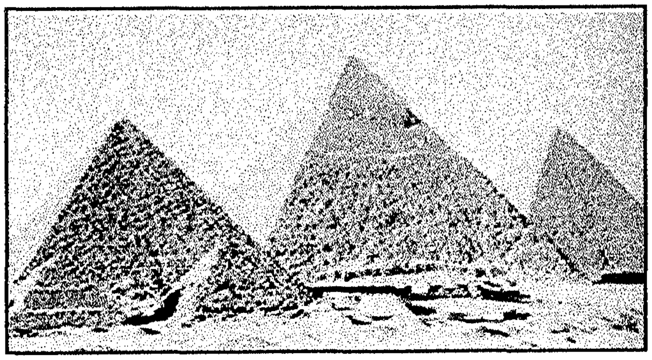
THE GREAT PYRAMID

APOTHEMS AND APOTHEGMS

A MATHEMATICAL EXPLORATION

OF
THE
GREAT
PYRAMID



THE PURPOSE OF THIS STUDY IS TO CREATE A METAPHOR

GPOUT.WPW FEB 24,1993

THE GREAT PYRAMID
A MATHEMATICAL EXPLORATION

INTRODUCTION
    MYSTERIES AND PROJECTIONS Gödel Consistency vs Completeness
    ARCHEOLOGY AND NATURAL SCIENCE

APPENDIX SOME GEOMETRY
    CLUSTERS IN FORM SPACE HAMMING SPACE
    RATIOS AND PROPORTIONS
    ON UNITS
    SOME APPROXIMATIONS e.g. $\varphi^2 = \frac{5}{6}\pi$
    SPHERICAL GEOMETRY

THE GREAT PYRAMID
    SHAPE AND SIZE
    LOCATION, POSITION
    INTERIOR

THE MATHEMATICAL PYRAMIDS FORM SPECIFIERS, $\frac{H}{b}$, $\frac{a}{b}$, $\frac{a}{r}$, $\sec\phi$; α, $\frac{\Omega}{4\pi}$ ..
    LIST .... (ABOUT 20)
    FAMILIES + OTHER CLUSTERS

EXTRINSIC RELATIONS
    OTHER PYRAMIDS
    THE NILE STONE HENGE $\lambda = 51°$ c. $20'$
    THE EARTH, THE MOON
    THE COSMOS, THE ATOM
    SHADOWS

Space Station Orbit
51°.6

INTERPRETATIONS AND CONCLUSIONS
    FACETISM
    MORPHOLOGY

PARA RELATIONS
    QUARTZ CRYSTALS VOGT + SULTAN p270 $141°47' - 90° = 51°47'$
    SUGAR
    SAND PILES - ANGLES OF REPOSE
    SATELLITE ORBITS 63°.4 = face angle — zero regression of line of apsides

SOC[illegible] TICISM

WAY OUT HYPOTHESES

GPREF.WPD May 9,1990; Feb 24,1993; February 23, 1999

THE GREAT PYRAMID

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BEYOND PYRAMID POWER--G. PAT FLANAGAN
ECHOES OF THE ANCIENT SKIES--E.C.KRUPP
– FINGERPRINTS OF THE GODS--GRAHAM HANCOCK
FORM, FUNCTION, AND DESIGN--PAUL J. GRILLO
GUIDE TO THE PYRAMIDS OF EGYPT--ALBERTO SILIOTTI
– MINDSTEPS TO THE COSMOS--GERALD S. HAWKINS p309 on Max Planck
REALITY REVEALED--VOGT and SULTAN p 270, 287, 290
RHYTHMS OF VISION--LAWRENCE BLAIR p76 vesica, land meridian, razor blades
SACRED GEOMETRY--ROBERT LAWSON
SACRED GEOMENTRY--NIGEL PENNICK p11
SACRED PLACES--S.A.OSMEN
SACRED SCIENCE--R.A.SCHWALLER De LUBICZ
SECRETS OF THE GREAT PYRAMID--PETER TOMPKINS
STONEHENGE DECODED--GERALD S. HAWKINS p155
THE COMPLETE PYRAMIDS--MARK LEHNER
THE CREATORS--DANIEL J. BOORSTIN
THE EGYPTIAN MIRACLE--R.A.SCHWALLER De LUBICZ
THE GREAT PYRAMID DECODED--PETER LEMESURIER
THE GREAT PYRAMID SPEAKS--J.B.GILL
(–)THE MESSAGE OF THE SPHINX ROBERT BAUVAL & GRAHAM HANCOCK
THE NEW VIEW OVER ATLANTIS--JOHN MICHELL p125, 144-5, q 158
THE ORION MYSTERY--ROBERT BAUVAL & ADRIAN GILBERT
THE PYRAMIDS--AHMED FAKHRY
THE RIDDLE OF THE PYRAMIDS--KURT MENDELSSOHN
THE STORY OF √(-1)--PAUL NAHIN
TRIGONOMETRIC DELIGHTS--ELI MAOR
Sun, Moon, & Earth – Robin Heath (p2,3)

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HORIZON, WINTER 1971 p
NATIONAL, GEOGRAPHIC JANUARY 1995
OMNI, JUNE 1981 p153 picture of shadow

BOOK NOTES

- MESSAGE OF THE SPHINX - GRAHAM HANCOCK, ROBERT BAUVAL
  CROWN PUB N.Y 1996
  p239 "anti-cipher Morrison & Sagan SETI
  precession obsession, Orion ~ Osiris, 3pyr, belt, Magi
  Exploration by association
  Exploration by unit manipulation
  Exploration according to Hoyle

- Echoes of the Ancient Skies - E. C. KRUPP
  Harper & Row 1983

- THE PYRAMIDS - Ahmed Fakhry
  Univ. of Chicago Press 1961
  P101 Facing stones removed in ≥ 13th century
  ∃ed inscriptions on the face ~ to 1179
  p115 H = 137M orig 146M B = 230M now 227M
  GP. a = 51°50'
  P137 Khafre H = 143.5m B = 215.5m a = 53°10'
  p146. Menkure B = 108.5 H = 66.5, a = 51°
  p241 EL Kurru, Piankhi's tomb a ≐ 68°
  p248 Meroë 68°-70°

- The Great Pyramid Decoded - Peter Lemesurier
  ELEMENT 1977, 1993
  p267. Messianic Parallels: Osiris, Quetzalcoatl, Jesus - the path
  p260. The 3 Kings
  p264 Mayan year 1 = 3113 BC
  Egypt - Horu 3141 BC Mayan week of 13 days
  p307ff measurements p313 51 51 14.3 51.853972
  Apex 76 17 31.4 76.2921
  ≐ π Pyramid

- Beyond Pyramid Power — G. P. FLANAGAN
  DeVorss 1975
  p47 51° 51' 14".3
  76° 17' 32"
  e 41° 49' 50' — Airis angle
  g 112° 25' 38".88
  h 96°
  p50 π to φ
  p54
  $\frac{(\sqrt{2})^3}{\pi}$
  $f = \tan^{-1} 2$
  p60 cones
  58 16 57

96/06/18

by type(ext)

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 Volume in drive B is GREATPYRMID
 Volume Serial Number is 0E3E-17EE
 Directory of B:\

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POLYROOT MCD        3955 12-12-94  11:16a
XTOP     MCD        2638 03-08-95   8:57p
PTOX     MCD        2674 03-08-95   8:46p
REVPTOX  MCD        2459 03-10-95   1:52p
REVXTOP  MCD        2435 03-10-95   2:16p
GPOVR    P51        2750 05-29-90   9:22p
GPINT1   P51        9546 06-07-90  12:14p
GPTABLE1 P51       10616 06-07-90   7:41p
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PATERN02 P51        1336 11-13-92   4:29a
PATERN03 P51        2769 03-07-93   6:48a
GPAPH    P51        7412 03-09-93   6:13p
CHARTRES PCX       66187 03-09-93   6:50p
PYRTABLE WB1        5964 05-21-93   7:56p
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PYR&MET1 WP6        2471 12-30-94   8:37p
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GPCALFR  WP6       67416 03-09-95   4:40p
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GTPYRIN2 WPW        3262 03-05-93  11:00a
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GPCAL1   WQ1        3400 05-22-90   7:30p
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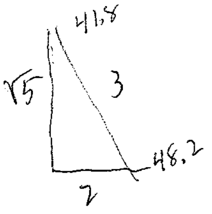
- The Egyptian Miracle R.A. Schwaller de Lubicz
  INNER TRADITIONS 1985 (1957)
  p68 philosophy of number
  p74 existence and apoptosis
  p96 stretched rods
  p139 Kepler's 3° Law

- Sacred Science R.A. Schwaller de Lubicz
  Inner Traditions 1988
  p206 Numbers 1-12
  p208 The cult of intellectuality - good and wrong arguments
  Copy p249
  p. 282 Facing intact 1340, being removed by 1395
  5'30 of Khufu ~ ' of longitude
  p287 Calendar 2781 BC & 4241 BC

