 29 of Mercury.

13	"	"	"	"	54	"
33	"	"	"	"	137	"
46	"	"	"	"	191	"

Venus—mean sidereal revolution—224 d. 16 h. 49 m. 8 s.

Earth—mean sidereal revolution—365 d. 5 h. 48 m. 48 s.

8 periodical revolutions of the earth are equal to 13 of Venus.

235	"	"	"	"	382	"
243	"	"	"	"	395	"
251	"	"	"	"	408	"
291	"	"	"	"	475	"

Prof. J. P. Cooke says in one of his scientific works :

In the solar system, for example, with the exception of Neptune, the intervals between the orbits of Mercury and the orbits of the other planets go on doubling, or nearly so, as we recede from the sun. (See Bode's Law, Vol. II, p. 330.). If we compare the periods of revolutions around the sun, expressed in days, we shall find another simple numerical relation, as shown by the following table :

Planets.	Observed.	Theoretical.	Fractions.
Neptune,	60,129	62,000	
Uranus,	30,687	31,000	$\frac{1}{2}$
Saturn,	10,759	10,333	$\frac{1}{3}$
Jupiter,	4,333	4,1333	$\frac{1}{4}$
Asteroids,	1,200 to 2,000	1,550	$\frac{1}{5}$
Mars,	687	596	$\frac{1}{6}$
Earth,	365	366 $\frac{1}{8}$	$\frac{1}{8}$
Venus,	225	227 $\frac{1}{2}$	$\frac{1}{2}$
Mars,	88	87	$\frac{1}{4}$

We copy from Prof. Cooke a table of the law of phyllotaxis, illustrated in a few instances, from which it will be seen that even the

fractions of a circle, which occur in the arrangement of leaves around a stem, are of a very peculiar character :

LAW OF PHYLLOTAXIS, OR LEAF ARRANGEMENT.

	No. of Spirals.	No. of Leaves.	Frac- tion.	Angle of Leaf Divergence.
Grasses,	1	2	$\frac{1}{2}$	180°
Sedges,	1	3	$\frac{1}{3}$	120°
Apple, } Cherry, } Poplar, }	2	5	$\frac{2}{5}$	144°
Holly, } Calistemon, } Aconite, }	3	8	$\frac{3}{8}$	135°
Rosettes of Houseleek, } Cones of White Pine, }	5	13	$\frac{5}{13}$	$138^{\circ} 27' 6''$
Cones of European Larch,	8	21	$\frac{8}{21}$	$137^{\circ} 8' 34''$
Certain Pine Cones,	13	34	$\frac{13}{34}$	$137^{\circ} 38' 49''$
Certain Pine Cones,	21	55	$\frac{21}{55}$	$137^{\circ} 27' 16''$
Typical arrangement which would expose to the sun's rays the greatest leaf-surface, }				$137^{\circ} 30' 28''$

After the first and second fractions, $\frac{1}{2}$ and $\frac{1}{3}$, the third fraction is formed by adding the numerators of the two preceding fractions for a new numerator, and the denominators for a new denominator, thus giving $\frac{2}{5}$, $\frac{3}{8}$, and so on. But this same peculiar series of fractions is found to be embodied in the orbits of the planets, as previously seen in the table. Thus the plants and the planets are in harmony and obey the same law. Thomas Hill in "Geometry and Faith," p. 88, remarks :

"The phyllotatic law is not of practical importance in the growth of plants; they live and flourish on the rudest approach to it. But the tracing of these approximations up, in such very numerous instances, to the highest degree of accuracy, such as 55 : 44, and 34 : 89, one above, the other below the perfect, show that *the law of extreme and mean ratio is actually incorporated into the vegetable kingdom. The builder of the plant knew that law untold ages before the geometer invented it.*"

According to the Pythagorean system, the world is a piece of harmony, and man the full chord, which consists of a fundamental or tonic, its major third, its just fifth, and its octave. From this it will be readily understood that the diapason (*through all*) means the complete chord, or according to another system, a "microcosm of nature." Man touches Deity, passes through all the planets and touches the

earth. It is because he touches Deity that man believes he has himself an immortal soul, and because he runs through the planets that the planets influence his nature.

The philosopher knows why the sun (he) governs the man, and the moon (she) measures the months and governs the woman.

"From harmony, from heavenly harmony
This universal frame began;
From harmony to harmony
Through all the compass of the notes it ran,
The diapason closing full in man."
"Song for St. Cecilia's Day."—*John Dryden*.

The ancients looked upon the universe as a living creature, and the followers of Paracelsus considered man a miniature representation of the universe. The universe was called the Macrocosm, and the man the Microcosm.

SAMUEL F. GOODWIN.

DEMONSTRATION OF THE MUSICAL SCALE. (Vol. V, p. 148.) Anthon says, in his "Classical Dictionary," under *Pythagoras* :

"Pythagoras considered music not only as an art to be judged of by the ear, but as a science to be reduced to mathematical principles and proportions. The musical chords are said to have been discovered by him in the following manner : As he was one day reflecting on this subject, and happening to pass by a smith's forge where several were successively striking with their hammers a piece of heated iron upon an anvil, he remarked that all the sounds produced by their strokes were harmonious excepting one. The sounds which he observed to be chords were the octave, the fifth, and the third ; but the sound which he perceived to lie between the third and the fifth he found to be discordant. Going into the workshop, he found that the diversity of sounds arose, not from the forms of the hammers, nor from the force with which they were struck, nor from the position of the iron, but merely with the difference of weight in the hammers. Taking, therefore, the exact weight of the several hammers, he went home and suspended four strings of the same substance, length, and thickness, and twisted in the same degree, and hung a weight at the lower end of each, respectively, equal to the weight of the hammers ; upon striking the strings he found that the musical chords of the strings corresponded with those of the hammers. Hence it is said he proceeded to form the musical scale, and to construct stringed instruments. His scale was, after his death, engraved on brass, and preserved in the temple of Juno at Samos."

FEAST OF ASSES. (Vol. V, p. 148.) A ridiculous festival of the Catholic church, celebrated in Rouen and some other cities in France, to commemorate the flight into Egypt. It was not uniformly ob-

served, but the following were among the ceremonies, especially at Beauvais. A young woman with a child on her arms was made to ride on an ass. Followed by the bishop and clergy she was conducted to the church, and a sermon was preached, in which the high qualities of the animal that enabled the Virgin and child to escape from Herod were lauded. During the ceremony a ludicrous composition, half in Latin, half in French, was sung in great vociferation, in praise of the animal, of which the last stanza way serve as a specimen :

" Amen dicas asine
Jam satur de germine
Amen, amen iterum
Aspenare vitæ.
Hes va ! Hes va ! Hes va ! Hes va !
Blas sire asen, car allez,
Belle bouche car chantez."

In Rouen it was celebrated about Christmas ; in Beauvais on June 14. Several popes, papal legates, and bishops endeavored to suppress it, but it maintained itself till the 15th century, when Nicholas de Clemangis by a book against it, and especially by a decree issued from the council of Basle, caused the suppression of this and a number of similar festivals.

TRIANGLE CONTROVERSY. (Vol. V, p. 148.) This was a dispute occasioned by a book published by Samuel Whelpley, entitled "The Triangle," against limited atonement, inability, and immediate imputation. The controversy led to the trial of Albert Barnes and of Lyman Beecher for alleged heresy, and finally to the disruption of the Presbyterian church in 1837.

DRAGOONS. (Vol. V, p. 148.) From the French *dragon*, probably from the Latin *dragonarius*, the bearer of a standard upon which was represented the figure of a dragon. A name given to a species of cavalry trained and armed to act either on foot or on horseback, as emergencies required. The origin of this species of troops has been ascribed by Pere Daniel to the Mersechel de Brissac. There is but little doubt that a species of soldiers, answering to the above description, was in use among the ancient Romans. At present they form part of the military force of the powers of Europe. The first regiment of dragoons raised in Great Britain was in 1681, and it was called the Royal Regiment of Dragoons of North Britain, now the Scotch Greys.

MOVABLE, AND IMMOVABLE FEASTS. (Vol. V, p. 148.) The Catholic church has retained nearly all the feasts and festivals of the primitive church, with the later ones of the apostles and martyrs, and have added largely to the list since the early church, so that nearly every day in the year is now recognized in memory of some saint. In McClintock & Strong's "Cyclopædia," Vol. III, p. 513, a catalogue of 269 are given with the dates of recognition. The list is too long to reproduce here. We give, however, those recognized by the Church of England :

MOVABLE FEASTS AND HOLY DAYS.

Advent ; Septuagesima ; Sexagesima ; Quinquagesima ; Quadragesima, and the four following Sundays ; Ash Wednesday ; Palm Sunday ; Maundy Thursday ; Good Friday ; Easter Eve (*Sabbatum Magnum*) ; Easter Day ; Sundays after Easter ; Ascension Day ; Whit Sunday ; and Trinity Sunday.

IMMOVABLE FEASTS AND HOLY DAYS.

Jan. 1, the Circumcision of our Lord.	July 25, St. James the Apostle.
Jan. 6, the Epiphany.	Aug. 24, St. Bartholemew the Apostle.
Jan. 25, the Conversion of Paul.	Sept. 21, St. Matthew the Apostle and Evangelist.
Feb. 2, Presentation of Christ in the Temple, or the Purification of the Virgin.	Sept. 29, St. Michael and all the Holy Angels.
Feb. 24, St. Matthias the elected Apostle.	Oct. 18, St. Luke the Evangelist.
Mar. 25, the Annunciation of the Blessed Virgin Mary.	Oct. 28, St. Simon and St. Jude the Apostles.
Apr. 25, St. Mark the Evangelist.	Nov. 1, All Saints' Day.
May 1, St. Philip and St. James the Apostles.	Nov. 30, St. Andrew the Apostle.
June 11, St. Barnabas's Day.	Dec. 21, St. Thomas the Apostle.
June 24, St. John the Baptist.	Dec. 25, Nativity of our Lord.
June 29, St. Peter the Apostle.	Dec. 26, St. Stephen the Deacon.
June 29, St. Paul, writer of epistles.	Dec. 27, St. John the Evangelist and Apostle.
	Dec. 28, the Innocents' Day.

Thus it will be observed the twelve apostles (excepting Judas Iscariot) are each recognized with an immovable feast, Matthias supplying the place of Judas ; the five evangelists, three of them (Matthew, John, Philip) being also apostles ; one deacon ; the archangel Michael and the hierarchy ; John the Baptist ; Paul the "apostle" to the Gentiles, and Barnabas one of the seventy.

THE THREE DIPPERS. (Vol. V, p. 148.) There are three configurations of stars which are quite familiarly known as "the dippers."

1. *The Dipper*, so called, is in the constellation *Ursa Major* or the Great Bear, the stars forming the tail of the bear also form the handle of the dipper. The first star in the handle, *Benetnasch*; the second, *Mizar*; the third, *Alioth*; and the four, *Megres*, *Phad*, *Merak*, *Dudhe*, form the bowl. The 2 latter stars are called "The Pointers," because they point or guide the eye to the Pole star (*Cynosura*), 29 degrees distant. The top bowl-stars are 10 degrees apart; the bottom, 8 degrees apart; the depth next to handle, $4\frac{1}{2}$ degrees apart; the outer end (the Pointers) $5\frac{1}{2}$ degrees apart.

The Little Dipper so called, is in *Ursa Minor*, or the Lesser Bear, but situated similarly in respect to the constellation, the tail forming the handle of the little dipper, and the handle turning up. "The Pointers" guide the eye to the first star in the handle—the Pole star—the *Cynosura*, called also *Alruccaba*. The two stars in this dipper corresponding to "the Pointers" are named *Kochab* and *Gamma* and these are called "The Guards," because they seem to guard the Lesser Bear around the North Pole.

The Milk Dipper is in the constellation *Sagittarius*, or the Archer, one of the southern zodiacal signs. It is so called, because lying partly in the Milky Way. It is turned nearly bottom up and formed of stars of the 3d and 4th magnitude.

WHO WAS KING RAMIREZ? (Vol. V, p. 68.) The picture is really called by the painter, "La Campana de Huesca," ("The Bell of Huesca,") and its hero is Ramero, or Ramirez II, king of Aragon (1090-1147). He had taken monastic vows, but on the death of his brother, Alfonzo I, in 1134, was released by Papal dispensation, succeeded to the throne, and married. The prince of Castile, Alphonzo VII, made war on the new monarch, with the connivance of the disaffected nobles and merchants of Aragon. Ramirez, driven to his Castle of Mondus for refuge, sent to seek advice from the abbot of the monastery of San Ponce de Tomeras. The latter simply took the messenger into the cloister garden, and for an answer, cut off the heads of the tallest flowers and weeds with a sickle. Ramirez took the hint, as, indeed, any one familiar with the story of Tarquin might readily have done. He summoned the Cortes of Huesca to his castle, and told them he intended to construct a bell so sonorous that it

should be heard all over Aragon. Soon after he was enabled to keep his word. He imprisoned many of the most influential of the nobles of Aargon, and decapitated fifteen of them at Huseca. The remainder he caused to be brought to his palace, and the pictures shows him at the moment, when accompanied by his favorite dog, he pointed out to the court his metaphorical bell, the beheaded ringleaders, with the head of the arch-rebel dangling from the bell rope. After concluding peace with Alphonzo, he inaugurated various successful reforms, abdicated in favor of his two-year-old daughter, Petronila, in 1137, resumed his monastic vows, and died ten years later in the cloister of San Pedro, in Huseca. A. P. SOUTHWICK, Baltimore, Md.

HUNDREDS. (Vol. V, p. 148.) Brande's "Encyclopædia" says that a hundred is a territorial division having for its object the more convenient and efficient administration of justice. Formerly it was common in other countries, particularly in England, France, and Lombardy, and adopted in this country as the subdivision of a county. It is referred to the time of King Alfred, and its institution, as well as that of county and tything, is upon no precise authority. It is probable that the division was of an older date, and that it was not introduced into all parts of England at the same time. The term had not the same application in all parts, for the meaning usually given to it was a district containing a hundred free families; and in the north it included a much larger district than in the south of England. In the north it often took the name of Wapentakes. To each hundred belonged a court baron similar in nature and extent of jurisdiction to the county court and court leet. The essential use of the hundred was in the liability of the hundreders, when offences were committed within their district, either to produce the offender or make good the damages. The division into hundreds is frequently used in acts of parliament as a convenient mode of reference. The term hundred was applied to the counties of Delaware in the United States.

CICERONES. (Vol. V, p. 148.) A cicerone is a name originally given by the Italians to those persons who pointed out to travelers the interesting objects with which Italy abounds. It is applied universally at present to any individual who acts as a guide. The application of the term Cicerone had probably its origin in the ironical exclamation, *E un Cicerone* (he is a Cicero), being elicited from the traveler by the well known garrulity of the Italian guides.

FESCENNINE VERSES. (Vol. V, p. 148.) These verses are so termed from Fescennia, an Etrurian town where they first had their origin. They were rude extemporaneous pieces of poetry recited by the youth of Latium and Etruria at rustic festivals, especially at harvest home, with gestures adapted to the sense. They consisted chiefly of rustic lines of raillery and abuse, a species of humor very much in vogue with the Grecian and Egyptian country people. The verses are remarkable for having given rise to satire, the only class of poetry of native Italian growth.