- The Great Pyramid Speaks - J. B. Gill
  Barnes + Noble 1984
  p25 Cole's sides 230.357 m etc.
  p 30 51° 51' 14."3

- The Orion Mystery - Robert Bauval, & Adrian Gilbert
  p135 photo

- The Riddle of the Pyramids - Kurt Mendelssohn
  Thames + Hudson 1974
  Mexican Pyramids Teotihuacan & also National Geographic
  photo p 95 p37 p40 Zoser at Saqqara
  Meidum 90 ↑
  Rolling Drum p73 copy Map p14



- Secrets of the Great Pyramid - Peter Tompkins
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p 368 Petri Northface 51°49'40" ± 1'05"
Π → 51°51'14" West
φ = 51°49'38" North

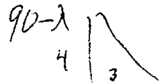
Hypatia p 4. Theon
p 3. Destruction of Library - 389 orders of Theodosius
Bishop Synesius
p.18 1356 stones → Mosque of Sultan Hasan
p70 Taylor + the Π Pyramid 51'51'
p73 Herschel's inch
p89 51°49', $\overline{51°52' 15."5}$ Herschel
/ Mean 51°51'14.3
p98 Smyth Petrie - triangulation, p118 . 119 siting
p121 what we can do with it - sun $\overline{\text{dial}}$
p143 cycles p190 perspective p262 $\underline{\underline{\varphi}}$ p263 sure
Cole p364 p372 pyramidion

Khafre p.379

Δ mr.?

$\tan\lambda = \frac{4}{3}$

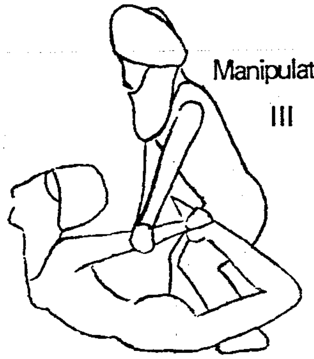
$\lambda = 53\ 07\ 48$



36 52 12

The "perfect angle 36°"

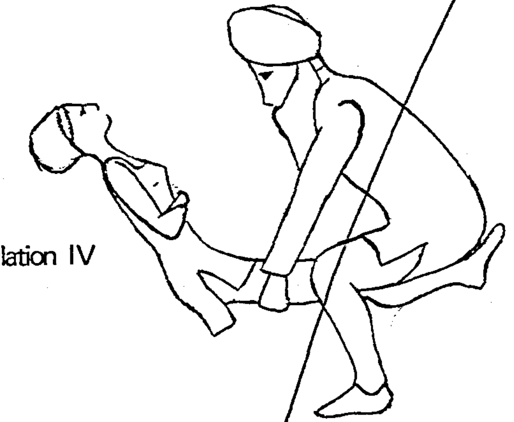
Repeat two or three times. Do not lift up high, the person is not a dumbbell. You want to stretch the muscles gently and cause the navel point to adjust internally due to the external stress.



Manipulation III

MANIPULATION IV

This is used only if the navel is still displaced a large distance upwards exactly on the center line. It should not be applied if the navel is still to the left or the right significantly. The subject should lie on his/her back. Place the subject's feet on your buttocks between your legs. Grasp the subject's body above the knees on the back of the legs. The subject's arms should be crossed over the chest, hands grasping the elbows. Have him/her tense the stomach as you sit back slightly and lift the torso off the ground. Hold the position for 30 seconds to one minute.



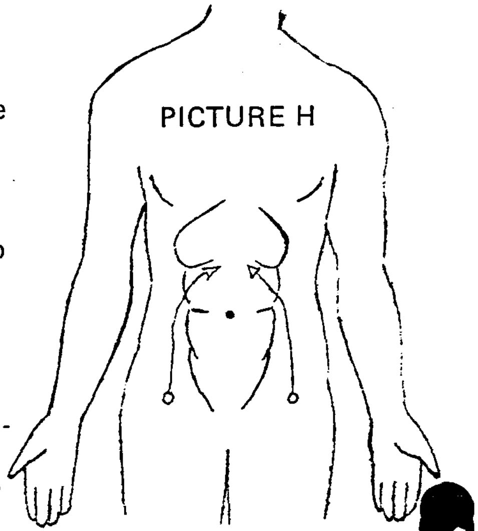
Manipulation IV

Massage

If you have done all of the manipulations that are appropriate and further adjustment is needed, then prepare to give a short massage. The subject should lie on his/her back and completely relax. Lightly massage the feet for a few seconds if there is any difficulty relaxing. Always use oil for massage, preferably almond oil. Station yourself to the right side of the subject so that his/her head is to your left. There are several variations and techniques of massage. The one presented here is the easiest and most basic.

After oiling your hands, lightly oil the abdominal area of the subject. Next, using the heel of the palms, press in just above the pelvic bone below the navel area. With deep pressure, run the palms gently up the solar plexus area. Continue this way for a few minutes. Next, do the same massage on the other side of the abdomen. (picture H)

Now place the palms down across the stomach with one palm above the umbilicus and one below it. Let the abdominal muscles totally relax. Grasp as much muscle as you comfortably can in each palm. This will form a ridge down the center of the stomach. The umbilicus will be the top of the ridge. (picture I) In a single, simultaneous motion holding the muscles in the hands, alternately push and pull. The umbilicus will stay stationary during the motion. Continue slowly for one minute.



PICTURE H

PICTURE I

A TABLE OF EGYPTIAN PYRAMIDS

SILIOTTI	PYRAMID	DATE	LOCATION	PHARAOH	HEIGHT	SLOPE	NOTES	LEHNER p17
	SIX STEP	2630 BC	SAQQARA	ZOSER DJOSER	204 ft	48°	STEP	
51°50'35"	SEVEN STEP	ca 2600 BC	MAIDUM	SNEFRU	306 ft	51°	SMOOTH FACED or 52.5°?	51°50'35"
54°27'44" 43°22'	BENT	ca 2600 BC	DAHSHUR	SNEFRU	344 ft	54°; 43°	TWO SLOPES 54°41', 43+	54°27'44" 43°22'
43°22'	RED PYRAMID ~~NORTHERN~~ RED	ca 2600 BC	DAHSHUR	SNEFRU	341 ft	43°	"NORTHERN STONE" = ~~RED PYRAMID~~	43°22'
51°50'40"	GREAT	2550 BC	GIZA	KHUFU [Cheops]	481 ft	51° 51'	✓	51°50'40"
50° 10'	"SECOND"	2520 BC	GIZA	[Chephren] KHAFRE	471 ft	53°	59°?	53°10'
51°20'	"THIRD"		GIZA	[Mycerinus] MENKAURE	203 ft.	51°		51°20'25"
53°7'48"		2250 BC	SAQQARA	PEPI II	172 ft	53°		52°7'48"

Data taken from the National Geographic Society, January 1995

Pharaohs: Snefru, Khufu, Khafre, Menkaure

Bent

Seked = cot [base-face angle]

$\frac{18}{25} \sim 54°15'$ #56 Rhind Papyrus ✓

$5\frac{1}{4} : 7 = \frac{3}{4} \sim 53°8'$ #58; 59 " "

Khafre, Pepi II

TEXT

November 22, 1997
February 1, 1998

THE GREAT PYRAMID:
AN INTRODUCTION

The astronomer, Sir Fred Hoyle, after studying in detail the arrangement of the stones at Stonehenge, concluded, "We do not know what the designers and builders of Stonehenge had in mind, and may never know for sure what it was intended for, but we do know what we can use it for: we can predict eclipses with it." In a general sense Sir Fred's statement can be applied to most of the pre-existing structures we have ever encountered, including the world itself: We do not know what the designer intended it for, but we have discovered what we can use it for. In the present case, we want to apply this apothegm to the Great Pyramid of Khufu. We are agreed that we cannot know for sure the intents of the designers and builders, but we do know that many are engaged in finding all of the uses that can possibly be projected on it. And these uses are not only quite varied but also oftimes quite imaginative.

Perhaps one of the most general uses we could make of the Great Pyramid is employing it as a sort of Rorschach test, substituting the measurements taken of the stones for ink blots. What investigators see in the pyramid tells us as much or more about them than about the pyramid. For example, some see the pyramid as a prophecy in stone predicting all of the important events from 2600 B.C.E. to the present (and even on into the future). Using a carefully chosen set of readily adaptable (and changeable) units, the pyramid can be shown to have predicted the Exodus, the birth of Christ, the Great Plague, the Great War, and the disappearance of Elvis. Another group of investigators see the pyramid as an encyclopedia in stone. Once it can be decoded, the pyramid will reveal the secrets of the universe. It contains the dimensions of the earth and the solar system, the fundamental constants of physics and the properties of the chemical elements. Others see the pyramid as a textbook in mathematics, a mineral manipulation of integers, radicals, and numbers such as pi and phi, the golden ratio. Still others see the pyramid as a vestige of an ancient and lost civilization dating back more than 12,000 years, constructed by Atlanteans or perhaps by ancient astronauts from some other star system. Finally, there are even a few, who having immersed themselves in the cultural context of the pyramid, come up with such ideas as the pyramid's being a tomb, or possibly a temenos to aid the Pharaoh in his passage into afterlife. So what can we say? We must conclude that we indeed do not know who the designers were or what they had in mind, but we do know the pyramid makes a great Rorschach test.

We know that psychological typing goes back at least to classical times, not being something just recently invented by Jung, Kretschmer, or Sheldon. The Greek physician Galen put together a four fold typology based on the 'humors', classifying people according to whether they were choleric, melancholic, phlegmatic, or sanguine. It seems reasonable that since the Greeks copied so much from the Egyptians that psychological typing may have been included among the many things they imported; and that millennia earlier the designers of the Great Pyramid were already experts in putting together Myers-Briggs tests,–albeit in stone rather than in questionnaires.

One psychological typing, which we can glean from studies of the shape of the pyramid, is the designers wanted a test that would differentiate people into what we might appropriately call "Pi Types" and "Phi Types". These terms derive from whether a person believes the pyramid was constructed according to the properties of the number π (pi), or according to the properties of the number ϕ (phi).[1] The designers were extremely clever in how they designed the test. They arranged for the pyramid to be built with a base-face angle of 51.8414 degrees, which is only a few seconds of arc smaller than 51.8540 degrees, the angle of a pi designed pyramid, and only a few seconds of arc larger than 51.8273 degrees the angle of a phi designed pyramid. Constructing the actual pyramid between these two closely valued mathematical pyramids would cause subsequent investigators to dispute whether the builders had pi or phi in mind, and split into two type groups according to their personality type. And the device has worked! Today there is an ongoing argument between Pi people and the Phi people over what the builders had in mind.

Perhaps the best way to characterize the two types is to look first at the arguments each side presents to support their point of view. First, the Pi view:

The Pi people note that if one takes the height of the pyramid as corresponding to the radius of a circle and takes the four sided perimeter of the pyramid's base as corresponding to the circumference, then the measurements show that the height to perimeter ratio is very closely equal to 2π. The precision of fit shows that the Egyptians at the time of Khufu (or earlier) had a knowledge of the value of π far exceeding any we have ever attributed to the ancients. 2π

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[1] By way of review, the number π = 3.1415926536... is best known for being the ratio of the circumference to the diameter of a circle. The number ϕ= 0.6180339887..., the so called Golden or Divine Ratio, which appears quite often in the structures and processes of nature, has the interesting property:

$$\phi+1 = 1/\phi.$$

The significant difference is that π is a ratio, while φ is a proportion, a ratio of ratios.

Let us stick with Hoyle's approach
Instead of trying to find what the builder had in mind
Let's see what we can do with it.

But we can do ~~som~~ so many things with it
by adjusting units that we need to
limit ourselves to no units
only ratio, + proportion

GPINT2.WP6 November 22, 1997

INTRODUCTION

The astronomer, Sir Fred Hoyle, after studying in detail the arrangement of the stones at Stonehenge, concluded, "We do not know what the designers and builders of Stonehenge had in mind, and may never know for sure what it was intended for, but we do know what we can use it for: we can predict eclipses with it." In a general sense Sir Fred's statement can be applied to most of the pre-existing structures we have ever encountered, even to the world itself: We do not know what the designer intended it for, but we have discovered what we can use it for. Here we want to reiterate this limitation for the specific case of the Great Pyramid of Khufu. We are agreed that we cannot know for sure the intents of the designers and builders, but we are trying to find all of the uses that we can project on it. And these are not only quite varied but oftimes quite imaginative.

Perhaps one of the most general uses we could make of the Great Pyramid is employing it as a sort of Rorschach test, substituting measurements of stone for ink blots. What investigators see in the pyramid tells us as much or more about them than about the pyramid. Some see the pyramid as a prophecy in stone predicting all of the important events from 2600 B.C.E. to the present and even on into the future. Using a carefully chosen set of varying units, the pyramid can be shown to have predicted the birth of Christ, the great plague, the Great War, and the death of Elvis. Another group of investigators see the pyramid as an encyclopedia in stone. Once it can be decoded, the pyramid will reveal the secrets of the universe. It contains the dimensions of the earth and the solar system, the fundamental constants of physics and the properties of the chemical elements. Others see the pyramid as a textbook in mathematics, a mineral manipulation of integers, radicals, and numbers such as pi and the golden ratio. Still others see the pyramid as a vestige of an ancient and lost civilization dating back more than 12,000 years, possibly constructed by ancient alien astronauts. Finally there are a few, who having immersed themselves in the cultural context of the pyramid, come up with such ideas as the pyramid being a tomb, or possibly a launch pad for sending the Pharaoh into afterlife. So we do not know what the designers had in mind, but we do know the pyramid is a great Rorschach test.

There is room for models that do not take into account all of the facts. They are steps. There is room for models based on lesser precision, lesser resolution, resolving power, fuzzier inputs – they are steps.

phlogiston, -- superceded, but useful

eyesight ~ radar

There is room for models that may be wrong, for they may apply to some other area of phenomena.

All interpretation involves a code-book

lacking a code-book we create our own

Experience ~ message

Each interpreter interpret ~~with~~ by bringing his own code book
investigate
and putting it in juxtaposition with the message

The Great Pyramid is put into juxtaposition
with the Bible, with historical events, with Myth
-- Osiris, Atlantis, with the earth lat, long,
with the Sky - Orion, the Pole, precession
Other pyramids + tombs, Book of the Dead.

— Can anything ever provide its own code book
message

— The Problem of communicating with aliens

— Prime numbers — ala Sagan

— We view the Earth a Hayek
What we can use it for
GP Tourism -

The Earth is God's
Rorschach Test
for us.

—

What does the GP say?

The ultimate code-book is mathematics.
A language that can be independently derived
by any intelligence anywhere — and will be
the same and understandable by any
who have explored it on their own

Mathematics is the primary code book

GPINT2.WP6 November 22, 1997

THE GREAT PYRAMID: AN INTRODUCTION

The astronomer, Sir Fred Hoyle, after studying in detail the arrangement of the stones at Stonehenge, concluded, "We do not know what the designers and builders of Stonehenge had in mind, and may never know for sure what it was intended for, but we do know what we can use it for: we can predict eclipses with it." In a general sense Sir Fred's statement can be applied to most of the pre-existing structures we have ever encountered, even to the world itself: We do not know what the designer intended it for, but we have discovered what we can use it for. Here we want to reiterate this ~~limitation~~ apothegm for the specific case of the Great Pyramid of Khufu. We are agreed that we cannot know for sure the intents of the designers and builders, but we are trying to find all of the uses that we can project on it. And these are not only quite varied but oftimes quite imaginative.

Perhaps one of the most general uses we could make of the Great Pyramid is employing it as a sort of Rorschach test, ~~substituting~~ replacing ink blots with measurements of the stones ~~for ink blots~~. What investigators see in the pyramid tells us as much or more about them than about the pyramid. For example, some see the pyramid as a prophecy in stone predicting all of the important events from 2600 B.C.E. to the present and even on into the future. Using a carefully chosen set of changeable units, the pyramid can be shown to have predicted the Exodus, the birth of Christ, the great plague, the Great War, and the death of Elvis. Another group of investigators see the pyramid as an encyclopedia in stone. Once it can be decoded, the pyramid will reveal the secrets of the universe. It contains the dimensions of the earth and the solar system, the fundamental constants of physics and the properties of the chemical elements. Others see the pyramid as a textbook in mathematics, a mineral manipulation of integers, radicals, and numbers such as pi and the golden ratio. Still others see the pyramid as a vestige of an ancient and lost civilization dating back more than 12,000 years, possibly constructed either by ancient alien astronauts or Atlanteans. Finally there are a few, who having immersed themselves in the cultural context of the pyramid, come up with such ideas as the pyramid being a tomb, or possibly a ~~launch pad~~ temenos for sending the Pharaoh into afterlife. So we do not know what the designers had in mind, but we do know the pyramid ~~is~~ makes a great Rorschach test. (perhaps giving us a new typology)

All of this does not have to do with facts, the facts are in place and pretty much universally agreed upon. What all of this is about is interpretation of facts. The pyramid illustrates for us that there really is no such thing as an isolated fact. Every fact in the very process of being experienced becomes transformed from 'fact' into 'fact plus interpretation(s)'. Objectivity is one of our illusions, so it behoves us to let imagination soar and come up with as many alternative interpretations as conceivable. Then cut them down to size.

Perhaps the Pyramid is telling us about numbers:
In its 4-fold and 8-fold aspects it is making
~~revealing th~~
a statement about integers. [and their ratios]

In the φ model it is making a statement
about radicals, irrationals, particularly $\sqrt{5}$

[in the West all was 4 - fourness
In China 5]

And in the π model, it is making a statement
about transcendental numbers.

i.e. 3 integers, irrationals, transcendentals

4
φ ~ $\sqrt{5}$ (pentagon)
π ~ ∞ (circle)

Pyracc2.wp6

12/30/94

π or φ ?