GREEK FIRE. (Vol. V, p. 56.) I remember an article on "Greek Fire" in one of the English quarterlies (I think the *Westminster Review*), many years ago. The writer seemed to think that it was a Chinese invention, if I remember aright, and of the character of gunpowder. I suspect myself that petroleum was part of the compound, and that spontaneous combustion was depended upon for its ignition. Perry Chand Mitra of Calcutta wrote a little monograph, now in my possession, which was designed to show that the Hindûs of the Punjab possessed gunpowder and used it in explosives for military purposes; and that Alexander the Great was once defeated by their use.

A. WILDER.

GNOSTICISM. This word is derived from the Greek *gnosis* (knowledge), that is, a higher kind of knowledge. Those who claimed to possess it, claimed to have acquired the higher wisdom, and were the Gnostics. Paul speaks of a "gnosis" falsely so called, (I *Tim.* xvi, 20). They were a secret sect at the beginning of the Christian era.

SALIENT POINTS IN THE GREAT PYRAMID. What are some of the leading claims of those who believe the Great Pyramid of Egypt was built for a Metrological Monument?

INQUIRER II.

The Great Pyramid of Ghized has been established to be the oldest monument in Egypt. Mr. C. Piazza Smyth, in view of this fact, has devoted a long period of time to studying, not its hieroglyphics, but the peculiar relations of its structure, position, etc. He has by a long series of reasoning, arrived at the following conclusions:

1. The Great Pyramid is accurately located as regards the points of compass (orientation), and its base is practically a perfect square.
2. The vertical height of the pyramid (5,835 inches), is to the sum of the four sides of its base (63,702.36+ inches), as the radius of a

circle, approximately, is to the circumference; or as 1 to 2π ; or as 1 to 6.9832.

3. The area of the meridional section of the pyramid is to the area of the base, as 1 to π .

4. The length of the side of the base (9,156.45+ inches), divided by the contents of the pyramidal cubit (25,025 cubic inches), gives the number 366.24+, which equals the number of revolutions of the earth on its axis during the sidereal year.

5. The distance of the sun from the earth, indicated by the height of the pyramid, is given by the following relation :

$$10^9 \times \text{the height of the pyramid} = 92,093,000 \text{ miles,}$$

and the corresponding parallax is 8."87648. This distance from the sun is precisely that to which the latest investigations approach.

6. The four faces of the pyramid are equally inclined on the central axis, the angle being $51^\circ 51' 14.3''$.

7. The inch, as deduced from the great pyramid, equals 1.0001 English inches.

8. The inch of the pyramid is the 500,000,000th part of the polar axis of the earth.

9. The cubit of the pyramid equals 25 of these inches; it represents the 20,000,000th part of the polar axis, or the 10,000,000th part of the semi-axis.

10. The modern value of the space passed over by the earth in 24 hours in its orbit around the sun equals 10^{11} inches of the pyramid, or 100,000,000,000 pyramidal inches.

11. The weight of the pyramid is the fraction $(\frac{1}{10})^{15}$, or involved it is $\frac{1}{1000000000000000}$ of the weight of the earth.

12. The pyramid indicates that the average temperature of the total surface of the earth is 20° centigrade, or $\frac{1}{2}$ the interval between the temperature of melting ice and of boiling water.

13. The sum of the two diagonals of the pyramid, valued in English inches, is 25,859, a number sensibly equal to the year that separates the successive returns of the meridian of some fixed star; for example, *a Draconis*, or the number of years that the sun occupies in traversing the circle of the ecliptic.

14. The pyramid indicates that the density of the earth is 5.7, water being taken as unity. This density has been found by experimental methods, subject to great uncertainty, to be 5.67, 5.568, and 5.316, of which the average differs little from the figures given by the pyramid.

QUESTIONS.

1. Of whom was it said that he would eat at a breakfast, 500 figs, 100 peaches, 10 melons, 20 bunches of grapes, 100 small birds, and 400 oysters?
FENLON FOSTER.

2. Who first called man the Microcosm in contradistinction to the world as being the Macracosm or Megacosm.
SANFORD.

3. What President of the United States first used the expression, "By the Eternal," to emphasize his determination, and when, and on what occasion?
SANFORD.

4. What is the game called *Pharaon*, and where did it originate?
JONATHAN.

5. What historical writer received the name *Rambam*, and why was he so called?
JONATHAN.

6. Pythagoras advised his disciples to "abstain from beans." What reasons are given for this advice?
ENQUIRER II.

7. Why was one of the leading thoroughfares in London called *Paternoster Row* ("Our Father")?
G. S. CLARK.

8. "Work done is won, soul's joy lies in the doing." Can some reader give me the correct version and source of the above?
G. F. K.

9. Which are considered the seven greatest hymns of the Christian dispensation?
WELLINGTON HOWARD.

10. There is a tradition or record that all person before the days of the patriarch Jacob, by sneezing slew themselves, and that Jacob obtained a relaxation of such a sudden death. Where can the account be found.
WELLINGTON HOWARD.

11. What is the origin of the expression: "A *sic vos non vobis* affair."
AGNOSTIC.

12. Does there actually exist fire known as "Jack-with-a-lantern," "Will-o'-the-Wisp," "St. Elmo's Fire," etc.?
JEROME.

13. Who was the "Brahan Seer," and what were the character of his prophecies?
M. M. W.

14. Who was Potter Christ who lived somewhere in the West of the United States several years ago, and left a work for the guide of his followers?
M. M. W.

15. Who was *Barchoeab* who took up arms against Rome, under the emperor Adrian?
SEARCHER.

16. Why was the Crescent adopted as the symbol of the followers of Mohammed?
SEARCHER.

17. In the "Queen's Wake," a Scottish poem a Rev. Mr. Grey is immortalized as the "bard of Greece," and author of a poem entitled "India." Where can this poem on India be found?
ENOCH.

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MISCELLANEOUS

NOTES AND QUERIES,

WITH ANSWERS.

" *The laws of nature are the mathematical thoughts of God.*" — PLATO

Vol. V.

OCTOBER, 1888.

No. 10.

THE ROYAL GAME.

—+—

This game the Persian magi did invent,
The force of Eastern wisdom to express;
From thence to busy Europeans sent,
And styled, by modern Lombards, pensive chess.

—SIR JOHN DENHAM.

The origin and history of "The Game and Playe of the Chesse," as Caxton quaintly denominates it, is involved in obscurity. Some authorities say it was first played before Troy, being invented by Palamedes to amuse the Grecian chiefs who were disgusted with the tediousness of the siege, while others claim it to be synonymous with the Roman *Ludus Latrunculorum*. There is also an Egyptian caricature in which a lion and a unicorn are indulging in a game which resembles this one, and even in distant China the natives say it was invented for the diversion of some troops disposed for mutiny. But the most probable conjecture is that it descended from the Brahmins through Persia to Arabia* about the sixth century, and passed into Europe two or three hundred years later.

Ravan, king of Ceylon, was besieged, it is said, in a strong fortress, and a Hindoo mathematician named Seffa devised the game for the amusement of his royal master, who mimicked the movements of his

* It is a curious fact that many of the terms employed in the game are palpably corruptions from Indian, Persian or Arabic words. Thus, check from the Persian *schach*, or king, and *mat*, in the same language, signify dead, hence "check-mate," or the king is dead.

enemies on the tiny battle-field before him. The monarch was so well pleased with the invention that he desired the philosopher to name any reward adequate to his ingenuity, and was astonished that he did not ask for wealth, but requested only a modest (?) quantity of wheat, equal to the number of grains arising from the successive doubling of a single grain for the first square of the chess-board, two for the second, and so on, doubling each product until the sixty-fourth square was reached, and finally adding all the products together. When the quantity of wheat which thus arose was computed, it was found to be greater than the whole world could produce in ten years.*

The Indian game differs somewhat from the European. The king, for example, is not permitted to move beyond a certain fortress, and the elephants, answering to our bishops, (and called in France the fools,) are not allowed to cross a fixed line of squares called a river. If a pawn has the good fortune to reach the square of the adverse king, or general, he too becomes a general; if he steps into the square of a knight, castle or bishop, he becomes that officer whose station he occupies,—but not until his master has lost such a one beforehand; otherwise he must endeavor to protect his pawn until the vacancy occurs. The Indian name of the piece we call queen is termed *pherz*, which signifies a vizier, or minister. When the game was brought into Spain from Arabia, this piece was denominated *fiercir*, and among old French authors we still see the gradually acquired name of *fierge*. The transition from *fierge* to *vierge* was very natural, due somewhat, perhaps, from its position by the side of the king. The absurdity of the metamorphosis of the vizier into a queen has remained to the present time, and the incongruity is still further increased by allowing a pawn or common soldier to change his rank and sex when he has reached the eighth square on his own "queen's" file. The word *rokk* in the Indian language signifies a dromedary, and the movements of this piece correspond with those of the rook or castle of the present day.

The following description of a checkmate is taken from an ancient poem on chess :—

" As when an Aas that from the common strays,
And breaks through fences, in fat meads to graze,
Is by the farmer banged from off the ground,
And children chase him to the parish pound;
The heavy stubborn beast, with motion slow,
And step by step, just budes, loth to go;

* " This question may be solved by multiplication and addition, but more expeditiously by geometrical progression. By this method it appears that the number of grains of wheat amounts to 18,446,744,073,709,551,615. Allowing 9,216 grains to an English pint, the quantity in bushels is easily calculated. For 9,216 multiplied by 8 gives 73,728 grains in a gallon, and that by 8 gives 589,824 grains in a bushel. Dividing the original number by this last, we have 31,274,997,412,295 for the number of bushels. Now, if 30 bushels be the average product of an acre in a year, it requires 1,042,499,913,743 acres to produce so many bushels, or about eight times the circumference of the globe."—*Encyclopædia Edinensis*.

So moves of majesty, the bulky weight,
 Now regal only in his port and gate:
 His guards, his army, and his pride, subdued,
 By pawns insulted, little pawns pursued;
 Till penn'd and pounded by the puny hands,
 Where late he reigned, he there close prisoner stands."

When a messenger informed Alamin Ben Haroun that the city of Bagdad was besieged, the caliph silenced him, saying, "Don't you see that I am on the point of giving checkmate?" The same potentate sought out the best players of his empire, brought them to court and pensioned them. His father, Abdallah III, used to bewail his sad fate in having more capacity for governing nations than for moving chessmen.

Ben Ziad, a caliph of Mecca, was also very fond of the game. "Is it not extraordinary," said he to a favorite with whom he was playing, "that sixteen pieces of ivory, placed on so small a plane, should give me more trouble than so many millions of men that cover the vast empire of my domains?"

Seneca relates of one Canius Julius, that he was playing at chess when the centurion, who was leading a troop of condemned men to death, commanded him also to join them. As the game was unfinished, he said to his opponent, "Beware, when I am dead, that thou beliest me not, and say thou hast won the game." Then addressing the centurion, he said, "Bear me witness that I have the advantage by one," and directed his steps to the place of execution.

Although we can find no definite traces of the game in England before its introduction by the French in the eleventh century, it was scattered over Europe at the time of Charlemagne*, and received a new impulse upon the return of the crusaders. Alphonso X, king of Castile, and Pope Innocent III, are both said to have written works upon it, and from an unknown Italian author of the thirteenth century an illuminated missal is extant containing a treatise in Latin hexameter upon chess. The manuscript states, after describing the pieces and moves, that the board represents the heavens, the squares the constellations, and the pieces the sun, moon and planets. He then continues: — "The king is the sun, the pawn is Saturn, the knight is Mars, the queen is Venus, Alphynus the bishop is Jupiter, and the rook is the traveling moon.†

*A set of chess-men said to have been those with which this emperor was wont to play, are in the royal treasury of St. Denis, near Paris. The king is seated on a throne, the whole figure being about a foot in height. The queen, crowned, occupies a smaller throne. Two archers, who take the place of bishops, hold each a drawn bow; next to these are two centaurs, and lastly two elephants. The sixteen pawns resemble soldiers, and are armed with swords.

†"Rex est sol, pedes est Saturnus, Mars quodque miles, regia virgo Venus, Alphynus Episcopus Ipse est Inppliter, et roccus discurrens luna."

In the *Syntagma Dissertagmionum* of Thomas Hyde, Professor of Arabic in the University of Oxford, published in 1694, we read that the ancient Irish were exceedingly fond of chess, and that, amongst them, the possession of some valuable estates has been decided by the game. The heirs of two noble families, the doctor says, hold their lands upon this tenure, that one of them shall encounter the other at chess, and that whoever of them should conquer shall retain the estate of his opponent; therefore, they, managing the affair prudently among themselves, meet by appointment perhaps once a year to indulge in this pastime, one of them makes a move, and the other takes a year before replying. A scribe commits to writing the situation of the game, which by this method may continue from one generation to another.

Prince Henry, the youngest son of the Conqueror, afterwards Henry I, was sent with his brother Robert to the French court, and on a certain day after dinner he encountered Louis, the king's eldest son, at chess, and won so much money from him that Louis, losing his temper, reproached Henry with the base birth of his father and threw the pieces in his face. Henry took up the board and struck his antagonist with such force that he drew blood, and would have killed him had not his brother Robert interfered. King John was also a chess player, and was so engrossed in a game when the deputies from Rouen came to notify him that their city was besieged by Philip Augustus, that he turned a deaf ear to their words until he had finished.

Some of the early players were quite expert at this pursuit while blindfolded, and others could play three or four games at one time. A Saracen named Buzecca visited Florence in 1266, and played simultaneously with three of the most skillful masters in that city. He saw but one board of the three, and won two games, the third ending in a drawn battle. Salvio, who wrote a treatise on chess, Zei one, Mediano, and the "chess-bishop," Ruy Lopez of Spain, Mangrolino of Florence, and Paoli Boi of Syracuse, were all accomplished blindfold players. Keysler informs us that Sacchieri, a Jesuit of Turin, who possessed a most wonderful memory, could play with three different opponents, without seeing one of the boards, and moreover converse with the company during the time of play. If any dispute happened to arise about the situation of any piece or pawn, he could repeat every move made by both contestants from the beginning of the game, in order to ascertain the location of the piece.

Tamerlane was extremely fond of chess, and invented several forms of chess boards for the improvement of the military art, in order to represent the various evolutions of an army on the battle field. He himself was engaged in a game during the very time of the decisive battle with Bajazet, the Turkish emperor, who was totally defeated and taken prisoner. In the "Chronicle of the Moorish Kings of Granada," there is related that, in 1396, Mehemed Balba seized upon the

crown which justly belonged to his elder brother, and spent his life in a succession of disasters. His wars with Castile always terminated so unsuccessfully, that finally, finding his position desperate, he despatched an alcaide to the fort of Salobrena to assassinate his brother Jussef, lest those who espoused the cause of the latter should form any obstacles to his (Mehemed's) son's succession. The officer found Jussef engaged at a game of chess with a priest, and when the prince learned the motive of the messenger, he begged for two hours' respite, which was at first denied, but finally the officer relented so far, in that he allowed him to finish the game; before its termination, however, word was brought of the death of Mehemed, and the unanimous election of Jussef to the throne.