Seeing with the "eyes of the mind" Kepler

There seem to be but two design processes that can explain the measured value of the base angle of the pyramid to the degree of accuracy to which the angle has been determined, namely 51°51'30"±30".

One of these is ~~Collin~~ T.E. Connolly's rolling drum process in which a height to semi-base ratio of 4:1 is converted to a ratio of 4:π, by substituting the circumference of the drum for the diameter. The arctan of 4/π is 51°51'14", well within the range permitted by the measured accuracy.

The second of these derives from the maximization of the volume/surface ratio. A pyramid with the maximum volume for a given surface has a base angle of 51°49'38". This value is not close enough to be considered. But the pyramid was not constructed as a complete pyramid but as a frustrum of a pyramid with an upper base no greater than 14 meters. Depending on the size of the upper base, the allowable base angle falls in the range 51°51'48" (upper limit) to 51°49'38", (no upper base, i.e. full pyramid). The range of size of the upper base allowed by the accuracy of the measured base angle is 11.24 meters to 14.73 meters. But the present upper base is 14.12 meters corresponding to a base angle of 51°51'48", well within the range of measured accuracy.

also Herodotus

also $\omega = 0$

$\gamma = 63.^{\circ}43$

So both the rolling drum and the max V/S approaches can fit the observed value. The rolling drum introduces the number π, while the maximization formula contains the number φ, the so-called Golden Ratio = 0.618034... How are we to choose between the π process and the φ process? Certainly from the point of view of simplicity the π approach is to be favored. Another factor supportive of the π approach is that when the ratio of height to semi-base is taken to be 3:1, modified to 3:π, the base angle becomes 43.5°, which is the observed upper angle of the Bent Pyramid and the base angle of the Red Pyramid. All of this seems to confirm the π process. But most supportive of the π approach is the belief that the builders of the pyramid did not possess the level of mathematical sophistication necessary to maximize a V/S ratio. None the less, it is remarkable that the constructed truncated pyramid has the exact base angle required to maximize the volume to surface ratio. Is this a coincidence? Or did the priests of ancient Egypt have some way of deriving the shape of a pyramid that would have the greatest volume for a given surface, i.e. requiring a minimum amount of polished surfac~~ing~~e limestone? Or did they understand both how to maximize V/S and to use a rolling drum to effect this shape in practice? [Note that 5/6 π = φ^2 to within a difference of 0.000040]. Is the answer π, φ, or both? $4\sqrt{\varphi} =$

43.°5 also for Pyramid of the Sun in Teohuatican but they had no wheel (rolling drum) ∴ 43.°5 whence ?

Here we return to Fred Hoyle. We do not know what the builders had in mind or how they effected what they did, but we do know that both the π explanation and the φ explanation can account for the observed shape. So the problem is in our, not the builders', court.

Some of us are π people and some of us are φ people.

The priests were secretive because they didn't understand their heritage.
like most priests

The φ Pyramid

Note: The base-apothem angle of $51^\circ 49' 38.''25$ arises from both

1) The maximumization of $\frac{V}{S}$ (A fixed)

and

2) The angle β.

$$\underset{\alpha}{\underset{\shortparallel}{\text{Arctan}(x)}} = \underset{\beta}{\underset{\shortparallel}{\text{Arcsin}\left(\frac{1}{x}\right)}}$$

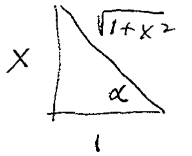
3) Herodotus $H^2 = \text{Area face}$

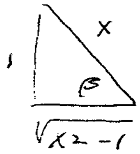
4) $\dot{\omega} = 0$

$$\boxed{\begin{array}{l}\varphi \text{ goes with} \\ \quad \dot{\omega} = 0 \\ \text{and } \frac{V}{S} \text{ max}\end{array}}$$

What does this tell us about the oblateness of the earth
Why the earth has this particular oblateness

also
$\frac{\omega}{2} \to \varphi$





$$\alpha = \beta$$

$$\text{i.e. } \overset{\sin\alpha}{\frac{x}{\sqrt{1+x^2}}} = \overset{\sin\beta}{\frac{1}{x}} \qquad \text{and} \qquad \overset{\tan\alpha}{\frac{x}{1}} = \overset{\tan\beta}{\frac{1}{\sqrt{x^2-1}}}$$

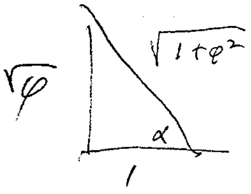
$$x^4 = 1 + x^2 \qquad\qquad x\sqrt{x^2-1} = 1$$

$$x^4 - x^2 - 1 = 0 \qquad\qquad x^2(x^2-1) = 1$$

$$x^4 - x^2 - 1 = 0$$

$$x^2 = \frac{1 \pm \sqrt{1+4}}{2} = \varphi$$

$$x = \sqrt{\varphi}$$



$$\varphi^2 = 1 + \varphi$$

$$\text{arc}\tan(\alpha) = \sqrt{\varphi}$$

$$\alpha = 51.^\circ 827292$$
$$= 51^\circ 49' 38.''25$$

$$\boxed{\frac{V}{S} \text{ max when } \frac{2H}{B} = \text{arctan}(\sqrt{\varphi})}$$

A fixed

$$\tan\alpha = \frac{2H}{B} = \sqrt{\varphi}$$

$$\boxed{H = \sqrt{\varphi}\,\frac{B}{2}} \to \max \frac{V}{S}$$

GTPIPHI.WP6 May 26, 1997

The "Pi People", mostly engineers, have been religiously making contributions to pyramidology with ideas on how the pyramids were **constructed.** But the "Phi People", mostly scholars, have contributed little in the way of possible factors that went into the **design** of the pyramids. The Π's have come up with rolling drums, ramps, cradles, and many ingeneous ideas, all, some or none of which might have actually been used by the builders. The Φ's, on the other hand, have left the design aspects pretty much where Herodotus put them over two millenia ago, leaving us with the Π versus Φ debate. The purpose of this essay is to come up with some additional design ideas to balance the plethora of construction ideas. The same disclaimer, however, holds: All, some or none of the proposed designs might actually have been used by the builders.

π : Jung's SFtype
Φ : Jungs NTtype

Every change in b, no matter how small creates a different pyramid, – like chaos theory – Each pyramid has it own implications, interpretations so $\exists$ pyramids for α, μ, $\frac{1}{\alpha}$, ... π, e, φ, ... etc.

12/22/94

π	~~w~~	Φ
Things happen by A pushing B B turning C D dissolving E ⋮		Things happen by Principle of Least Action etc.
Specifics		Archetypes
See the world as is		See what is behind the world of appearance.
		Usually what is Most fundamental is $\boxed{\text{NUMBER}}$

Both could be right in the determination of the base-apothem angle β.

This is Science, the fraternity

$$\pi \quad \beta \quad \varphi$$

THE GREAT PYRAMID

AN ~~ONTOLOGICAL~~ ROHRSACH TEST

To check your ontological views

The WordPerfect for Windows Macro Command Inserter

The Macro Command Inserter helps you to easily insert macro product and programming commands into your WordPerfect® for Windows™ (WPwin™) macros.

Product commands perform functions that are normally performed by an application (such as opening a dialog box). When you insert product commands, you can also use the Macro Command Inserter to specify parameters and value set members. These give WPwin information about what options to choose in dialog boxes and whether certain features (such as the Ruler) should be displayed or hidden.

Programming commands give you control over what happens when a macro runs. For example, you can use programming commands to specify whether part of a macro runs several times, or not at all, depending on what a user types. The Macro Command Inserter displays the proper syntax of the selected programming command.

If you want to use the Macro Command Inserter, but you did not install it when you installed WordPerfect, you can run the Installation program again and answer Yes when you are asked if you want to install the Macro Command Inserter.

The Installation program edits the WPC.INI file with the necessary information to run the command inserter. The lines

```
[WPWP-3rd]
macrocmd=c:\..path...\wpwcmd.dll
```

are added to the WPC.INI and are necessary to use the command inserter.

Using the Macro Command Inserter

When you use the Macro Command Inserter you don't have to worry about making spelling or typing errors–you simply choose the commands and parameters you want from the list boxes and insert them into your macro.

To choose a command, parameter, or value set member, double-click it, or select the item and then choose Edit (or press **Enter**).

The Macro Command Inserter places the command in the Token Edit text box and then positions the insertion point at the place in your macro where you may need to enter additional parameters or values.

Inserting Commands

To insert product or programming commands into a macro you are editing,

1 Press **Ctrl+m** to run the Macro Command Inserter.

2 Choose the type of command you want to insert from the Type pop-up list (choose WP for product commands or Program for programming commands).

3 Choose the command (such as ButtonBarOptions or If) from the Commands list box.

If you choose a product command that has parameters, the parameters will appear in the Parameters list box.

If you choose a product command without parameters (the Parameters list box is blank), or if you choose a programming command, skip to step 6.

4 Choose the parameter you want to use (such as Style) in the Parameters list box.

If the parameter has value set members, the selection cursor moves to the Members list box. If the Members list box remains blank, skip to step 6.

5 Choose the member you want to use (such as PictureOnly) in the Members list box.

6 The insertion point moves to the place in the macro command where you may need to type additional parameters or values. Type any additional parameters you need in the Token Edit text box.

7 Choose Insert (or press enter) to insert the completed product or programming command into

THE π Route to the Φ Route

We have two Pythagorean Classes:

The π People (Connelly - Electronic Engineer Rolling Drum)

and the φ People (Maximization of $\frac{V}{S}$) for frustrum of pyramid

Both give the value of Φ accurately

The argument arises over the fact

$$\frac{5}{6}\pi = \varphi^2 \qquad \delta = .000040$$

$\frac{5}{6}\pi = 2.617\ldots = \varphi^2 = 1.618034$

2.618034

$\underline{2.6179938}$

$\delta = .000040$

$\varphi = 1.618034$

Extenuating Circumstances

for π People: Red Pyramid 43½°

for φ People: Capstone Geometry

π People
Practical

argument against:
Egyptians could see
diam & circumference
would have used
factor of 3

φ People
Theoretical

Argument Against.
Egyptian had no
way of solving
problem of maximization

or could they?

The unlikelies
so close to $\frac{V}{S}$ max
by accident

Bottom Line
Hoyle's
Stonehenge
remark

Converting WordPerfect 5.1 for DOS Macros
into
WordPerfect 5.1 for Windows Macros

Using the Macro Facility you can convert a number of WordPerfect 5.1 for DOS (WP51 DOS) macro commands and codes into WordPerfect 5.1 for Windows (WP51 Win) format. Not all macro commands and codes found ~~in~~ WP51 DOS convert into WP51 Win format. Commands and formatting codes that do not convert will be commented out. See below for a complete list of the commands and codes you can convert.

Important: If the Macro Facility cannot find the macro conversion utility (WPM2WCM.DLL), Convert will not appear in the Macro menu of the Macro Facility. You may need to use the Install program to install it. See Getting Started in Reference for information about using the Install Program.

To convert a WP51 DOS macro to WP51 Win macro format,

1 Choose Run from the File menu in the Windows Program Manager, type MFWIN.EXE and choose OK.

or

Choose Run from the File menu in the WordPerfect File Manger, type MFWIN.EXE and choose Run.

You can also install the Macro Facility as a program item in the Windows Program Manager (see your Windows manual).

2 Choose Convert from the Macro menu.

3 Select the macro you want to convert, then choose Convert.

The Macro Facility displays a message when it has finished converting your macro.

4 Select another macro to convert and choose Convert.

or

Choose Cancel if you don't want to convert any other macros.

The new WP51 Win macro will have the same filename as the original macro. However, the new macro will have a .WCM extension. For example, if you have a WP5.1 DOS macro called LETTER.WPM and convert the macro, the new macro is named LETTER.WCM. After you convert it, you can choose Move/Rename from the Options pop-up list in the Convert Macro dialog box to place the new macro in a different directory if desired.

Additional Information

- It is a good idea to either view or open the converted macro file before you play the macro in WP51 Win to make sure everything converted properly. You may also want to try compiling the macro. If it doesn't compile, you'll have to edit it to fix the problems before you can run it.
- You won't lose anything from the original macro even if the Macro Facility can't convert the command or code into the WP51 Win format. Any macro commands or codes that aren't converted are commented out-that is they'll be preceded by two forward slashes (//). You'll need to change these items yourself.
- After you convert a macro you are returned to the Convert Macro dialog box so you can select another macro to convert.
- WP51 DOS macros using the Search and Replace feature that ask the user to confirm the occurrences of the word they want replaced will not work properly when converted into a WP51 Win macro format. You'll need to edit the converted macro before you run it in WP51 Win. However, if you didn't ask the user to confirm the occurrences of the word they want replaced, the search and replace function in the macro will work properly when converted.
- WP51 DOS macros using the Search and Replace feature to replace a code with another code (such as replacing all bold codes with underline codes) will not work properly when converted into a WP51 Win macro. You'll need to edit the converted macro before you run it in WP51 Win. You can, however, convert and use macros which use Search and Replace to replace text strings.

π W φ

Or we could say that they were right for the wrong reason

Being right was max $\frac{v}{s}$

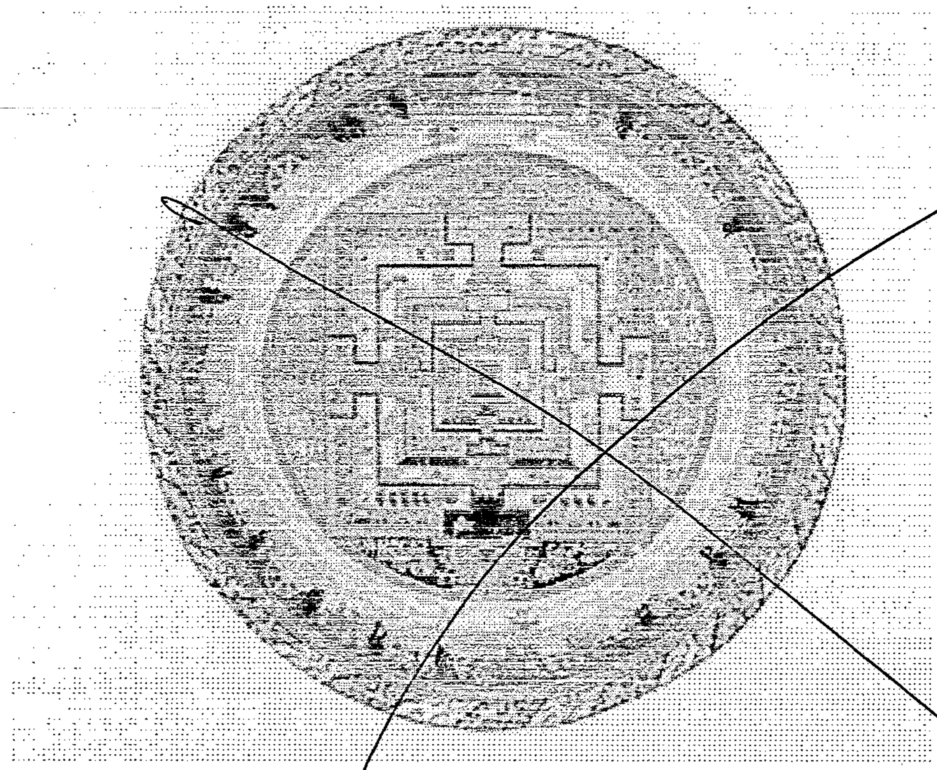
Wrong reason diam → circumference

A π person is likely to be practical, an engineer, a
devoted to Occam's razor.

A φ person is likely to be imaginative, looking at possibilities
— however improbable.

π is Jung's S type

φ is Jung's N type



~~~MAX1861.bmp~~
~~~

IN TRODUCTION

To write an ~~opinion~~ essay ~~about~~ on the pyramid is an initiation exercise required for admission to the sangya of those who ~~feel that~~ are persuaded ~~there are many tr~~ of the pluralistic nature of truth. This is contrary to all mono views ...

It is not a matter of what they knew that we don't, or what we know that they didn't. It is a matter of what they sought and what we seek.

how

G.B. Shaw Quote for π & φ

when:

π
" You see things; and you say 'why'
φ
But I dream things that never were and I say 'why not'
could it be

Thought without a Thinker

From Message of the Sphinx Chap 16 p 239

The idea of an anti-cipher of messaging and standardization

p241: The idea of a message in the pyramid

The stones are unaltered

{[ritual]} {[celebrated]}

" As long as a myth continued to be told unaltered it will continue to contain and transmit any deeper messages that may be hidden within its structure, regardless of whether either the teller, sender, or hearer, receiver understands the message" release the energy, a person clings to his self-conceived reality and will not be open to any outside view. If the chakra is developed and balanced, no outside view can stand his scrutiny. He can penetrate the reality of any other person.

The navel chakra is associated with the element 'fire'. It generates heat and regulated digestion. "Fire burns all things to ash. It purifies all things into the vapor of the air." On the negative side, it can destroy everything. With positive development, it sublimates everything. In proper balance, it can be a source of warmth, but it can be a source of burn and injury if unregulated. If the fire is strong, bad habits can be burned in it. So a strong navel chakra gives the ability to break and create habits.

A strong balanced nabhi chakra gives the power to maintain a course of action. Often you will know someone who just can't stay on a diet or who can't focus the mind on anything for long, or who would love to do those things but never does. The power to sustain an effort is missing. If an effort is sustained, it becomes a habit. As a habit, it sustains itself. The navel energy is necessary to easily initiate self-sustaining actions.