In 1475 appeared the second book ever printed in the English language, *The Game and Playe of the Chesse*.* "Fynysshid the last day of Marche the yer of our lord god. a. thousand foure hunderd and lxxiiij." It contains little or nothing, however, upon the subject which its title-page would lead us to surmise, being devoted to "thauctorites, dictees, and stories of auncient Doctours philosophes poetes and of other wyse men whiche been recounted & applied vnto the moralite of the publique wele as well as of the nobles as of the comyn peple after the game and playe of the chesse."

We may here recount a few of the famous Englishmen who took delight in the "Royal game." Among the monarchs besides those already mentioned, we find Elizabeth, James I and Charles I, the latter of whom was indulging in this pastime when news was brought of the final intention of the Scots to sell him to the English. He continued his game with the utmost composure, and no one could have surmised that the tidings he had received were the reverse of agreeable. William of Orange, Prince Albert and Queen Victoria deserve enumeration among the chess fraternity, and Prince Leopold distinguished himself at Oxford as a fine player.

Philosophy, Science and Art are represented by such names as Lord Bacon, Wollaston the physician, Dr. Roget the mathematician, Flaxman the sculptor, and Proctor the astronomer, who occasionally found time to compose a problem.

But it is among the literati that our search is mostly rewarded, and truly, did space permit, we could mention a host of celebrities who are devotees of the mystic board. Amongst others we discover the Benedictine monk, John Lydgate, the author of the *Anatomy of Melancholy*, and the almost forgotten poets, Abraham Cowley, Sir John Denham,

* Only twelve copies of this book are known to exist, and consequently it must ever remain a *rara avis* among collectors. In 1813, Alchorne, a copy, wanting six leaves, fetched £54 12s. at auction, while in 1869 Mr. Quaritch offered a copy for sale, wanting seven leaves, for four hundred pounds!

and Nicholas Breton. The last named has given us a beautiful poetical description of chess, concluding with the following :

L'ENVOY.

"Then rule with care, and quicke conceit,
And fight with knowledge, as with force;
So beare a braine, to duell deceit,
And work with reason and remoraes.
Forgive a fault when young men plaie,
So give a mate, and go your way.

"And when you plaie beware of checke,
Know how to save and give a knacke,
And with a checke beware of mate;
But chiefe, ware had I wist too late:
Lose not the Queens, for ten to one,
If she be lost the game is gone."

Sir John Harrington, Walter Raleigh, Earl Chatham, Warton and Edmund Burke must not be forgotten in our list, and Sir W. Jones, Sir Walter Scott, Sydney Smith, Warren the novelist and Buckle the historian were also attached to the game. It may not be generally known that the friendship between Samuel Johnson and Mr. Baretti, which had existed for over thirty years, was broken off on account of a game of chess. It seems that Onai, a native of Otaheite, became considerably proficient in this game while in London, and at one time defeated Mr. Baretti. The latter was frequently and occasionally unmercifully rallied by the great lexicographer on the subject, and "at length," says Mr. Baretti, "he pushed his banter on at such a rate that he chafed me, and made me so angry that, not being able to put a stop to it, I snatched up my hat and stick and quitted him in a most choleric mood." After the doctor had learned how thoroughly he had offended his friend, he again invited him to his house; but Mr. Baretti was then in the country, and before he returned Johnson was dead.

There is a story told of the Earl of Sunderland, minister to George I., who was a good player, that he upon a certain day had for his opponents the Laird of Cluny and the learned Cunningham, the editor of Horace. Cunningham with too much skill and too much sincerity beat his lordship. "The Earl was so fretted at his superiority and surliness that he dismissed him without any reward. Cluny allowed himself sometimes to be beaten, and by that means got his pardon, with something handsome besides."

Benjamin Franklin compared the game of chess to human life, "in which we have points to gain, and competitors or adversaries to contend with, and in which there is a great variety of good and ill events that are, in some degree, the effects of prudence or the want of it." He contends that by studying it we learn several things, viz.:—fore-sight, circumspection, caution, and finally "the habit of not being discouraged by present bad appearances in the state of our affairs, the

habit of hoping for a favorable change, and that of persevering in the search of resources."

Catherine de Medici, Henri IV. and Louis XIII. were chess players. Louis XIV., who detested games of chance, and would not allow them to be played at court, was so passionately addicted to chess that he pursued it even when riding in his carriage. Each man had a pin at his foot, which, being stuck into a padded chess-board, resisted the joltings of the royal vehicle. Philidor says that a set of chessmen belonging to Prince Eugene were in the possession of a coffee-house keeper at Rotterdam. They were three inches in height, made of solid chased silver, not different in color, but sufficiently distinguished by one side representing Europeans and the other Mongolians. The famous Prince of Conde seems to have held a similar opinion with Tamerlane, for he contended that it was necessary for an officer, in order to become a good general, to understand chess thoroughly.

Among other French monarchs and statesmen we must not omit, as being partial to the game, the names of Richelieu, Marshal Saxe, Robespierre and Bonaparte, as well as the latter's marshals, Berthier, Murat, and Eugene de Beauharnais. Two of Napoleon's greatest antagonists have figured in chess history: one, Admiral Tchichakoff, who opposed his passage to the Beresina, and the other no less a personage than the Iron Duke himself.

French authors as well as scientists seem to have found spare time for this pursuit, the names of Helvetius the physician, Comenius the grammarian, Voltaire, Rousseau, Marmontel, Baron Holbach, Lacretelle the jurist, and Diderot and D'Alembert the encyclopædists, figuring among the brotherhood. D'Aguesseau, the chancellor of France, was very fond of this exercise, and was accustomed to play with M. de Legalle, the master of Philidor and the best player of his time, for half a crown a game. The latter once proposed deep play to the chancellor, explaining it to be a living at Vincennes, that he wished to procure for an Abbé of his acquaintance. D'Aguesseau had the move, and in advancing his pawn he said "*va l'Abbé.*" His opponent, though in the advantage, did not desire to win the game, and upon his resigning the chancellor told him that his own victory should not prejudice his friend, and accordingly he gave him the benefice.

There is a curious anecdote told of Ferrand, Count of Flanders, that he was in the habit of being constantly defeated by his wife, with whom he was accustomed to play at chess, so that a mutual hatred took place between them, which finally rose to such a height that when her husband was taken prisoner at the battle of Bovines, the countess suffered him to remain confined a long time, though she could easily have procured his release.

Ferdinand of Aragon, Sebastian king of Portugal, and Philip II. of

Spain, must not be forgotten in our enumeration. A Spanish nobleman having frequently played at chess with the latter monarch, and being a far more skillful player, won continually, and finally perceived that his majesty was much ruffled from chagrin when he rose from play. The lord, when he returned home, said to his family: "My children, we have nothing more to do at court; there we must expect no favor, for the king is offended at my having won of him every game of chess." Philip considered that he ought to suffer no rival, not reflecting that this game depends solely on the genius of the players, and not on the quantity of their possessions.

Olaus Magnus, who flourished in the sixteenth century, informs us that in his time it was "a custom among the most illustrious Goths and Swedes, when they would honestly marry their daughters, to prove the disposition of the suitors that came to them, and to know their passions especially, by playing with them at tables or chess. For at these games their anger, love, peevishness, covetousness, dullness, and many more mad pranks, passions and motives of their minds, and the forces and properties of their fortunes, are used to be seen: as whether the wooer be rudely disposed, that he will indiscreetly rejoice and suddenly triumph when he wins; or whether, when he is wronged, he can patiently endure it, and wisely put it off."

Frederick the Great was a chess player, and occasionally indulged in a game with Marshal Keith, with living pieces, in which he employed the services of his soldiers. So also were Leibnitz, Grimm, Schumacher, Wolff, Euler and Kempelen the mathematicians, and the eccentric Duke of Brunswick. Dr. Robertson, in his "History of Charles V.," tells another anecdote to show that with some individuals the love of chess has been strong enough to counterbalance the fear of dying. John Frederick, Elector of Saxony, made prisoner at the battle of Muhlberg in 1547 by Charles V., was playing chess with his fellow-captive, Ernest of Brunswick, when he received the news of his condemnation to death. After a few remarks on the irregularity of the emperor's proceedings, he quietly continued his game. On winning it, he expressed his satisfaction, and then retired to prepare for his execution. He did not, however, suffer the death penalty, but was released after five years' imprisonment.

The annals of chess, though furnishing numerous more difficult and tedious problems, contain none more marvellous than the following:

When Charles XII.* was pursued by the victorious Russians after

* Among the virtues of this youthful monarch must be enumerated his aversion of gaming, which he carried so far that he even prohibited any man in his army from indulging in game of chance. Chess, however, was excepted, and the king took such a delight in it that he encouraged the study and practice of it among all his courtiers. His playing was peculiar in one respect, viz., that he moved the king more than any other piece, a conduct in which he finds few, if any, imitators, on account of the ruin involved upon all the pieces in case the king meets with a disaster.

his defeat at the memorable battle of Pultowa, he sought refuge on a small island in the Dniester, in the dominions of the Sultan. Here, near the town of Bender, surrounded by Swedes, Poles and Tartars sent by the Sultan, and by janizaries in his service, he established his camp; till the Turk, fearing longer to offend the Czar, peremptorily ordered the unfortunate king to leave. The latter, notwithstanding that he had but three hundred men at his command, refused, and resolved to remain and die. Meanwhile the enemy, thirty thousand strong, besieged him there, with now and then an occasional shot to warn him of his danger. His constant amusement while in camp was chess, and among his most familiar opponents were the gallant Poniatowski and the brilliant Swede, Christian Grothusen. The Swedish historian Pryxell has recorded his contests with the latter, while the writings of Voltaire tell us of his combats with the former. It was in January, 1713,—not a month before his final capture and transport to Adrianople. The king and his General Grothusen were just at the close of a long and exciting contest, when Charles announced, "Mate in three moves." The position was as follows: White king on king's bishop's fifth, white rook on king's knight's seventh, white knight on the king's square, and white pawns on king's knight's second and king's rook's second; black king on king's rook's fourth, bishop on king's bishop's seventh, and pawns on king's rook's third and on king's knight's sixth. Thus:

WHITE (Charles XII).



BLACK (General Grothusen).

The words were no sooner uttered than a stray bullet, shattering a window-pane, hurled the white knight from the board, but ere his dismayed opponent could replace the piece Charles coolly smiled and said: "I do not need the knight," and declared mate in four moves. At this second announcement a second bullet removed the white rook's pawn. The monarch, with his accustomed composure, remarked to his opponent: "You have our good friends, the Turks, on your side; I can scarcely contend against thirty thousand heathen—this is the first time I have seen chess played with muskets. But wait," he added, "I think I can spare this unlucky pawn also," and informed the general that there was a "mate in five moves"! Those who belong to the school of Caissa can now produce their boards and endeavor to solve this problem.

Don John of Austria is said to have had a chamber in his palace the floor of which was paved with black and white marble like a chess-board, and upon this living men moved under his direction, according to the laws of the game. A duke of Weimar is also recorded to have possessed a similar apartment and utilized his soldiers for chess-men. In 1792, Hunter, in describing the palace of Akbar at Delhi, says that the pavement of one of the courts was "marked out in squares in the manner of the cloth used by the Indians for playing the game called pachess. Here Akbar used to play at the game, the pieces being represented by real persons. On the side of the court is a little square apart, in the center of which stands a pillar supporting a circular chair of stone, at the height of one story. Here the emperor used to sit to direct his moves."

And now, kind reader, our task is done, and our hope is that those who are not yet initiated into the mysteries and wonderful positions of this delightful recreation will be induced to penetrate them. We have only to add that in our rambles among chess-lore we have discovered the subjoined old quotation, and should be thankful to be informed of the authorship of the same:

THE DIVERSITIE OF MATES.

"The Queen's mate, a gracious mate.
The Bishop's Mate, a gentle mate.
The Knight's Mate, a gallant mate.
The Rooke's Mate, a forcible mate.
The Pawn's Mate, a disgraceful mate.
The Mate by discovery, the most industrious mate of all.
The Mate in a corner of the field, Alexander's mate.
The Mate in the midst of the field, an unfortunate mate.
The Mate on the side of the field, a coward's mate.
The Blind Mate, a shameful mate.
The Stole Mate, a dishonorable mate.
The Mate at two Draughtes, a fool's mate.

CAXTON.

Dr. Edward Jenner.

Dr. Edward Jenner, the author of this charming poem on weather signs, was born in Gloucestershire, England, May 17, 1749, and passed most of his life in Berkeley, as a regular medical practitioner. He was the discoverer of vaccination, as a preventive of small-pox, and after much opposition and great obloquy from the medical fraternity, lived to see his system triumph, and adopted in every part of the globe. Oxford University presented him with a diploma, the Royal Society admitted him to membership, and Parliament voted to him a gratuity of £20,000.

Besides the authorship of several medical works bearing on his great discovery, Dr. Jenner wrote much on Natural History, a subject of which he was very fond.

His poems exhibit the life and spirit of true genius, a close observation of nature and a weird and unique style of expression that remind one of the short fragmentary poems of Shakespeare.

He died January 26, 1823, and the poem given below, had a great circulation for a few years subsequent to his death, both in this country and England. It is copied from Leavitt's Farmers' Almanac for the year 1826.

W. H. H.

SIGNS OF RAIN.

An excuse for not accepting the invitation of a friend to make an excursion, with him.

An Original Poem, by the late Dr. Jenner.

1. The hollow winds begin to blow,
2. The clouds look black, the grass is low;
3. The soot falls down, the spaniels sleep,
4. And spiders from their cobwebs peep.
5. Last night the sun went pale to bed,
6. The moon in halos hid her head;
7. The boding shepherd heaves a sigh,
8. For, see, a rainbow spans the sky.
9. The walls are damp, the ditches smell,
10. Clos'd is the pink-eyed pumpernell.
11. Hark ! how the chairs and tables crack,
12. Old Betty's joints are on the rack;
13. Loud quack the ducks, and peacocks cry;
14. The distant hills are looking nigh.
15. How restless are the snorting swine,
16. The busy flies disturb the kine.

17. Low o'er the grass the swallow wings;
 18. The cricket, too, how sharp he sings;
 19. Puss on the hearth with velvet paws,
 20. Sits, wiping o'er her whiskered jaws.
 21. Through the clear stream the fishes rise,
 22. And nimbly catch the incautious flies;
 23. The glow-worms, numerous and bright,
 24. Illum'd the dewey dell last night.
 25. At dusk the squalid toad was seen,
 26. Hopping and crawling o'er the green;
 27. The whirling wind the dust obeys,
 28. And in the rapid eddy plays;
 29. The frog has changed his yellow vest,
 30. And in a russet coat is drest.
 31. Through June the air is cold and still;
 32. The mellow blackbird's voice is shrill.
 33. My dog, so altered in his taste,
 34. Quits mutton-bones, on grass to feast;
 35. And see yon rooks, how odd their flight,
 36. They imitate the gliding kite,
 37. And seem precipitate to fall—
 38. As if they felt the piercing ball,
 39. 'Twill surely rain, I see with sorrow;
 40. Our jaunt must be put off to to-morrow.
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ANNUAL MOURNING OF HASSAN AND HOSSEIN. (Vol. IV. p. 251.)