Meditation can be described many ways. For this discussion, meditation is a process that produces a temporary alteration of the thought flow, consciousness, and identity of a person. We practice a meditation to create a subconscious habit pattern of thought, feeling and behavior. Different meditations produce different alterations of the brain and open up different abilities. To sustain the effect of a meditation, integrate it into the personality and speed its assimilation, the navel chakra energy must be strong and fluid. Without the navel energy, you can meditate for years and not have the effect you can get in three days with the navel energy. This is one of the basic reasons why nabhi kriyas and exercises such as sat kriya are always taught first in the advanced forms of yoga. Then progress is rapid and consolidation of the effects in the personality are guaranteed.

To improve the depth and quality of meditation, practice a nabhi kriya before beginning. The navel kriya will give voltage and power to the meditation. The focus, mantra, and posture will add direction and quality to the meditation. The channels called the silver and golden cords, run from the base of the spine to the pituitary gland and finally to the pineal gland. This channel needs to be open and strong for deep meditation. The cord can be stimulated and cleared by first letting the solar plexus charge the navel energy and drawing that energy chakra by chakra along the cord and out the top of the skull. An example of this technique is to do the nabhi kriya (in this issue), followed by the Raja Yoga Meditation in KRI JOURNAL volume I, issue 4-5, page 54. Alternating the focus from the navel chakra through the spine to the pineal gland will improve all your meditation practices.

Besides the sample of exercise kriyas presented here, there are many meditations that focus on the navel chakra and lower triangle. Here are just a few to entice you to study further. The meditations are simple but very potent.

Nabhi Kriya:

I) Sit in easy posture, hands in gyan mudra. Spine is erect. Fix both eyes at the tip of the nose. Inhale and contract the rectum and sex organs. Pull in on the navel point. Exhale and release the lock. Imagine the pranic energy flowing in and to the navel point. Breathe in such a way that the breath creates the mental sound SAT with the inhale, and NAM with the exhale. If your concentration is good, the entire back and spine will start to heat up.

It is written that one who perfects this kriya can master death and old age. He can learn to transfer the prana to another being for healing and even extend that person's life. He will not be affected by his past negativity and no negative thought will penetrate his projection. It is a simple meditation but it deals with the primal power of the creation.

II) After doing a powerful navel kriya, lie on the back to deeply relax. Collect all your conscious energy at the brow point. Let that sphere of energy descend to the navel chakra. Feel the beat of the heart there. On each beat, hear the echoing sound, ONG, ONG, ONG.... As you feel your entire energy begin to vibrate with the sound, see the spinning vortex spreading out from the navel. In this mental body, let the mind raise up and out of the navel chakra to float freely in the vicinity near the physical body.

This is the beginning of mental levitation, the ability to project the creative center of the psyche to points beyond the body. By leaving through the navel point, the physical energy is stimulated to maintain the body. Sometimes a person tries to project and has a weak navel center. The body can get cold and illness or disorientation can result. This technique opens the capacity of total relaxation and physical regeneration.

After five to fifteen minutes, bring yourself

PYRIDIOT.WPD

97/11/25

RE PYRAMIDIOTS AND ANCIENT ASTRONUTS

Hi Sharon and George
Really rude of me to make a succinct reference to something without filling in a bit of background. Several years ago I visited the Great Pyramid and like many others became curious as to whether there wasn't more to it than just a tomb. I began to read stuff claiming the pyramid was a prophecy in stone, an encyclopedia in stone, a monument built by Atlanteans or ancient astronauts, etc, etc. All amusing and some even interesting.

Being mathematically inclined what really intrigued me was the various mathematical claims being made by some investigators. This launched me into a now and then project of seeing what purely mathematical relations were involved in the dimensions of the pyramid. By purely I mean using only ratios, that is pure numbers, not ad hoc units picked to prove anything you had in mind. I have a file on this stuff and am now planning to write it up as I have found a few curious relations that I have never seen published.

With regard to my e-mail note, there are two basic schools of pyramidiots. The first is the "pi" school, that takes a value of the face-base angle a fraction of a minute of arc different from the most carefully measured values and concludes the builders had a very accurate knowledge of pi. The second or "phi" school takes a slightly different value, still differing by less than a minute of arc from the measured face-base angle and comes up with a pyramid related to the golden section or divine ratio, phi = 0.618034...

On a now and then occasion a couple of years ago, using some differential calculus that I am not sure the builders used, I showed that the phi pyramid has the greatest volume to surface ratio possible for a fixed value of the face apothem. At the most recent now and then occasion that occurred last month, I noted that the apex face angle of the phi pyramid was mathematically identical to the value of the angle of inclination an orbiting earth satellite must have in order that its line of apsides not progress or regress. You are right, this movement is caused by the earth's oblateness. It moves in one direction at inclination angles of less than 63.4349 degrees and in the opposite direction at angles greater than 63.4349 degrees.

This is of course a very interesting coincidence (or synchronicity?) One could make a big splash writing this up as supporting alien astronauts needing a marker to know at what angle to orbit their saucers when visiting the earth. But what is much more interesting to me is the number of places that phi shows up in the structure of the world. The connection between celestial mechanics and the geometry of the phi pyramid lies, not in ancient astronauts, but in the number phi. As Pythagoras always maintained, at the root of all lies number.

How to present the material on the Great Pyramid?

Intro
G.P.

1) Sir Fred Hoyle approach
"We do not know ...
But we do know what we can measure ...
read into it

2) The Egyptian, like the Tibetan Monks, were in touch through a different way of knowing,

3
other
ways of
knowing

Here we have Polyphanos + Metamethkics
Priest of Thoth or
Forgotten Truth
~~3~~ Ancient Astronaut
Pythagoras = "Himself"
3) Mimimization

Intro
JMY

4) Loot
5) π - φ types
Not a trip
Sacred Time
Huston Smith

8 600 BC. at now on return
2000 AD

DAIZIES

Scale ≠ distance
Size ≠ place
extension ≠ separate

DDMA
SDMA
EDMA

SDMA ~ ADMA
FDMA ~ TDMA
is scale the inverse of distance?

INTROS freq. ≠ duration
size

power spectrum

more like modulate
scale modulate

Multiplexed Universe

shared: If Brahma is interested in variation on a theme
design to minimize interference

SHARED UNIVERSE: Each path may be determined but the paths are independent

The electron tries all paths simultaneously

How do it know?

$\delta \int_A^B f(\alpha) d\alpha$

Homogenization as erasing the black board

Rorschak Test

```
                                            Print File List
                                           11/7/96   4:47AM
                                                 B:\

whitred2.wp6        4,509     6/7/96     6:11PM -38
figrnd2.wp6        10,858     6/5/96     6:44AM -24
aphor96.wp6         3,723     6/2/96    12:46PM -29
breakout.wp6        5,197     6/2/96    10:05AM -36
empquad.wp6       130,992    5/29/96     1:05PM -35
alphlist.wp6        5,901    5/19/96     2:14PM -16
juxtbegn.wp6       22,428    5/14/96    10:12AM -31
injtoins.wp6        3,742     5/9/96     6:49PM -34
moralemp.wp6        3,909     5/9/96    10:45AM -33
juxtpyth.wp6        5,737     5/8/96     2:26PM -32
hamtot.wp6          3,577     5/8/96     8:18AM -2
kmfnsk01.wp6        6,063     5/7/96    12:58PM -30
meltpot1.wpd        5,986     5/6/96     8:38PM
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dhrmsang.wp6        3,911    4/28/96     7:32AM -28
newchon3.wp6       25,053    4/11/96     9:44AM -14
commexp1.wp6        4,600    4/10/96     9:36PM
relig101.wp6        3,524    4/10/96     6:14PM -26
fundvalu.wp6        6,647    4/10/96     9:14AM
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heavhell.wp6        3,268     4/8/96     6:27AM -25
hellheav.wp6        3,320     4/8/96     6:24AM
fracdim1.wp6        3,958     4/4/96     9:51PM
fracdim4.wp6        2,256     4/4/96     9:48PM
fracdim3.wp6        2,975     4/4/96     5:53PM
conres01.wpd        5,231     4/3/96     9:36AM -23
emerson2.wpd        9,228     4/2/96    10:53AM -22
emerson1.wpd        4,186     4/2/96     9:09AM -21
aaquest1.aol        4,092     4/1/96     2:41PM -20
6degsep.wp6         8,720    3/31/96     4:59PM -19
shorts1.wp6         5,433    3/17/96     6:37PM -3
galbrath.wp6        3,159    3/16/96     9:05AM -18
inmem95.wp6         3,543    3/15/96     3:09PM -17
reent02.wp6         1,424    3/10/96     2:35PM
reent01.wp6         6,134     3/8/96     9:09PM
signprof.wp6        6,218     3/4/96     9:49PM -11
illusaph.wp6        4,454     3/3/96     6:04PM -12
kroon1.wp6          2,381     3/3/96     5:23PM
hayward2.wp6        5,502     3/3/96     5:19PM -13
```