It is related that Hassan and Hossein, Mohammed's grandchildren, on a certain time being both sick, the prophet, among others, visited them, and they wished Ali to make some vow to God for the recovery of his sons; whereupon Ali and Fatema, and Fidda, their maid-servant, vowed a fast of three days in case they did well; as it happened they did. This vow was performed with so great strictness, that the first day, having no provisions in the house, Ali was obliged to borrow three measures of barley of one Simeon, a Jew, of Khaibar, one measure of which Fatema ground the same day, and baked five cakes of the meal, and they were set before them to break their fast with after sunset; but a poor man coming to them, they gave all their bread to him, and passed the night without tasting anything except water. The next day Fatema made another measure into bread, for the same purpose; but an orphan begging some food, they chose to let him have it, and passed that night as the first; and the third day they likewise gave their whole provision to a famished captive. Upon this occasion Gabriel descended with a chapter in the Koran, and told Mohammed that God congratulated him on the virtues of his family.

QUESTIONS AND ANSWERS.

RAMBAM. (Vol. V. p. 163.) Moses Maimonides (i. e. son of Maimon,) also called by the Jews Rambam, from the initial letters, R. MOSES b. MAIMUM and by the Arabians Abu Amran Musa b. Maimun Obeid Allah, son of the greatest of the Jews since the exile—the great luminary, the glory of Israel, the second Moses, the reformer of Judaism, as he is called, was born at Cordova, March 30, 1135. As a youth, he received his instruction in the Hebrew Scriptures, the Talmud, and Jewish literature, from his father, R. Maimon, who held the dignity of judge of the Jews, as also his forefathers had held it for some centuries previous, and was himself renowned as a scholar and author of a commentary on Esther, a work on the laws of the Jewish prayers and festivals, a commentary on the Talmud.

THE CRESCENT SYMBOL OF THE MOHAMMEDANS. (Vol. V. 163.) The crescent is the symbol of the Mohammedans, but it has nothing to do with their peculiar religious opinions. It was the ancient symbol of Byzantium, now Constantinople, and is found on ancient coins of that city, with the legend, "Saviour of Byzantium." When Philip of Macedon besieged Byzantium, and was going to storm it in a cloudy night, the moon shone out, and discovered his approach, so that the inhabitants observed and repulsed him. This story is told by three ancient writers,—Stephanus of Byzantium, Eustathius, and Hesychius Milesius. In consequence of this deliverance, the Byzantines erected a statue to Hecate, before which a lamp was continually kept burning. The Turks, on entering Constantinople when it was overthrown by Mohammed II., found this ancient badge of the crescent in many places, and suspecting some magical power in it, assumed the symbol to themselves, so that the crescent is now their bearing.

PATER NOSTER. (Vol. V, p. 163.) The name Pater Noster was given to one of the great thoroughfares of London on account of the many prayer-books sold in that street.

POEM ON INDIA. (Vol. V, p. 163.) Rev. Mr. Grey's poem on India was published in *The Zodiac*, a periodical issued in Albany, N. Y., in 1835-36. It is divided into two parts. Book I. consists of 88 verses, and Book II, 127 verses, of nine lines each. It is descriptive and full of life, portraying the religion, traditions, customs, manners, &c., of that ancient country.

TRADITION ON SNEEZING. (Vol. V, p. 163.) S. Baring-Gould's work "Legends of the Patriarchs and Prophets," p. 227, says: Custom of saying "God bless you!" when a person sneezes, dates from Jacob. The Rabbis say that, before the time that Jacob lived, men sneezed once, and that was the end of them—the shock slew them; but the patriarch, by his intercession, obtained a relaxation of this law, subject to the condition that, in all nations, a sneeze should be consecrated by a sacred aspiration.

WAR OF 1812-14. (Vol. V. p. 145.) The author's name of the pamphlet, asked for by M^r O. Waggoner, is Joseph Penley. He resided in Paris, Oxford county, Maine. I was personally acquainted with him and bought one of his pamphlets of him personally. Several of his sons are now living near me. He has been dead several years.
CALCHAS, Bryant's Pond, Me.

GREAT EATER. (Vol. V, p. 163.) This is Albinus, one of those who contended with Severus for the Roman empire. He is described as being like a leopard; this indicates a variegated character; and such was that of Albinus, of whom it is said that, notwithstanding his many vices, he was a man of great courage and skill in military affairs, and commonly called a second Cataline. The feet of a bear indicate a rude and brutal character; and it is said of Albinus, that he was stern, reserved, morose, and rigid to cruelty. The mouth of a lion may indicate a voracious appetite; and it is said of Albinus, that he would eat a breakfast 500 figs, 100 peaches, 10 melons, 20 bunches of grapes, 100 small birds, and 400 oysters.

POTTER CHRIST. (Vol. V, p. 163.) Potter Christ was a man who preached near Council Bluffs, Ia., in 1870, and claimed to be the "Messenger of the New Covenant," as prophesied in Malachi III, 1. He published a work entitled, "Revelations, given by inspiration of God for the Salvation of the Whole World." The titles he claimed for himself are: The Deliverer, Rom. XI, 26; Everlasting Father, Isaiah IX, 6; The Lord's Anointed, Psalm, II, 2; Ancient of Days, Dan. VII, 7, 13, 22; Second Adam, The Lord from Heaven, 1 Cor. XV. 45; Shiloh, Genesis XLIX, 10; Michael Your Prince, Daniel XII, 1; verse; Root and Offspring of David—Morning Star, Rev. XXII, 16; The Rod out of the Stem of Jesse, Isaiah XI, 1.

SIC VOS NON VOBIS. (Vol. V, p. 163.) The origin of the phrase is this: Virgil wrote a distich in praise of Cæsar, which was claimed by a poet named Bathyllus; Virgil, angry, wrote beneath the distich the lines:

"Hos ego versiculos feci, tulit alter honores ;
Sic vos non vobis——
Sic vos non vobis——
Sic vos non vobis——
Sic vos non vobis——

Cæsar asked Bathyllus if he could finish the lines, but he couldn't. Virgil then stepped up, and said he could. So he finished them thus:

——*fertis aratra boves ;*
 ——*mellificatis apes ;*
 ——*vellera fortis oves ;*
 ——*nidificatis aves.*

The translation of the five lines is: "These lines made I, another steals my honors; so you for others, oxen, bear the yoke; so you for others, bees, store up your honey; so you for others, sheep, put on your fleece; so you for others, birds, construct your nests."

HANSEATIC LEAGUE. (Vol. V, p. 96.) The Hanseatic League was a commercial association formed in 1239, by the people of Western Europe, to protect themselves against the banditti of the east. Some of their chief posts, formerly called Hanses, still remain as free cities; namely, Hamburg, Bremen and Lubec.

H. RITTERHOFF, New York City.

DID JESUS EVER LAUGH? (Vol. V, p. 78.) McClintock & Strong's Cyclopædia, Vol. IV. p. 884, says: According to the text of Gabler (in Latin) it reads as follows: "A man of tall stature, good appearance, and a venerable countenance, such as to inspire beholders both with love and awe. His hair, worn in a circular form and curled, rather dark and shining, flowing over the shoulders, and parted in the middle of the head, after the style of the Nazarenes. His forehead, smooth and perfectly serene, with a face free from wrinkle or spot, and beautiful with a moderate ruddiness, and a faultless nose and mouth. His beard full, of an auburn color like his hair, not long, but parted. His eyes quick and clear. His aspect terrible in rebuke, placid and amiable in admonition, cheerful without losing gravity; a person never seen to laugh, but often to weep."

QUESTIONS.

1. What was the "Quinquarticular Controversy" in England regarding some points of religious doctrines, some 300 years ago?
HERBERT.
2. Did the origin of the "Zodiacal Man" have any connection with the historical Judas Iscariot of whom it is related by Luke that "all his bowels gushed out."—*Acts* i, 18.
JACOB.
3. "Be not deceived; evil communications corrupt good manners."—*I Corinthians* xv, 33. Burritt's "Geography of the Heavens," p. 98, says Paul quotes this from the *Thais* of Menander. In D. Appleton & Co.'s edition of the "Poetical Works of John Milton," 1868, p. 359, it is stated that Paul quotes this from Euripides. Whis is correct? Give the reference—
LOIS PHILLIPS.
4. Who is the author of, and where found, the following, quoted from memory: "Some write their deeds in marble; He the Just, stooped down and wrote theirs in the dust."
ANDREW.
5. What was the so-called "Battle of the Chains?"
D. M. DRURY.
6. What was the so-called day of the Camel?
D. M. DRURY.
7. Is it possible that a decimal can ever be a repetend, even if the decimal should be extended to n places, provided the decimal is derived from a series? For example, could the value of π , or e , ever become a repeating decimal?
A TYRO.
8. What were the five keys of secret knowledge among the Mohammedans?
J. P. SHIELDS.
9. Who were the *genii* employed by Solomon in the construction of his Temple?
M. M.
10. What and where is Banbury Cross?
D. B. TOWNSERD.
11. Who wrote the ballad of "Wild Darrell," and where can it be found?
D. B. T.
12. What is the drama on which "Erminie" is founded, and what is the history of that drama?
D. B. T.
13. Whence the phrase "carrying coal to Newcastle?"
D. B. T.
14. Will some one give the names of the Twelve Apostles as they are represented in the painting of the Last Supper by Leonardo de Vinci; commencing at the left.
ADMIRER.
15. Who was "King Lemuel" mentioned in Proverbs xxxi, 1?
JONATHAN.
16. A theological writer quotes from the Bible this: "The apocalypse of the apocrypha." Where is it found?
SEARCHER.

MISCELLANEOUS

NOTES AND QUERIES,

WITH ANSWERS.

VOL. V.

NOVEMBER, 1888.

No. 11.

"There is a nearer way to Heaven than Homer's chain."—THOS. BROWNE.

The Religious Card-Player.

A soldier, by the name of Richard Lee, was taken before the Mayor of Glasgow for playing cards during divine service. The account of it is thus given in an English journal :

Sergeant commanded the soldiers at the church, and when the parson had read the prayers he took the text. Those who had a Bible took it out, but this soldier had neither Bible nor prayer book, but pulling out a pack of cards he spread them out before him. He looked first at one card and then at another. The sergeant saw him and said :

"Richard, put up the cards ; this is no place for them."

"Never mind that," said Richard.

When the service was over the constable took the soldier a prisoner and brought him before the mayor.

"Well, what have you brought the soldier here for ?" said the Mayor.

"For playing cards in church."

"Well, soldier, what have you to say for yourself?"

"Much, sir, I hope."

"Very good ; if not, I will punish you more than ever man was punished."

"I have been," said the soldier, "about six weeks on the march. I have no Bible or prayer-book ; I have nothing but a pack of cards ; and I hope to satisfy your honor of the purity of my intentions."

Then, spreading the cards before the mayor, he began with the ace.

"When I see the ace it reminds me there is but one God. When I see the deuce it reminds me of Father and Son. When I see the tray

it reminds me of Father, son and Holy Ghost. When I see the four it reminds me of the four evangelists that preached—Matthew, Mark, Luke and John. When I see the five it reminds me of the five wise virgins that trimmed the lamps. There were ten, but five were wise and five were foolish and were shut out. When I see the six it reminds me that in six days the Lord made heaven and earth. When I see the seven it reminds me that on the seventh day God rested from the great work which He had made and hallowed it. When I see the eight it reminds me of the eight righteous persons that were saved when God destroyed the world, viz., Noah and his wife, their three sons and their wives. When I see the nine it reminds me of the nine lepers that were cleansed by Christ, and nine out of ten never returned again to give thanks. When I see the ten it reminds me of the Ten Commandments which God handed down to Moses on tables of stone. When I see the king it reminds me of the great King of Heaven, which is God Almighty. When I see the queen it reminds me of the Queen of Sheba who visited Solomon, for she was as wise a woman as he was man. She brought with her fifty boys and fifty girls, all dressed in boys' apparel, for King Solomon to tell which were boys and which were girls. King Solomon sent for water for them to wash; the girls washed to the elbows and the boys to the wrists, so he told by that."

"Well, said the mayor, "you have given a description of all cards in the pack except the knave."

"I will give your honor a description of that, too, if you will not be angry."

"I will not," said the mayor, "if you do not term me to be the knave."

"Well," said the soldier, "the greatest knave I know of is the constable that brought me here."

"I don't know," said the mayor, "if he is the greatest knave, but I know he is the greatest fool."

"When I count how many spots in the pack of cards I find 365—as many as there are days in the year. When I count the number of cards in a pack I find there are 52—the number of weeks in a year; and I find four suits—the number of weeks in a month. I find there are twelve picture cards in a pack, representing the number of months in a year; and, on counting the number of tricks, I find thirteen, the number of weeks in a quarter. So you see, sir, a pack of cards serves for a Bible, almanac and prayer book."

THE LAST SUPPER. (Vol. V, p. 180.) The order of the twelve apostles, commencing at the left, as given on our copy of the painting of the last supper, by de Vinci, is as follows: James, Philip, Andrew, Judas Iscariot, Simon, John, (Christ), Bartholemew, Peter, James the less, Matthew, Thomas, Jude.

GÆLIC PROVERBS. Meal is finer than grain, women are finer than men. There was never good or ill but women had to do with it. Modesty is the beauty of women. I like not pullets becoming cocks. Take no woman for a wife in whom you cannot find a flaw. Choose your wife as you wish your children to be. Take a bird from a clean nest. Choose the good mother's daughter, were the devil her father. If you take a wife from hell, she'll bring you home there. When you see a well-bred woman, catch her, catch her; if you don't do it, another will match her. Their own will to all men, all their will to women. What a woman knows not she'll conceal. Harsh is the praise that cannot be listened to; dark are the dames that cannot be dallied with. Where a cow is, a woman will be; where a woman is, temptation will be (attributed to St. Columbia.) A man's wife is his blessing or bane. If you wish to be praised, die; if you wish to be derided, marry. You are too merry, you ought to marry. Who speaks ill of his wife dishonors himself. True or false, it will injure a woman. Warm is the mother's breath.—*A. Nicholson.*

We naturally expect to find a strong flavor of the sea derived from the Hebrides and the adjacent shores of the mainland, and the proverbs which come to us from this source are among the most racy and original of all. "No wind ever blew that did not fill some sail," is an "ill wind that blows nobody good." Making needless difficulties is happily described as "Making a great ocean of a narrow strait." For a man who piques himself on being always wiser than his neighbors, it is said: "He knows where the whales breed." For one who seems fated never to be in luck: "When the herring is in the north, Red Malcolm is in the south." Here is a brave and cheery utterance, peculiarly suggestive of the narrow seas, where the tide is a power not to be lightly set at nought: "None ever got tide with him that did not get it against him." Nor is the wind forgotten: "I shall go to-morrow said the King. You shall wait for me, said the wind." What a world of suggestive tenderness and pathos lies in the following: "There is hope of a man at sea, but none of the man in the church-yard!" To these may be added the following graphic little story. The small Hebridean islands of Elva and Gometra are divided by a narrow channel, which is passable at low water. On one occasion, when the minister, who had gone over to Gometra to preach—intending afterward to return to Mull,—was in the midst of his sermon, he was summarily interrupted by the Beadle with the warning: "Get on, Master John—the channel is filling!"—*Chamber's Journal.*

FORETELLERS OF STORMS. The saw-like note of the great titmouse is said to foretell rain; that of the blue tit, cold.