95/03/28

BRANCH ESSAYS

FROM THE GREAT PYRAMID TRUNK

- Ratios and Proportions – purifies → pure number (vs cubits)
- $\frac{V}{S}$ → plant and animal kingdoms
- The definition confluence in the ∠ of 51°
  ⇒ cf. Anthropic Principle
- Mysteries vs Mysterium
  20 Quest   20 Quest a la Wheeler
- Gurdieff Cosmology: Successive Liberations
- Ontology
  - Interstices   2 types of 20 question
  - Confluence   3 Umpires
  - Resonance
- φ vs π
- Woo-Woo, Mummifying, Razor Blades, &c.
- Drawing Power of Gt. P.
- Specifies → 51°
  Octant.
  Rolling Drum $3t \rightarrow 4t$ $(\tan^{-1}(\frac{4}{\pi}))$
  $H^2 = \frac{AB}{2}$
  $\frac{V}{S}$ max
  $\frac{360}{7}$ cf. Rudyar
  Visica Pisces
  $\sin^{-1}(\frac{\pi}{4})$
  $\frac{Edge}{H} = \frac{3}{2}$

~~are true and that both provinces may claim the honour. For six years, wherever it was, he tended swine, and loneliness led him to seek comfort in religion. He was led by miraculous promptings to attempt escape. Although many miles separated him from the sea he made his way to a port, found a ship, and persuaded the captain to take him on board. After many wanderings we find him in one of the small islands off Marseilles, then a centre of the new monastic movement spreading westward from the Eastern Mediterranean. Later he consorted with Bishop Germanus of Auxerre. He conceived an earnest desire to return good for evil and spread the tidings he had learned among his former captors in Ireland. After fourteen years of careful training by the Bishop and self-preparation for what must have seemed a forlorn adventure Patrick sailed back in 432 to the wild regions which he had quitted. His success was speedy and undying. "He organised the Christianity already in existence; he converted kingdoms which were still pagan, especially in the West; he brought Ireland into connection with the Church of Western Europe, and made it formally part of universal Christendom." On a somewhat lower plane, although also held in perpetual memory, was the banishing of snakes and reptiles of all kinds from the Irish soil, for which from age to age his fame has been celebrated.~~

~~It was therefore in Ireland and not in Wales or England that the light of Christianity now burned and gleamed through the darkness. And it was from Ireland that the Gospel was carried to the North of Britain and for the first time cast its redeeming spell upon the Pictish invaders. Columba, born half a century after St Patrick's death, but an offspring of his Church, and imbued with his grace and fire, proved a new champion of the faith. From the monastery which he established in the island of Iona his disciples went forth to the British kingdom of Strathclyde, to the Pictish tribes of the~~

THE GREAT PYRAMID:
AN INTRODUCTION

The astronomer, Sir Fred Hoyle, after studying in detail the arrangement of the stones at Stonehenge, concluded, "We do not know what the designers and builders of Stonehenge had in mind, and may never know for sure what it was intended for, but we do know what we can use it for: we can predict eclipses with it." In a general sense Sir Fred's statement can be applied to most of the pre-existing structures we have ever encountered, including the world itself: We do not know what the designer intended it for, but we have discovered what we can use it for. In the present case, we want to apply this apothegm to the Great Pyramid of Khufu. We are agreed that we cannot know for sure the intents of the designers and builders, but we do know that many are engaged in finding all of the uses that can possibly be projected on it. And these uses are not only quite varied but also oftimes quite imaginative.

Perhaps one of the most general uses we could make of the Great Pyramid is employing it as a sort of Rorschach test, substituting the measurements taken of the stones for ink blots. What investigators see in the pyramid tells us as much or more about them than about the pyramid. For example, some see the pyramid as a prophecy in stone predicting all of the important events from 2600 B.C.E. to the present (and even on into the future). Using a carefully chosen set of readily changeable units, the pyramid can be shown to have predicted the Exodus, the birth of Christ, the great plague, the Great War, and the death of Elvis. Another group of investigators see the pyramid as an encyclopedia in stone. Once it can be decoded, the pyramid will reveal the secrets of the universe. It contains the dimensions of the earth and the solar system, the fundamental constants of physics and the properties of the chemical elements. Others see the pyramid as a textbook in mathematics, a mineral manipulation of integers, radicals, and numbers such as pi and phi, the golden ratio. Still others see the pyramid as a vestige of an ancient and lost civilization dating back more than 12,000 years, constructed by Atlanteans or perhaps alien astronauts. Finally there are a few, who having immersed themselves in the cultural context of the pyramid, come up with such ideas as the pyramid's being a tomb, or possibly a temenos to aid the Pharaoh in his passage into afterlife. So we must conclude that we indeed do not know what the designers had in mind, but we do know the pyramid makes a great Rorschach test.

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THE GREAT PYRAMID: AN INTRODUCTION

The astronomer, Sir Fred Hoyle, after studying in detail the arrangement of the stones at Stonehenge, concluded, "We do not know what the designers and builders of Stonehenge had in mind, and may never know for sure what it was intended for, but we do know what we can use it for: we can predict eclipses with it." In a general sense Sir Fred's statement can be applied to most of the pre-existing structures we have ever encountered, even to the world itself: We do not know what the designer intended it for, but we have discovered what we can use it for. Here we want to reiterate this limitation for the specific case of the Great Pyramid of Khufu. We are agreed that we cannot know for sure the intents of the designers and builders, but we are trying to find all of the uses that we can project on it. And these are not only quite varied but oftimes quite imaginative.

Perhaps one of the most general uses we could make of the Great Pyramid is employing it as a sort of Rorschach test, substituting measurements of stone for ink blots. What investigators see in the pyramid tells us as much or more about them than about the pyramid. For example, some see the pyramid as a prophecy in stone predicting all of the important events from 2600 B.C.E. to the present and even on into the future. Using a carefully chosen set of changeable units, the pyramid can be shown to have predicted the birth of Christ, the great plague, the Great War, and the disappearance ~~death~~ of Elvis. Another group of investigators see the pyramid as an encyclopedia in stone. Once it can be decoded, the pyramid will reveal the secrets of the universe. It contains the dimensions of the earth and the solar system, the fundamental constants of physics and the properties of the chemical elements. Others see the pyramid as a textbook in mathematics, a mineral manipulation of integers, radicals, and numbers such as pi and the golden ratio. Still others see the pyramid as a vestige of an ancient and lost civilization dating back more than 12,000 years, possibly constructed either by ancient alien astronauts or Atlanteans. Finally there are even some ~~a few~~, who having immersed themselves in the cultural context of the pyramid, come up with such ideas as the pyramid being a tomb, or possibly a launch pad for sending the Pharaoh into afterlife. So we do not know what the designers had in mind, but we do know the pyramid is a great Rorschach test.

All of this does not have to do with facts, the facts are in place and pretty much universally agreed upon. What all of this is about is interpretation of facts. The pyramid illustrates for us that there really is no such thing as an isolated fact. Every fact in the very process of being experienced becomes transformed from 'fact' into 'fact plus interpretation'. Objectivity is one of our illusions, so it behoves us to let imagination soar and come up with as many alternative interpretations to every fact as conceivable. ?

Throw away Occam, his idea stifles all other ideas

Just as God could raise up Children of Abraham from the stones, so can anyone generate ~~fits~~ numerical fits to the Great Pyramid.

e.g. Eddington's Number
Feigenbaum Constant
Eulers
... any dimensionless quantity

Most researchers stew around with 30 or 40 sets of units to create their fits — unnecessary — stick with vectors, pure, dimensionless quantities — still get fit

∃ 2 realistic fits

1) The rolling wheel — practical, believable, accurate

2) Maximization — theoretical, accurate
believable?

Only if you possess enough humility to grant ancient people as much intelligence as we have.

∃ 2 such levels in everything.