Various proverbs would seem to indicate that the cry of the owl, if heard in bad weather, foretells a change.

Herons, says an old author, flying up and down in the evening as if doubtful where to rest, "presage some evil-approaching weather"—a legend as old as Virgil.

In Germany dwellers in the country lack faith in the skylark as announcing fine weather, but when the lark and the cookoo sing together they know summer has come.

In Hampshire swans are believed to be hatched in thunderstorms, and it is said that those on the Thames have an instinctive prescience of floods. Before heavy rains they raise their nests.

In the south of France so much store is set by the wisdom of the magpie, that if it builds its nest on a summit of a tree the country folk expect a season of calm, but if lower down, winds and tempests are sure to follow.

The abhorrence in which mariners hold the swallow like storm petrel is well known. Its appearance is believed to denote wild weather. This little bird is the Mother Carey's chicken of sailors, and is also called storm finch and water witch.

Concerning gulls in general children who live by the sea say: "Seagull, seagull, sit on the sand; it's never good weather while you're on the land;" and fisher folk know that when the seamews fly out early and far to seaward, fair weather may be expected.

When rocks fly high and seem to imitate birds of prey by soaring, swooping and falling, it is almost a certain sign of coming storm. Staying in the vicinity of the rockery, returning at midday or coming to roost in groupes are also said to be omens to the like effect.

The constant iteration of the green woodpecker's cry before the storm has given it the names of rain-bird, rain-pie and rain-fowl. Stormcock is a provincial name shared by this bird and the missel thrush, the latter often singing through gales of wind and rain. Storm bird is also applied to the fieldfare.

To Scotch shepherds the drumming of the snipe indicates dry weather and frost at night, and Gilbert White remarks that woodcocks have been observed to be remarkably listless against snowy, foul, weather, while, according to another author, their early arrival and continued abode "foretells a liberal harvest."—*Chicago News*.

"THE ORDER OF THE SACRED HEART." What are the prime principles of this recently promulgated order?
DAMON.

As yet this order has no rules, no initiation fees, no formal or ceremonial initiations. Its rules are entire freedom, for it will have no members who cannot be trusted as we trust God. Its initiation fees are the voluntary service of each one to the same beneficent ends. Its initiations are the sacred and private ones that must come to each before he or she will ever dream of entering upon service. Whoever does freely give in allegiance to its immense and world-wide purposes, by so doing virtually says: With all my powers of body, mind and soul, with all my senses on the alert, I give my individual assurance:

1. I affirm that what is known as the "fall of man" was a fall into physical generation, resulting in the separation of an other wise perfect being into two perfect halves, and the solidification of the human form, rendering it subject to pain and death, and the necessity of repeated physical births, lives and deaths.

2. I affirm that the antagonisms of nature; the strife and turmoil of the animal creation; the difficulty with which nature yields her increase; the great catastrophes that afflict her and involve us in them, are the result of the antagonistic forces generated in our loves and lives, together with the presence here of invisible beings, whose wills are utterly perverse and rebellious against the divine order.

3. I affirm that these beings, of whom I have spoken, are kept alive by the awful waste of our life forces, caused by an over-stimulation of the intellectual and physical centers of activity—the brain and the sex forces—both of which are self-destructive, because though failing to hold them subject to the true heart center, we are constantly dissipating our soul substance.

4. I affirm that a great conflict is being fought between these powerful beings and equally powerful good ones, variously called angels; guardian spirits; sons of God; Mahatmas; teachers; inspirers; who cannot fight the battle for us, but can help us when by our method of life we so conserve the forces of being, that through them they can co-operate with us, and we with them, by becoming in various ways sensible of their glorious companionship.

5. I affirm that the various manifestations we call Spiritualism, and in which we are all so deeply interested, about equally divided between these evil beings, who are still at their work of deception, and these God-like beings, who are working through these methods for our rescue and redemption.

6. I affirm that in all the life and death of Jesus, the great renunciation of Buddha, and in all the sacred writings of the world, we have pictured for us these great truths, teaching us the way back to the Lost Paradise.

CHINESE PROVERBS. New milk is not got from a statue.

Ambition is like hunting for fleas.

An emperor may have the measles.

The hasty man drinks his tea with a fork.

A little scandal is to tea what an olive is to wine.

A wise man at court is like a mermaid in a ball-room.

Shave with a file if you like, but don't blame the razor.

A disobedient son is a bad bull tied to his father's pig-tail.

Teaching a woman scandal is like teaching a kettle to boil.

Be not too prodigal; the kettle when too full puts out the fire.

Carrying a peacock on your head does not make you a nobleman.

If the golden key won't open a woman's heart try brass.

A comet can be caught any time by putting a little salt on his tail.

He who marries an angry woman must sleep in a bed of fireworks.

Never do anything hastily; remember, it is the last cup of tea that is the strongest.

Looking into the future is like giving a blind man a pair of spectacles to see through a mill-stone.

THE ORIGIN OF THINGS. The first daily, *Frankfort Gazette*, in 1615.

The phonograph was invented by T. A. Edison, 1877.

Theophrastus mentioned amber in his writings 300 B. C.

The most authentic newspaper was published in 1494.

The first bank was established by Lombard Jews, in Italy, A. D. 808.

Aurelian was the first Roman emperor who wore a diamond, A. D. 273.

Photographs were first produced in England in 1802; perfected in 1841.

The first daily paper in the United States, *The Pennsylvania Packet*, in 1784.

Gutta percha was first used as a coating for telegraph wires, in Brooklyn, in 1848.

The first daily paper continuously printed in America, *The Boston News Letter*, in 1702.

The first academy for girls only was the Adams academy at Derry, N. H., incorporated in 1823.

Famous Earthquakes.

Year.	Place.	Persons Killed.	Year.	Place.	Persons Killed.
1137,	Sicily,	15,000.	1859,	Syria,	20,000.
1159,	Syria,	20,000.	1784,	Ezing, Asia Minor,	5,000.
1268,	Cilicia,	60,000.	1897,	Country between Santa Fe and Panama,	40,000.
1456,	Naples,	40,000.	1805,	Naples,	6,000.
1533,	Lisbon,	30,000.	1822,	Aleppo,	50,000.
1626,	Naples,	70,000.	1829,	Murcia,	6,000.
1667,	Schmaki,	80,000.	1830,	Canton,	6,000.
1692,	Jamaica,	3,000.	1842,	Cape Hatien,	4,000.
1693,	Sicily,	100,000.	1857,	Calabria,	10,000.
1703,	Avuila, Italy,	5,000.	1859,	Quito,	5,000.
1703,	Yeddo, Japan,	200,000.	1860,	Mendoza, South America,	7,000.
1706,	The Abruzzi,	15,000.	1868,	Towns in Peru and Ecua- dor,	25,000.
1716,	Algiers,	20,000.	1875,	San Jose de Cucuta, Col. umbia,	14,000.
1726,	Palmio,	6,000.	1881,	Scio,	4,000.
1731,	Pekin,	100,000.	1880,	Charleston,	96.
1746,	Lima and Callao,	18,000.			
1754,	Grand Cario,	40,000.			
1755,	Kashan, Persia,	40,000.			
1755,	Lisbon,	50,000.			

THE CALLIOPE. It was on the nation's Independence Day in 1856, that the calliope made its debut at Worcester, Mass. Its inventor, Joshua C. Stoddard, had toiled for over a year in the machine shop of Wood & Light, and, with admirable patience, had succeeded in reducing the harsh tones of escaping steam through the bell whistle to trained musical notes, and at night, not only the city, but the country for miles around was serenaded. On a special railway trip to Providence, great crowds rushed to hear the new instrument, and Mr. Stoddard was loaded with honors. The press described it as a "gigantic novelty," and "blowing a hurricane of music." At a distance of two miles, N. P. Willis, the poet, wrote to the *Home Journal*, "The tones were soft and musical, but yet as distinct and powerful as though they had been produced close by. They seemed to pervade the whole atmosphere. I stood in astonishment, and watched and listened." This was on the Hudson river. The rare instrument has since been heard on numerous great rivers, in traveling shows, at fairs exhibitions, etc., world over. On the car of fire and iron, the calliope is the voice of the "metallic devil" tamed and singing sweetly at the lucid intervals of his madness, singing the *hallel* of a royal car ere long to descend from the skies.

Questions and Answers.

ACHILLES' SHIELD. Will you give us a literal rendering of Homer's description of Achilles' Shield? JONATHAN.

First of all, Hephæstus (Vulcan) made a shield large and strong, ornamenting it in every part; and around it he threw a bright rim, triple, and glittering; and he fitted to it a silver handle. Five were the thicknesses of the shield, in which he made many ornaments with cunning skill.

In it he made earth, and heaven, and sea; and the never-wearied sun, and the full moon; in it he made also every constellation with which heaven is decked—the Pleiades, the Hyades, and the strength of Orion; and the Bear, to which some give the Wain also, which revolves around the pole and looks toward Orion, and alone of the constellations dips not in the waters of ocean.

And in the shield he made two beautiful cities, in one were marriages and feasting; and they were leading brides from their chambers by the light of torches through the city, and loud the nuptial song arose. And dancing youths were moving quick, and pipes and lutes kept up music for them; and the women stood and admired, each at her house door.

[In another part] the people assembled in a public place; and there a dispute had begun; two men were disputing about the fine of another man who had been murdered. One man said that he had paid the whole fine, addressing himself to the people; and the other said that he had received nothing at all. And both were eager to have the matter decided by witnesses (or judges). The people shouted aloud as they favored either party; but the officers kept the people in check, and the old men (the judges) took their seat on benches of polished stone, forming a hollowed circle. In their hands they held wands, such as belong to loud-tongued criers; with these they waved for silence, and each in turn gave his opinion. And there lay before two talents of gold, to be given to him who should pass the most just judgment.

But around the other city were lying two armies, glittering in their armour; and they were divided in opinion, whether they should plunder the city, or consent to depart on receiving half of the citizens' goods. But the besiegers were not induced to come to terms, but armed themselves to lie in ambush. The walls were defended by the women and the young children who took their station there, and next to them stood the old men. The army advanced, and Ares (Mars) and Pallas Athene led them, both represented in gold, and clothed in golden garments, beauteous and tall as gods should be, and both of them conspicuous; but the people were smaller. And when they came

to a fit place for ambush, by the bank of a river, where all the cattle were watered, they sat down cased in their glittering armour of brass. Two scouts took their station at a distance, and waited to look out for the sheep and herds with bending horns. And they soon came on, with two keepers following, who were playing on their pipes, without suspecting any danger. The enemy, when they got sight of them, rushed on and separated the herds of oxen and the fine flocks of white sheep from their keepers, and killed the keepers themselves. But when the citizens heard a loud noise among the cattle, while they were seated in front of the public place, immediately on swift horses mounted they arrived at the spot; and there they fought a battle by the banks of the river, and pierced one another with their brazen-pointed spears. And among the crowd were strife, and tumult, and deadly fate holding one prisoner just wounded and another unwounded; a third who was dead, she was dragging by the feet in the turmoil. And her garment about her shoulders was stained with blood. These mingled in the battle like mortals, and fought; and dragged off the dead from either side.

And in it he made a soft fallow, a fertile arable land, spacious, thrice worked; and many ploughmen in it, driving their oxen, turned them this way and that. When the ploughmen after turning came to the end of the field, a man was ready to put in their hands a cup of honey-sweet wine; they accordingly turned their ploughs along the furrows, being eager to arrive at the end of the fertile field. And it (the field) grew black behind them, and was just like a ploughed field, though made in gold; this indeed was a marvelous piece of workmanship.

And in it he made a field with high standing corn, and reapers were cutting with sharp scythes in their hands; while some stalks were falling on the swathes, close after one another on the ground, the binders were fastening others up in sheaves. The sheaf-binders were three, and behind them children collecting the corn in bundles, and carrying it in their arms, continually supplied the sheaf-binders. Among them stood the lord in silence, on a swathe, with a staff in his hand, well pleased. In another part of the field servants were preparing a repast under a tree, and they were dressing a large ox which they had killed; while the women were preparing supper for the reapers, and were kneading much white meal.

And in it he made a vineyard, heavily laden with bunches of grapes, beautiful and of gold; and the grapes were black. The vines were all supported by silver props. Around the vineyard was a dark-looking ditch, and also a hedge made of tin; and a single path led to the vineyard, by which the gatherers used to go, when they plucked the grapes. Merry virgins and youths were carrying in wicker branches the honey-sweet fruit. And in the midst of them a boy was playing on his sweet lute, and was singing to it the song of Linus with his

soft voice; while the youths and virgins, striking the ground to the tune, with songs and shouts followed, nimbly moving their feet.

And in it he made a herd of oxen with upright horns; and the cattle were made of gold and tin; and with lowing they were moving from the stalls to the pastures, along a murmuring brook, by the rustling reeds. Keepers of gold were following the herd; four keepers, and nine swift dogs with them. Two horrid lions seized a bellowing bull foremost among the herd, and he dragged along roaring, while the dogs and the young men came quickly after him. The lions having torn the hide of the strong bull, were eating the entrails, and lapping his blood; but the keepers in vain followed and urged on the quick dogs; for they had kept aloof from biting the lions, but stood near and barked; yet all the while kept they out of the lions' way.

And in it skillful Vulcan made a peice of pasture, a large pasture for white sheep in a beautiful valley; he made both folds and huts for the shepherds, and pens with roofs.

And in it skillful Vulcan made a dance like that which Dædalus once made in spacious Gnossus for Ariadne with beautiful hair. There youths, and virgins too he bought with large dowries, were dancing, holding one another by the hand: the virgins were clothed in fine linen, and the youths in well-spun vests, smooth, and shining like oil. And the girls had beautiful chaplets on their heads, while the youths had golden knives fastened with silver chains. At one time they would move lightly with their feet (running in a circle), just as a potter who is seated tries the wheel well fitted to his hands, to see if it will run: at another time they would move in lines toward one another. And a large crowd delighted stood around the happy troop, two active dancers among them began the song, and moved quickly in the midst.

And in it he placed the great strength of Ocean, along the outer border of the well-made shield.

YGGDASIL. (Vol. V, p. 148.) Yggdasil is the great "World-Ash" of the ancient Skandinavians, *Fraser's Magazine* derives the name from Y-g-g-r, the Thinker, the Terrible—a name of Odin, and *draga*, to bear or carry. This makes the name mean a vehicle or ovator of Odin; and the tree is analogous to the Bo-tree and Banyan of India. It is the Tree of Life, of which every human being is a participant. To describe it, however, would require a treatise, and there are several works already that treat of it, among them, the *Prose Edda*, Mallet's "Northern Antiquities," Forlong's "Rivers of Life," etc. Rev. James Challen wrote a poem upon it.

A. WILDER, M. D.

AN ANCIENT WORD. (Vol. V, p. 148.) Emanuel Swedenborg spoke repeatedly of an Ancient church and a most Ancient church. The latter of these was in direct communication with the celestial beings, as he was himself in his illuminated seasons. The Ancient church was less exalted, and was the possessor of the "Ancient Word"—a divine revelation given for their benefit and instruction. In his work, the "Apocalypse Revealed," he says: "Seek for it in China, perchance it may be found in Great Tartary."

Every person must, and will, exercise his own judgment in regard to the illumination and character of Swedenborg. I do not dispute them; but I have surmised that he was a member of secret orders of learned men who possessed in their arcana, ancient faiths and doctrines which formerly dominated in the oriental world, and were afterward proscribed by the Roman church. It is plausible that the Hebrew Scriptures were more or less formed from older records. We find such phrases as the "God of Heaven" (Ahurmazd), "God of Truth" (Asha-Vahia), also "angels" and "princes" or Yazatas and Amshashands. That there were ancient sacred Scriptures, the two Aryan collections, the Vedas and Avesta, conclusively show. There were also the Baskets of the Buddhists, and others now well known to exist.

Again, it is pretty generally believed among the learned that the earlier seats of the Aryans and other leading human races were in "Great Tartary," or somewhere in that region.

The Khatans, Akkads, Eurythæns, Drairdes, and others, also appear in Archaic monuments, and traditions appear to have originated them. Semitic and Aryan races seem to have been of late development. The Chinese in the East, the Skyths, and Aethiopes were from that source. These people had religious and social polity, and letters. The late tribes about, whom we have tried to construct history, were their offshoots, and derived their notions and customs from them. Whether, therefore, Swedenborg derived this arcana from intercourse with those having knowledge in these matters, and afterward wrote it out after his own style of allegory and correspondence, or whether angels spoke to him, and he was illuminated, it is very certain that what he said of an "Ancient Word" was borne out by facts, and that it is probably possessed by the intelligent classes in China. But who will know it when he finds it?

A. W.

Will you kindly inform me, through NOTES AND QUERIES, of any book or books on the subject of "Height or Growth of the Human Body," and oblige,
C. F. PEASLEE, Boston, Mass.

The proportions of the human figure are said to be strictly mathematical. The whole figure is six times the length of the foot. Whether the form be slender or plump, the rule holds good; any deviation from it is a departure from the highest beauty of proportion. The Greeks made all their statues according to this rule. The face, from the highest point of the forehead, where the hair begins, to the chin, is one-tenth of the whole statue. The hand, from the wrist to the middle finger, is the same. From the top of the chest to the highest point in the forehead, is a seventh. If the length of the face, from the roots of the hair to the chin, be divided into three equal parts, the first division determines the place where the eyebrows meet, and the second, the place of the nostrils. The height from the feet to the top of the head, is the same distance from the extremity of the fingers when the arms are extended.

"BY THE ETERNAL." (Vol. V. p. 168.) South Carolina, named in honor of Charles II. of England, by whom the province was created in 1663. One of the thirteen original states. First permanent settlement made by English at Port Royal, 1670. Famous nullification troubles occurred 1832-33, led by J. C. Calhoun, and opposed vigorously by President Jackson, during which his famous expression "By the Eternal," was first used.

THEBES. (Vol. V. p. 148.) It is probable that the name *Thebes* (in Egypt) only means *the city*, in the same sense of metropolis or "town." Thus Rome was called *Urbs*, and time reckoned *anno Urbis condita*. Athens was *aster* and Tyre was *Kartha*.

Medina also signifies a dwelling-place—Daniel iv, 25-32, and v, 21. The Egyptian name is *ta*, the, and *ape*, city. A. W.

"BY THE ETERNAL. (Vol. V. p. 31.) President Jackson used to have the credit of using the phrase "By the Eternal" pretty often. When Nicholas Riddle refused to permit him to carry his civil-service policy to the extent of warning officers of the United States bank, he is said to have declared his purpose to crush the bank, sealing it by that characteristic "swear."
A. WILDER.

POLARIZATION OF LIGHT. (Vol. V, p. 148.) "ENO" will find a good account of polarization of light in Brande's Encyclopædia, *Art* "Polarization." The polarization of light may be effected in various ways, but chiefly in the following: 1. By reflection at a proper angle from the surfaces of transparent media, as glass, water, &c. 2. By transmission through crystals possessing the property of double refraction. 3. By transmission through a sufficient number of transparent uncrystallized plates placed at proper angles. 4. By transmission through a number of other bodies imperfectly crystallized, as agate, mother of pearl, &c.

The polarization of light by reflection is only effected completely when the light falls on the reflecting surface at a particular angle; and it has been mentioned that, in the case of glass, the angle which the direction of the ray must make with the surface is about 33° , or the angle of incidence (the complement of the former) must be 57° , in round numbers. This angle is called the polarizing angle. It is different for different substances; but from an extensive series of experiments with a great number of different bodies, Sir David Brewster found the following remarkably simple and beautiful relation to subsist in all cases between the polarizing angle and the refractive power of the medium, viz.: "The tangent of the polarizing angle for any medium is the index of refraction belonging to that medium."

PALM, FOOT, CUBIT, &c. (Vol. V. p. 148.) The *palm* was a measure of length, and, by the Romans, of about eight and one-half miles, as denoting the length of the hand.

The *foot* is named from that organ in a full-aged man, and appears to have been a measure employed by the ancient Egyptians.

The *cubit*, Latin cubitus, an elbow,—is a Roman measure of length, corresponding with the length from the elbow to the end of the middle finger.

Rod and rood are the same word, denoting a cross, or gallows,—also a pole. The use with measuring with a pole, led to the reckoning of $16\frac{1}{2}$ feet to a perch or pole, and forty of these to a rood, cross, or square.

A *chain*, *chignar* or *cotera*, is a series of links. The Gunter's chain is an arbitrary device for convenience in measuring.

Fathom is from the old Aryan root *fat*, to extend, and denotes the distance to which a good-sized man can stretch his arms.

TWELVE DISCIPLES. (Vol. V, p. 148.) It is not well to build too much upon accounts given in the *Acts of the Apostles*. The early Christian church did not recognize the book as genuine. It appears from *Acts* xviii, that Apollos, an Alexandrian Jew, instructing and teaching exactly the things about the Lord, came to Corinth and taught them, "Knowing only the baptism of John." The next paragraph states that Paul came to Ephesus and found some twelve disciples there, who were like Apollos, having received John's baptism, but gone no further. The apparent fact is that John was a brother or monk of the Essenian Fraternity, which had its schools in Alexandria, Arabia and Asia Minor. The baptism was a symbol of cleansing and beginning on a higher plane of thought and life. This is what the Greek word *Metanoia*, incorrectly translated *repentance*, really means. Essenism contemplated a living "while in, *above* the world." There were Essenians at Ephesus. In many respects they appear to have been Zoroasterian in sentiment, and had secret rites and doctrines.

Christianity as promulgated by Paul, was essentially different. The *Metanoia*, or repentance, is barely mentioned; baptism is slightly spoken of. His theme is "Jesus and the Resurrection"—a gospel which was emphatically his own. The "Twelve Disciples" at Ephesus, would seem therefore to have been men, like Apollos, thoroughly instructed in the earlier doctrine, but in no way familiar with the Pauline gospel. They were by far the larger number. A. WILDER.

MACROCOSM. (Vol. V, p. 163.) The Hexalpha, or double interlaced triangle was a symbol of the Macrocosm or larger-world creation. Occult students believe it signifies the powers of nature. It is known as Solomon's Seal and some believe it was used by that king as a potent talisman to control the Jinns and make them assist in the construction of the temple. The Hindüs venerate it as the sign of Vishnu and affirm the possession of equal might when equally handled. The symbol is often drawn with one triangle light, pointing upward, and one triangle dark, pointing downward. The Pentalpha or five-pointed star is the symbol of the Microcosm, or little world, or lesser creation, and this signifies man. Pythagoras applied these words as stated. The doctrine turns on the hermetic axiom—"What is below is like that which is above; and what is above is like that which is below.

FIVE KEYS OF SECRET KNOWLEDGE. (Vol. V, p. 180.) The five keys of secret knowledge as given in Sale's Koran, p. 309, are as follows: Five things are enumerated which are known to God alone, viz.: the time of the day of judgment; the time of rain; what is forming in the womb, as whether it be male or female, &c.; what shall happen on the morrow; and where any person shall die. These the Arabs, according to a tradition of their prophet, call *the five keys of secret knowledge*. The passage, it is said, was occasioned by al Har-eth Ebu Amru, who propounded questions of this nature to Mohammed.

APOCALYPSE OF THE APOCRYPHA. (Vol. V, p. 180.) This phrase is found in Romans XVI, 25. The common version reads: "The revelation of the mystery," the original Greek being *Apocalypse* of the *Apocrypha*. The former word is applied to the last book of the New Testament, and the later word to the uncanonical books at the end of the Old Testament.

FRENCH QUOTATION. (Vol. V, p. 148.) I am not over-strong on French, but guess that *Il faut que j'y songe encore*, means, "I must dream about it again." A. W.

WILL-O'-THE-WISP. (Vol. V, p. 163.) I think I have seen the luminous appearance in moist ground, known as *ignis fatuus* or "Will-o'-the-Wisp." In these days when so much is known about spontaneous combustion, it can seem to be explained that some hydrous substance may be produced which will ignite spontaneously. A. W.

PROBABILITY OF MARRYING. A table inserted in the *Assurance Magazine* exhibits results of a rather startling character. In the first two quinquennial periods, 20-25 and 25-30, the probability of a widower marrying in a year is three times as great as that of a bachelor; at 30, it is nearly four times as great; from 30 to 45, it five times as great, and it increases, until at 60 the chance of a widower marrying in a year is 11 times as great as that of the bachelor. It is curious to remark, from this table, how confirmed either class becomes in its condition of life—how little likely, after a few years, is a bachelor to break through his settled habits and solitary condition, and, on the other hand, how readily in proportion does a husband contract a second marriage who has been deprived prematurely of his first partner. After the age of thirty, the probability of a bachelor marrying in a year diminishes in a most rapid ratio. The probability at 35 is not much more than half that at 30, and nearly the same proportion exists between each quinquennial period afterwards.

THE BRAHAN SEER. (Vol. V, p. 163.) The Brahan seer was known as "Coinneach Odhar Fiosaiche," his real name being Kenneth Mackenzie, was born at Baile-na-Cille, in the Parish of Uig, on the Island of Lews at the beginning of the 17th century. This Scottish seer's prophecies have been gathered and published by Alexander Mackenzie, and a third edition published at Inverness, in 1882. Some of his prophecies are here given, and it is stated that nearly all have come to pass:

The day will come when there will be a road through the hills of Ross-shire from sea to sea, and a bridge upon every stream.

That the clans will become so effeminate as to flee from their native country before an army of sheep.

That the day will come when the big sheep will overrun the country until they strike (meet) the northern sea.

The day will come when the hills of Ross will be strewn with ribbons.

The day will come when the old wife with the footless stocking (cailleach nam mogan) will drive the Lady of Clan Ranald from Nunton house, in Benbecula.

The day will come, and it is not far off, when farm-steadings will be so few and far between, that the crow of the cock shall not be heard from the one steading to the other.

The time will come when whisky or dram shops will be so plentiful that one may be met with almost at the head of every plough furrow.

Policemen will become so numerous in every town that they may be met with at the corner of every street.

Traveling merchants [pedlars and hawkers] will be so plentiful that a person can scarcely walk a mile on the public highway without meeting one of them.

The day will come when a fox will rear a litter of cubs on the hearthstone of Castle Downie.

The day will come when a fox, white as snow, will be killed on the west coast of Sutherlandshire.

The day will come when a wild deer will be caught alive at Chanonry Point, in the Black Isle.

Many a long waste feannag (rig, once arable) will yet be seen between Uig of the Mountains and Ness of the Plains.

The day will come when the Lewsmen shall go forth with their hosts to battle, but they will be turned back by the jaw-bone of an animal smaller than an ass.

The day will come, however distant, when 'Cnoc na Rath' will be the center of the village.

The natural arch, or 'Clach throll,' near Storehead in Assynt, will fall with a crash so loud as to cause the laird of Leadmore's cattle, twenty miles away, to break their tethers.

MISCELLANEOUS

NOTES AND QUERIES,

WITH ANSWERS.

VOL. V.

DECEMBER, 1888.

No. 12.

"Nothing is lost, but all transmutes and becomes."—GIORDANO BRUNO.

Biblia Sacra Nova.

First Principles. Chap. I.—Time and space are the two great fundamental ideas, anyhow.

2. They are the latitude and longitude of all conceiving.
3. All things, tangible and aerial, material and spiritual, are in time and space.

Chap. II.—Time and space much resemble each other.

2. Present looks like zero ; future like plus ; past like minus ; eternity like infinity.

3. Mathematics is the science of number.

Chap. III.—If three apples cost two cents, what will five marbles cost?

2. You cannot compare apples and marbles, my son.
3. But :—Two apples are to four apples as three marbles are to six marbles.

4. Because the *abstract ratios* two-fourths and three-sixths are equal.

5. Hence you may *represent* apples by marbles,

6. As you do forces by lines, although forces are not lines.

7. The abstract is a conception, distinct from the concrete. Always and everywhere the same.

Higher Applications. Chap. I.—A mathematical line is conceived as composed of consecutive points.

2. A length of time is conceived as composed of consecutive moments.

3. Moments are to time-lengths as points to lines.

4. Hence, I may represent moments by points, time-lengths by lines.

5. As you do every day on the face of your time-piece.

Chap. II.—Mankind is composed of individuals.

2. Individuals are to mankind as points to a line.

3. Hence, I may represent individuals by points, and mankind—on any one moment of time—by a line.

Calisthenics. Chap. I.—Several celebrated metaphysicians have said that matter did not exist.

2. Allow me to take them at their word for about fifteen minutes.

3. So long as my *mental impressions* are the same, it don't make any difference about the essence of the object.

4. An image seen in a mirror is a clear case of the *sense of sight* being deceived by an *immaterial form*.

Chap. II.—Ubiquity is no attribute of man.

2. Hence, the sum of any one individual being, on any one moment of time, must be represented by a point of space.

[Chap. III.—Birth occurs on a moment of time.

2. Death occurs on a moment of time.

3. And the intervening moments compose a line of biography.

Chap. IV.—Again, suppose I were the happy possessor of a magic wand,

2. By whose flourish, at any moment, I could arrest all motion in the world, and change all material things into marble.

3. I might send my spirit to inspect, at leisure, the attitude of human affairs, from minute to aggregate, from atom to mass, from particular to universal.

4. Something as I may now examine a complicated machine that has been stopped, as a ten-cylinder Hoe printing press, for example.

5. Then I would set the thing to going again, and nobody would know the difference.

Chap. V.—The attitude of human affairs on any one moment of time will be represented by a line.

2. Hence history, which is universal biography, will be represented by a surface, in the process of generation.

3. But this surface will be a web.

4. To exhibit the plan in this web is to explain existence.

Pyrotechnics. Chap. I.—Man, they say, is a mixture of good and evil.

2. To meet this, let us suppose *two* surfaces in the process of generation.

3. The one, to present all desirable conception, quality, and action,—

4. And the other all undesirable.

Chap. II.—Let us modify and qualify.

2. Instead of the representative lines being straight, let them be concentric circles, in the process of enlargement from a center.

3. Something like wavelets from a stone thrown upon placid water, in still, shady hours of contemplation.

4. Next, instead of the generated surfaces being plane, and independent, let the enlarging circles be,—

5. The successive parallels of latitude, starting simultaneously from the opposite poles of a finite, immaterial sphere in space, and meeting in the equator.

Chap. III.—Let figure 1 represent a plain figure of the chromo trope, in process of evolution.

2. Imagine some poet laureate in the audience to exclaim, And such is life.

4. Let the same figure also represent a polar hemisphere in orthographic projection.

4. In figure 2 the sphere is seen from over the equator.

Chap. IV.—A mathematical point, which is mere position, or zero, is neither plus nor minus.

2. A state of purity and innocence, in nakedness and ignorance,—is neither good nor bad.

3. Hence the opposite poles of the sphere will represent the origin of the race.

4. The prominent points along the quadrant will represent intervals of light in the growth of civilization,—in the history of mankind.

5. The perpendicular and equator will represent the promised millennium.

Net Results. Chap. V. — Abstract and concrete, name and thing, principle and fact, subject and object, species and individual.

2. Masculine and feminine, ideal and real, eternal and temporal, infinite and finite, positive and negative,—macrocosm and microcosm,—co-incide.

3. Science and religion, philosophy and poetry, materialism and spiritualism—are one.

4. The Shakespearean drama, tragedy and comedy, is put upon the stage of earth; the Miltonian idea is expressed in the language of Eighteen hundred four score and eight, and going, going, gone.

5. Goethe's Faust is illuminated, and Robert Pollock's Course of Time is run.

6. Darwin is accounted for, used and thanked. The Bible is translated.

7. The Perpetual Suney is read to be unveiled.

WOMEN AS ACTRESSES. There seems no doubt that actresses did not perform on the stage till the Restoration, in the earliest years of which Pepys says for the first time he saw an actress upon the stage. Charles II. must have brought the usage from the continent, where women had long been employed instead of boys or youths in the representation of female characters. Tom Coryat, in his "*Crudities on Travels*," 1611, as Mr. Lee says, saw actresses performing on the stage at Venice. John Chamberlain, in a letter to Dudley Carleton, 1602, relates a hoax or swindle played upon the public by a person who proposed, at a high price of entrance, to exhibit actresses in a theater. Chamberlain ventures to think he had heard of actresses before in England. Mr. Lee says women did perform in masques which were played before royalty or among the aristocracy by persons of nobility. Henry VIII is mentioned in the "*Chronicles*" of Hall, 1512, as having introduced masques into England, and having taken a part in them himself. Edward III, however, is said to have given a precedent to the dramatic masque, which flourished during the sixteenth century in England. Masques are said to have been taken from Italy. Henry VIII, with a Spanish wife who participated in them, may, however, have been adopting the manners of Spain and Portugal. Instances of women acting in plays and of royal personages taking their parts in them are afforded in Portugal by Gil Vicente, who, in the beginning of the sixteenth century, wrote dramas in the Castilian language, which gave rise to the Spanish theater, and anticipated Lope de Vega and Shakespeare by nearly a century. It is related of him, "His plays were enacted at the court of King Emmanuel, and the first of them was performed in 1504. They had great success, which increased during the reign of Emmanuel's successor, John III, who often played a part in them. It appears that Gil Vicente acted himself in his dramas; and it is certain that his daughter Paula (lady of honor to a royal princess) was the first dramatic performer of her time in Portugal." Gil Vicente wrote *autos* or religious plays, comedies, tragi-comedies, and farces. Being the only dramatic author of his time, he gained a European reputation, and Erasmus learned Portuguese in order to read his works. It appears, therefore, that in 1602 the public were not averse to seeing actresses on the stage, as in their disappointment they wreaked vengeance on the furniture of the theater, breaking to pieces what was in it. This was different from what happened near 30 years afterward, in 1629, when, as Mr. Collier relates, a French company were not permitted by the public to perform because they had actresses to fill women's parts. This marks the progress of Puritanism.

ORIGIN OF THE "BEGGAR'S OPERA." At Schomberg House, Pall-mall, was first concocted the dramatic scheme of the "*Beggar's Opera*," as the first thought of writing such a gross and immoral dra-

ma originated with him. Swift, also, who was an ardent admirer of the poetic talents of Gay, delighted to quote his Devonshire pastorals, they being very characteristic of low, rustic life, and congenial to his taste; for the pen of the Dean revelled in vulgarity. Under the influence of such notions, he proposed to Gay to bestow his thoughts upon the subject, which he felt assured would turn to good account, namely, that of writing a work to be entitled "A Newgate Pastoral;" adding "and I will, *sub rosa*, afford you my best assistance." This scheme, was talked over at Queensbury House, and Gay commenced it; but it was soon dropped, with something of disgust. It was ultimately determined that he should commence upon the "Beggar's Opera." This scheme was approved, and written forthwith, under the auspices of the Duchess, and performed at the theater in Lincoln's-inn fields, under the immediate influence of her grace; who, to induce the manager, Rich, to bring it upon the stage, agreed to indemnify him all the expenses he might incur, provided that the daring speculation should fail. The offer had first been proposed to Fleetwood and his partners, at Drury-Lane Theater; but it was at once rejected by them, as a piece that would not be tolerated by a public audience. indeed, they stoutly refused it a rehearsal. The success of the "Beggar's Opera" mainly depended upon two points—the hatred of one party against the Italian Opera, and the hatred of another party against the court. The ridicule of sing-song, united with operatical acting, was complete, and the satire levelled in the original against the king, the queen, and the court, by Gay, who was a disappointed courtier, was too bitter, too witty, not to be felt. It was received with applause.

ARKANSAS. Is "Arkansas" pronounced "Arkansaw?" If so, why, and when was the pronunciation changed? G. A.

The proper pronunciation of "Arkansaw" is "Arkahnsah," accented on the first and last syllables. This was the old Indian pronunciation, which the early French traders expressed in letters as "Arkansas." The French *a* is always broad, and the final *s* is silent; so "Arkansas" to the French was pronounced "Arkahnsah." Congress spelled the name, in the act organizing the territory, "Arkansaw," and for some years the name continued to be so spelled. Finally, as every one knew the pronunciation, the original spelling was brought again into use. Then, however, came a people who knew not the history or the pronunciation of the word, who called it "Arkansas," with the accent on the second syllable, and this mispronunciation throve, and was accepted by many. In 1830 the State Historical and the Eclectic societies jointly investigated the name and its pronunciation, and on their report, the substance of which is given above, the legislature of the state decided that the legal pronunciation was "Arkahnsah."

Sayings of the Seven Sages of Greece.

Periander of Corinth. Please all men. Rashness is dangerous. Pleasures are always mortal, but honors immortal. Be the same to your friends when they are in adversity. Base gain is a very odious thing. Conceal thine own misfortune, lest thou make thine enemies rejoice. Stick to the truth. Hate violence. Moderate pleasure. Follow godliness. Abstain from vices. Show pity to the suppliant. Frequent the company of wise men. Regard good men with esteem. Avoid disgrace. Do those things of which thou mayst not repent. Imitate that which is just. Honor those that are well deserving. Hate slandering. When you have mistaken, change your resolution. Show yourself ready to oblige all men. Fear the magistrates. Perform whatsoever thou hast promised. Do the things that are just. Give place to powerful men. Refrain from an oath. Command things that are honest. Repay a kindness. Rest is a good thing. Instruct your children. Hate controversy. Attend to what concerns thee. Answer in time. Envy no one. Rule your eyes. Cherish hope. Be affable, or easy to be spoken to. Keep lasting friendship. Study to promote concord. Do not speak merely what you please. Trust not to the resources of the moment. Be not vexed for every trifling cause. Show deference to one above thee in years. Be as frugal as if thou wert immortal. Hope as if thou wert mortal. Be not lifted up with praise. Let great men have precedence. Think on mortal things. Do not a wrong the first. Slander not a dead man. Advise honestly. Do not neglect thyself. Die for thy country. Beget children of women that are free-born. Conceal a secret. Wait for an opportunity. Bestow in order to benefit. Avoid resentment. Make use of thy friends. Delight thy friends.

Bias of Priene. Behold thyself in a looking-glass: and if thou shalt seem to be beautiful, do those things which become thy beauty; but if thou beest ill favored, recompense that with thy fair carriage which is not so fair in thy face. Speak not evil of God, but hearken after him. Hear much, speak little. First understand what thou hast to do, and then fall to thy work. Praise not an unworthy man for his riches. Take a thing by persuasion, not by force. Get trouble in thy youth, and wisdom in old age.

Pittacus of Mitylene. Do not tell those things beforehand which you are about to do; for if you be disappointed, you will be laughed at. Restore that which is intrusted to your keeping. When thou art hurt by thy friends in small matters, bear with them. Give no bad language to your friends. Be the master over your wife. Look for the same things from your children which you shall do to your parents. Be not slothful. Contend not with thy parents, although thou speak reason. Wish not to command before thou hast

learned to obey. Mock not a wise man in misery. Take heed you do not desire those things that cannot be done. Do not be hasty to speak. Know thyself. Above all things worship God. Reverence thy parents. Restrain pleasure. Do not think thine enemy thy friend. Be not a judge amongst friends. Let not thy tongue run before thy wit. Obey the laws. Do nothing too much. Be willing to hear. Put away enmity. Marry a wife of thine equals; lest, if thou marriest one of them that are richer than thou, thou get thee masters, not kinsfolk.

Cleobulus of Lindus. Be not puffed up at any time. Turn over thy books again. Judge justly. Forbear bad language. Overcome thy parents with forbearance. Cast not off an inferior. Throw not thyself headlong into danger. Love thy friend's things, and preserve them as if they were thine own. Do not to another man that which thou hatest. Threaten no one, for that is womanish. Go sooner to thy friends that are in misery than to them that are in prosperity. A liar depraveth his life with slandering. Whosoever is discreet and wise, hateth liars. Have a care of thy house. Instruct thy children that are most dear to thee. Do good to good men. Throw away suspicion. Remember a courtesy received. Do not covet other men's things. Nothing is more precious than a vow.

Chilo of Lacedæmon. Know thyself. Covet nothing that is too much. Misery is an attendant on debts and suits. Exercise temperance. Obey the time. Please the multitude. Be approved in thy behaviour. Hate slanderers. Do not envy any man things that are mortal. Avoid whatever is disreputable. Get an estate honestly. Use wisdom. Do not suspect anything. Be not burdensome.

Solon of Athens. Worship God. Relieve thy friends. Sustain the truth. Obey the laws. Moderate thine anger. Hate bad men. Reverence thy parents. Envy no one. Do not swear. Consider what is honest. Commend virtue.

Thales of Miletus Honor thy prince. Be like thyself. Take in good part that which thou hast. Follow glory. Love peace. Pack a tale-bearer out of thy house. Try thy friends. Make a promise to no one. Abstain from all vices. Have a care of thy life. Deserve a commendation from all men.

FOUR-POST BED OF RICHARD III. At the Blue Boar's Head Inn, Leicester, there is still shown the four-post bed on which Richard III slept on the night of August 21, 1485, his last night on earth, for the next day he was defeated and slain on Bosworth Field. In the reign of Elizabeth the house was kept by a man named Clark, whose wife one day observed a gold coin roll from the bed; this led to an investigation, when it was found that the double bottom concealed a quantity of gold, partly coined by Richard and partly of an earlier date.

QUESTIONS AND ANSWERS.

PHARAON. (Vol. V, p. 163.) I suspect that *Pharaon* is the game of cards vulgarly denominated *faro*. A. W.

PATER NOSTER. (Vol. V, p. 163.) As a guess, I would say that such a name as "Paternoster Row" originated in the same way as *Notre Dame* street in Montreal. A. W.

MACROCOSM AND MICROCOSM. (Vol. V, p. 163. The term *Mikros Kosmos* is found in a life of Pythagoras. The compounds *macrocosm* and *microcosm* are not correctly formed, and so are not found in classic literature. The latter term appears in a work of Isidorus Hispalensis, bishop of Seville, *Origincum sive Etymologiarum*, Liber XX, in the seventh century. Thomas Norton, writing on alchemy four centuries ago, declares the "philosopher's stone" to be *microcosmus* and Galen used the phrase *brachys koamos*. A. W.

ABSTAIN FROM BEANS. (Vol. V, p. 163.) The maxim of Pythagoras "Abstain from beans," has had many interpretations, and perhaps the right one has not been given. The popular one is based on the practice of voting by beans, and would be a direction that most philosophers prefer to follow: to keep clear of political strife. Others, however, affect the physiological explanation—that beans are heating and hard of digestion, accordingly unsuitable. The philosopher is said to have convinced an ass of this, and the donkey ever after eschewed them. In Plutarch's *Symposiaca* reference is made to their orchid shape as being the reason. It is said that there are mystic phallic symbols on each side of the esculent. A. W.

THE QUINQUARTICULAR CONTROVERSY. (Vol. V, p. 163.) The five doctrines controverted between the Calvinists and Arminians, viz., predestination, extent of the atonement, grace, free-will and final perseverance. The *quinquarticular controversy* in England was a dispute which arose at Cambridge in 1594 respecting the above points. In 1626 two fruitless conferences were held on these points; and in 1630 Bishop Davenport preached at court on these disputed matters, and thereby gave great offence to Charles I. The next year the controversy was revived at Oxford and in Ireland, of which Archbishop Usher was then primate. The king issued certain injunctions concerning the bounds within which these points might be discussed.

BARCOAB. (Vol. V, p. 163.) With the destruction of the Temple at Jerusalem, the Jewish people cherished the expectation of deliverance. Even the Christians of that time appear to have looked for something of the kind. The 24th chapter of Matthew contains predictions, which after we look beyond the symbolic parlance, seems to be an account of the Advent of "the Son of Man" and the sending of angels or messengers to bring in the faithful Jewish people. "This generation shall not pass," says the oracle, "till all these things be fulfilled." Rabbi Akiba, in the reign of Trajan, went through all the countries of the East preaching that the time had come to restore the kingdom. He was a man of wonderful parts; in the language of the Talmud he had been in Paradise and came forth in his right mind. A great secret fraternity existed, and the members were ready to rise as one man. Akiba had a leader in his mind. This was one Bar Chonta, whose name the Rabbi changed to *Bar Cochba*, or Son of the Star (Haggai II, 21). The insurrection began; Samaritans joined with the Jews, making an army of from two to five hundred thousand men. The war was one largely of extermination. In twelve months Palestine was free, and the war was carried into Egypt and Cyprus. A kingdom was set up at Jerusalem, a civil order established and money coined. The Great Synagogue was revived, and the name YAWA (Jehovah?) was made public, becoming the watchword of the new nationality. This name the followers of Jesus would not pronounce. It is conjectured that additions were made to the Gospels, in regard to this matter. Families were divided; Judæan partisans denounced their Nazarean kindred to the authorities, to be scourged and even put to death as partisans of Rome. Hadrian recalled Julius Severus from Britannia, and sent him with an army against Palestine. The war was fiercely contested, but with the common result. More than half a million perished in the battles, and an innumerable host by famine, sickness, and fire at the sack of towns. The country became a desert. The conqueror was merciless in his vengeance. Bar Cochba perished in battle. Akiba was tortured and sent to the executioner, the last Jewish patriot. When Jerusalem fell the "abomination of desolation," the statue of Hadrian, was erected on the site of the sanctuary, and all compelled to do it homage. This was prior to the final overthrow; but the statue remained there for centuries, and every Jew who did not worship it was killed at once. The fate of the Da-

vids of Mara was united upon the devoted Judean race — and they became aliens in their former country.

A. WILDER.

ASTEROIDS DISCOVERED IN 1888. (Vol. V. pp. 8-13, continued.)

Nine asteroids discovered in 1888 have been added to the 271 given in the January N. AND Q., 1888; and Nos. 269 and 271 have been named, as follows :

269	Justitia,	Sept. 21, 1887	Palisa ₈₀ .
270	Anahita,	Oct. 8,	Peters ₈₁ .
271	Penthesilea,	Oct. 16,	Knoore ₈₂ .
272	Antonia,	Feb. 3, 1888.	Charlois ₈₃ .
273	Atropos,	March 8,	Palisa ₈₄ .
274	Philagoria,	April 3,	Palisa ₈₅ .
275	Sapientia,	April 15.	Palisa ₈₆ .
276	Adelheid,	April 17,	Palisa ₈₇ .
277		May 3,	Charlois ₈₈ .
278	Paulina,	May 16,	Palisa ₈₉ .
279		Oct. 25,	Palisa ₉₀ .
280		Oct. 31,	Palisa ₉₁ .

"THE SUM OF TWO NUMBERS IS EQUAL TO THEIR PRODUCT." A and B, two workmen dispute on the above problem. A says the only number that will solve the problem is 2, namely :

$$2 + 2 = 4; \quad 2 \times 2 = 4$$

B says there is another solution to the problem, but does not give it. Can you give any other number that will solve the problem ?

A BYSTANDER.

B is right. It is a problem of algebra. Let x = the larger number, and y = the smaller number. Then the equation, $x + y = xy$, when solved will give two numbers satisfying the conditions :

$$x = 2.618024+; \text{ and } y = 1.618034+$$

$$\text{Proof. } \begin{cases} 2.618034 + 1.618034 = 4.236068 \\ 2.618032 \times 1.618034 = 4.236068 \end{cases}$$

Many other relations also exist between these two numbers which may interest the reader :

$$\begin{array}{ll} x = 2.618034 & y^3 = x + y = 4.236068 \\ y = 1.618034 & y^3 = xy = 4.236068 \\ x - 1 = y = 1.618034 & x^2 - y^2 = 4.236068 \\ y + 1 = x = 2.618034 & x^2 = y^4 = 6.854102 \\ y^2 = x = 2.618034 & (y - 1)^2 + (y - 1) = 1 \end{array}$$

"CARRYING COALS TO NEWCASTLE." (Vol. V, p. 180.) A phrase to signify anything unnecessarily done. Newcastle is noted for its coal fields, hence it would be unprofitable to send coal to that town. Chaucer has a similar phrase :

And add more coals to Cancer when he burns.

Fuller, in his *Gnomologia*, (1732), has "You bring owls to Athens," which has the same signification, as owls were plentiful in that city.

CAXTON.

"SOUND ON THE GOOSE." (Vol. V, p. 68.) Bartlett's "Dictionary of Americanisms" says : "Sound on the goose" is a phrase originating in the Kansas troubles, and signifying true to the cause of slavery.

A. H.

LETTERS OF "JUNIUS." (Vol. V, p. 43.) "Junius Unmasked ; or, Thomas Paine author of the Letters of Junius, and of the Declaration of Independence," Washington, D. C., 1872, was written by Joel Moody, Mound City, Kansas. Mr. Burr claims to be only its god-father.

J. FRANCIS RUGGLES, Bronson, Mich.

ZOUNDS. (Vol. II, p. 460 ; III, 19.) I have recently found an instance of the older form of this word, which may be interesting :

I cannot Martinize—swear by my say in a pulpit, and rap out gogs-wounds in a tavern. — GREENE, *Farewell to Folly*, 1590, (prefatory epistle).

CAXTON.

ORDER OF THE CHERUBIM. What is the order for placing the cherubim ?

J. P. SHIELDS.

As far as our observation goes it seem to have been optional. For instance, this correspondent is referred to the following :

In Genesis 1, 20, it is given as	Man, Ox, Eagle, Lion.
In Ezekiel 1, 10, it is given as	Man, Lion, Ox, Eagle.
In Ezekiel x, 14, it is given as	Ox, Man, Lion, Eagle.
In Revelation iv, 7, it is given as	Lion, Ox, Man, Eagle.
In the Zodiac it is	Ox, Lion, Eagle, Man.
In Godfrey Higgin's "Anacalypsis,"	Lion, Ox, Man, Eagle.
In the legend of the H. B. of L.,	Man, Eagle, Ox, Lion.
In "The Trumpet of Israel" it is	Ox, Lion, Man, Eagle.

We therefore infer that it is optional how these are arranged. Mr. Higgins's arrangement is the same as that in Revelation.

THE CRESCENT. (Vol. V, p. 163.) A secret religion underlay ancient beliefs, and hence a significant symbolism was adopted. Strictly speaking, there are no new religions, but every one is in some way an outgrowth from the one preceding it. This is as true of Mohammedanism, as of any other. The founder had already been identified with the doctrines of Hanyf; and after his death the same thing occurred as in other instances. His doctrines were revised and amalgamated with these of preceding faiths, and the symbols also were adopted. Some religions have a masculine outlook; others are feminine. Saivism and Vaishnavism in India, Yavism and Alahism in Palestine, Prottestantism and Romanism in Christendom, are illustrations. The ancient Arabic religion of Mekka was female. Al Huza or Astarté was their goddess, and like the other Mother-goddess, had a black or magnetic stone for a symbol. It was built into the structure of the Kaaba, and is venerated like stone on Mount Pessinos, or at Kyprus. The holy day is Friday—the Venus' day and woman's day of the whole world—anciently the day of Good Fortune, till the Christian practice of executing criminals reversed the superstition. Their adoption made Islam acceptable to the goddess-worshipping populace. The crescent naturally came in with the other symbols of femininity. Its meaning is this: "The moon is the isthmus which joins the immortal principle of life to earthly existence." It denotes maternity, and hence the crescent constituted the horns of Ashtaroth-Karnaim, of Isis, and other divinities. Whatever the imams and others may teach to the populace, there is a secret religion behind which the instructed ones understand. Their beliefs, many of them, are remarkably compatible with this sentiment.

A. WILDER.

BANBURY CROSS. (Vol. V, p. 180.) Banbury Cross is a borough in Oxford County, England, celebrated for its buns, tarts, and cheese. But its buns will give one the dyspepsia for a week, as I found to my sorrow in 1887.

S. L. G.

KING LEMUEL. Vol. V, p. 180.) It is not known who the Lemuel, mentioned in Proverbs xxxi, 1, was. Most interpreters refer it to Solomon, some to Hezekiah, while others refer it to some petty Arabian prince, or to an imaginary person.

S. L. G.

KING COLE. Who was the personage that went by the name of King Cole? JONATHAN.

About the middle of the last century, or a little later, there lived a curious character, well known then by the appellation of King Cole. He was a fish salesman at Billingsgate, and on the day of the liberation of the celebrated John Wilkes, he always invited 45 friends to dine; and he treated them with a plum-pudding containing 45 pounds of flour, and 45 of fruit; it was boiled 45 hours, and conveyed to the place, where the party were at dinner, with flags and music, and 45 butchers with marrow-bones and cleavers. There were also upon the table, 45 pigeon-pies, and 45 apple dumplings. When this old gentleman lost his son he consoled himself by using the same mystical number. He had him buried 45 miles from town, attended by 45 fish-mongers; he paid the sexton 45 shillings, for 45 tolls of the bell; he mourned 45 days in deep mourning and 45 days in half mourning. See Oliver's "Pythagorean Triangle for account of this singular man.

How is this attachment for certain numbers to be accounted for? Let the physiologist find it out if he can. The belief in the efficacy of certain numbers is too firmly fixed in the mind of some persons to admit of being extinguished by argument of sober reason, be those arguments ever so specious and sound.

THE THREE IMPOSTORS. Who are said to be the three impostors, and who was the author of the book which bore that title? A. P. A.

Toward the end of the tenth century a rumor was current that a book had appeared by the above title, to prove that the world had been grossly deceived three times, by three impostors, each founding a religion. The most extravagant ideas prevailed and the authorship of the unknown work was in turn attributed to the emperors Frederick I and II, Averrhoes, Petrus a Vineis, Alphonzo X, king of Castile; Cocaccio, Poggio, L. Aretin, Pomponazzio, Machiavelli, Erasmus, P. Aretino, Ochinus, Servetus, Rabelais, Gruetius Barnaud, Muret, Nachtigall, Giordano Bruno, Campanella, Milton, and others. In 1716 a person named Haag claimed to have the original in his possession. A book appeared published from a MS. of 1598. Nothing is known of its author. Some think the original title was not "The Three Impostor," as it does not call either of the founders — Moses, Jesus, or Mohammed—outright impostors.

POETRY AND PROJECTILES. Prof. Longfellow has recorded a wonderful story of the fleetness of his Indian hero.

*" Swift of foot was Hiawatha ;
He could shoot an arrow from him,
And run forward with such fleetness,
That the arrow fell behind him.

Strong of arm was Hiawatha ;
He could shoot ten arrows upwards,
Shoot them with such strength and swiftness,
That the tenth had left the bow-string
Ere the first to earth had fallen."*

If we suppose an arrow shot upward every second, then as ten arrows must be in the air at one time, the time of flight of each arrow must be at least ten seconds, and if the time of ascending is the same as descending, though really it is somewhat less, the height attained is found to be sixteen times the square of five, or 400 feet. As the greatest horizontal distance to which a body can be thrown is double the height it would attain if projected with the same velocity, it is evident that if Hiawatha put forth his maximum " strength of arm " in shooting forward as well as upward, the greatest range of his arrow would be 800 feet. As a projectile attains its greatest height and remains the longest in the air when thrown vertically upward, the time of flight of the forward shot must be less than ten seconds. The theoretical angle of greatest range being 45 degrees, and the initial velocity being equal to that due to gravity acting five seconds, or 160 feet, this velocity multiplied by the sine of 45 degrees, gives the horizontal component of the initial impulse, which is 113,136, and hence the quotient of 800 divided by this component, which is seven seconds nearly equals the actual time of the flight of the arrow. Now as the arrow flies 800 feet in seven seconds, or 114.3 feet per second, it is plain that Hiawatha must exceed this speed to get ahead of the arrow, which would require him to run a mile in about 46 seconds, or more than 78 miles an hour. It is to be feared that such runners as he who won the lovely Minnehaha have long ago departed

*" To the Islands of the Blessed,
To the kingdom of Ponemah,
To the land of the Hereafter."*

N. B. WEBSTER IN *The Reveille*.

QUESTIONS.

1. Define the word *root* when it is a value of x in an equation of any degree, and also the word when it is a base of any power. R.
2. What is the difference between the "Antichrists" (I John II, 18), and the "false Christs" (Matthew XXIV, 24)? R.
3. Who were the "Twelve Imams" and when did they flourish? Who is the Mahdi, and is he to be the last Imam? R.
4. Give the real etymology of the words *whole, whirl, wheel, world*. R.
5. What authority is there for designating the period before the present era as the Jewish Dispensation, and the latter period as the Christian Dispensation? ALPHA.
6. Why should the woman whom it is said that King Saul visited the night before his death, be denominated "the *witch* of En-dor," while the text reads, "A woman that hath a familiar spirit at En-dor" (I Samuel XXVIII, 7)? ALPHA.
7. What is the reason for Joseph to be buried at Shechem, (Joshua XXVI, 32), when Abraham, Isaac, and Jacob, with their several wives, were entombed at Hebron (Genesis XLIX, 31; L, 13)? ALPHA.
8. What was "the Testimony" mentioned in Exodus XVI, 34, and elsewhere? ALPHA.
9. Why, when Jacob and Laban made a covenant together, does each swear a different imprecation: Laban by "the God of Abraham, the God of Nahor, the God of their father"; and Jacob by "the Fear of his father Isaac" (Genesis XXXI, 53)? ALPHA.
10. Why was the island in the St. Lawrence river, near Montreal, called "Isle of Jesus," and those in the west of Lake Superior, the "Apostles' Islands"? FELIX OTTINGER.
11. What is the first account of *wire* that we read of either in sacred or profane history? D. M. DRURY.
12. Where is the first recorded instance of a *seventh son*, and also a *seventh son of a seventh son*? J. PAYSON SHIELDS.
13. Rev. Dr. M. Edrehi wrote a book entitled "An Historical Account of the Ten Tribes, settled beyond the River Sambatyon, in the East." Where is the river *Sambatyon*? OLIVER.
14. How many persons, or other subjects have had the "mark of the beast" and "the number of his name" or 666 applied to them; and who and what are some of them? INQUIRER II.

1. What is the origin and true meaning of the word *bonfire* ?

ALPHA.

2. Does the word *cross* in its proper sense denote a crossed piece of timber as it is now made to imply? A *crux* denoted a tree, or other instrumentality for putting men to death, whether by hanging, impaling, or piercing with weapons; and a *stauros* was an upright stake, or a pole for impaling. The Aztecs of Mexico are said to have fixed a victim to a tree every spring to shoot to death with arrows. Would not this be a crucifixion?

ALPHA.

3. Was circumcision primarily an African or an Asian custom?

ALPHA.

4. What is the purport and etymology of the syllable *go*, in Latin words as *origo*, *virgo*, *virago*, etc.? Perhaps it is suggested by the word *li*, or terminal *l* in English. *Gir*, or *ga*, seems to have been used to signify a young person, in which case *girl*, or *girl*, may denote a woman.

ALPHA.

5. We are informed that Job's household, was as follows:

Job i, 2-3.		Job XLII, 12-13.	
Sheep,	7,000	Sheep,	14,000
Camels,	3,000	Camels	6,000
Yokes of oxen,	500	Yokes of oxen,	1,000
She asses,	500	She asses,	1,000
Sons,	7	"Also," Sons,	7
Daughters,	3	"Also," Daughters,	3

Does the "also," in XLII, 13, give us to understand that his children were doubled, and that he had 14 sons and 6 daughters? X.

6. What are some of the most "remarkable coincidences" that have occurred and been taken note of?

SEARCHER.

7. What was the size and shape of the ancient cities of Jerusalem, Rome, Babylon, Nineveh, etc.?

HANNAH.

8. What is the "quincunx order" for planting trees?

JOEL.

9. Who first solved the problem of the "Tour of the Chess Knight"?

LOVER OF GAMES.

10. Is there more than one place on the globe called "the Bight," that is, on the west of Africa; also, more than one "Levant," that is, on the west of Palestine?

OBSERVER.

11. Why are monkeys called *quadrumana*, "four-handed"? I.

Mathematical Bibliography.

Several inquiries have been made for the publications of the United States devoted wholly or in part to mathematics. We therefore publish this bibliography as a reference list for those who are interested in this branch of science. Our library contains all but five of the serials wholly devoted to the science, and nearly all those containing a department devoted to it, although some of the files are broken.

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