Both "slices" fit
base your world view on your choice

The pyramid gives back what you put into it — like the world itself

In this sense the pyramid is a cosmos

(Many have said this — but not for this reason

Some claim the pyramid maps the earth — the world
They are all correct

It maps anything and everything — as a function of the mapper. It is a mysterium
It takes many projection

The purpose of this study is to generate metaphors

Function	WP51 DOS Keystroke(s)	WP 5.1 DOS Macro Code
Down Arrow	Down Arrow	{Down}
End of Document (after codes)	Home, Home, Down Arrow	{Home}{Home}{Down}
End of Line	Home, Home, Right Arrow	{Home}{Home}{Right}
Enter	Enter	{Enter}
Far Left of Line	Home, Home, Left Arrow	{Home}{Home}{Left}
Flush Right	Alt-F6	{Flush Right}
Hard Center Tab	Home, Shift-F6	{Home}{Center}
Hard Left Tab	Home, Tab	{Home}{Tab}
Hard Page	Ctrl-Enter	{HPg}
Hard Right Tab	Home, Alt-F6	{Home}{Flush Right}
Indent	F4	{Indent}
Left Arrow	Left Arrow	{Left}
Page Down	Page Down	{Page Down}
Page Up	Page Up	{Page Up}
Paragraph Down	Ctrl-Down Arrow	{Para Down}
Paragraph Up	Ctrl-Up Arrow	{Para Up}
Reveal Codes	Alt-F3 or F11	{Reveal Codes}
Right Arrow	Right Arrow	{Right}
Screen Down	Home, Down Arrow	{Home}{Down}
Screen Up	Home, Up Arrow	{Home}{Up}
Soft Hyphen	Ctrl--	{SHy}
Tab	Tab	{Tab}
Tab Align	Ctrl-F6	{Tab Align}
Top of Document (after codes)	Home, Home, Up Arrow	{Home}{Home}{Up}
Top of Document (before codes)	Home, Home, Home, Up Arrow	{Home}{Home}{Home}{Up}
Up Arrow	Up Arrow	{Up}
Word Left	Ctrl-Left Arrow	{Word Left}
Word Right	Ctrl-Right Arrow	{Word Right}

The pyramid is an object so wondrous that there are those that feel it was built by other than Cheops's workmen.

Its location and proportions have intrigued

Its size,

The Great Wall of China — an engineering feat of much greater dimensions — but of obvious use.

Whereas — a tomb - just a tomb leaves questions

10 Mystery
Why the fascination
with this object?

MYSTERIES
OF THE
GREAT PYRAMID

This particular pyramid: design ~ anthropic principle
So many ways in which it resembles the cosmos
A monument to man's understanding

The Great Pyramid of Gizeh stands among many pyramids
While it stands as the largest of the pyramids, it
is not its size alone that sets it apart
Something beside size grabbed the imagination

Bring in
Recollection (History) π the record, memory
and Recognition (Mystery) φ
no details
on a ~~form~~ of signification

competing theories
assume them all

of The Pyramid is recognized
significated
why

personnal cause such as, success or failure, acceptance or rejection, etc. The question is not whether fluctuations in our moods are real, but whether they are attributable to local, personal causes, or might derive from broader influences that govern the local and the personal, flowing through us collectively like some psychic blood. We observe such seasonal phenomena in animals and birds, yet tend to deny that such forces could be operating in us. We continue to search unconsciously for specific causes on which to hang our collective moods rather than entertain the possibility that the mood may be primary and our "causal hooks" secondary. The Journey of the Year informs us that the seasons of the spirit, like the seasons of the sun, are real and not to be explained away in terms of local and personal factors.

When we consider that awareness and sensitivity to the seasons has greatly diminshed in the present century, it is not surprising that there is little or no recognition of the less visible and more subtle seasons of the spirit. Our losing touch with the great rhythms of nature about us has resulted from the homogenizations impressed on life by urbanization and by our ways of using technology. Electric lighting, in all but removing the former drastic limitations imposed on human activity by darkness, has equalized day and night. Central heating and air conditioning have diminished the physical impact of the seasons while urbanization has insulated us from their psychic influence. Egalitarianism has overflowed its original social intention and become a philosophical directive toward the homogenization of all things. The Sabbath has lost not only its sacredness but even its specialness. Dates set aside for celebrations and remembrance have become arbitrary. Holidays have been wrenched from their rightful dates and manipulated in accordance with ~~the~~ such bottom lines--the ~~longest possible~~ 3-day weekend. Even sports, which once lent a special enhancement to their proprietory times, in being played throughout the year have lost the allure of seasonal anticipation. It is small wonder that the egalitized space and homogenized time of the physics laboratory have become the foundation stones of our current world view.

For us to awaken to the injunctions of the seasons we must detect and loosen the bonds which technology and urbanization have woven around us. For us to experience the essences of the year we must transcend the mind set that tells us only the visible and immediately sensed exists. We must enter again into natural space and enter a dialog with the Earth in order to find that larger world which contains the world of our technologies and cities, that same world with which people in ages past lived in intimacy and which was their source of wisdom. In becoming isolated from this larger reality, we have tried to lock into some mental closet things we cannot understand or are unprepared to encounter. But they cannot be locked away. They continue to invade the tidy rational domain we want to define as reality, generating anxieties and frustrations and making us behave in unintended and counter productive ways. Ultimately, there is no insulation, the larger realities, both inner and outer, will continue to invade our lives. Our choice is between continuing to hold the illusion of their non-existence or to get in communication with them, understand them, and work in harmony with them.

the context?

Let us go back in imagination to an age for which our records are sparse, when men stood beneath an open sky and observed the movements of the sun and moon and stars. Let us stand on that earlier Earth and watch the flights of birds, the coloring of leaves, the paths of clouds and storms. Let us follow the sprouting of plants and the birth of animals, their coming to maturity and fulfillment, and their return to the Earth. Let us measure the cycles of light and darkness of growth and decay and ponder their periods of ease and of stress. Let us note our moods of anticipation and

95/03/02

Notes from the ABC program 10:00 P.M. March 1, 1995, Channel 7

Author of "The Orion Mystery" Peter Bauval

The pyramid: The World's Great Treasure
A Gigantic Question mark
Why built
Why built here

Belt + Sword of Orion Maps location of pyramids
Osiris, God of the After Life
The pyramids are launch pads to afterlife
The shafts to Orion [cf. Virginia Trimble]

These things will never be proved wrong, nor right ∴ not scientific

---

Prof. AhRas ?
∃ no evidence for this theory
Royal tombs for the sun, not the stars
Location: for limestone, solid pad
Back stress of workers
Pyramids a civic, not a religious, project

Re Pyramid: Take a few pictures, get a wild theory, give lectures
write a book - you'll get rich

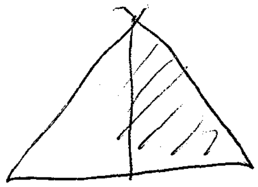
Did the builders know something about afterlife
we do not know?

{[Did the builders know more mathematics than we
give them credit for?

The feeling that certain times and certain places have special properties is considered to have no objective scientific basis and is only some sort of subjective illusion. Before electric lighting reduced the difference between day and night and before central heating and air conditioning insulated us from the thermal changes of the seasons, we were more conscious that there was a proper time for our various activities. When we worked close to the earth the seasons played a governing role in determining the timing of our activities. Our schedules were given us by the earth and sky, not by the imperatives of technology. And our psyches resonated with the pulse beat of nature which they cannot do with the factory whistle and the nine-to-five punch clock. When our lives are governed by the time tables of businesses detached from nature, we are constantly caught in the dilemma of having to do things at the wrong time. We find this especially true before Christmas, when the pressures to do all of the things conventionally required for Christmas seem to violate our real feelings and needs of the season.

Though urbanized and fast lane life styles have taken command of our lives, the moods and inner feelings derived from millennia of being in tune with the earth still persist within us. These seasonal moods and feelings have over time become interwoven with our traditional religious celebrations providing a calendar for our souls. However, religious festivals and their calendars should not be approached as mere mythic explanations of the attributes of the seasons. Rather both our religious festivals and our seasonal moods derive from the natural order. But only when the spiritual message of a religious festival is properly associated with the seasonal mood and observed at the appropriate time of year can its full power be transmitted and received. Christmas, for example, contains a message whose proper season for yearly enunciation is the time of reversal from darkening to light. Over the centuries most religious (and some secular) festivals have come to reside in their proper season. (Christmas finally became associated with December 25th only in the sixth century.) Nonetheless, some of the festivals celebrated in our current culture have yet to find their proper season while others have accumulated corollary customs that violate the primary moods of their season, a distortion which has created no small portion of the frustration and malaise of modern life.

Today the ideas of egalitarianism and democratization have overflowed their appointed social and political bounds and have become philosophical directives ~~to~~ for the homogenization of all things. As one consequence, the Sabbath has lost not only its sacredness but even its specialness and has become like the other days of the week. Since it is broadly assumed that the dates set aside for observances and celebrations are arbitrary, holidays have been pried from their rightful dates and manipulated for the sake of the bottom line—the long weekend. The selection in 1918 of the eleventh hour of the eleventh day of the eleventh month to end the ~~Great War was to symbolize humanity's precarious relationship with~~



Tompkins p 109

Minkaure 51°

Oudimose Pharaoh at Exodus ?

DATES

8 350 years toward present

	OLD B.C.E	"NEW"
Santorini	1100?	
Exodus	1447	1100
Akhnaton	1336 ———	1000
MOSES	b 1535	1200
Ramses II	1400	925
Darius	496	

694 BC Last strong date

925 ?

What was the extinction that led to the 550 BC radiant ?

$$12\overline{)25000}$$

2080
24
100

550
2080
2630 time of pyramids

The pyramids were a radiant

Dates

Mayan Aug 13, 3114 B.C. → Dec 23 2012 A.D.
Egyptian
Hebrew

May 5 2000 —
♀ ☿ ♂ ♆ Ur line up
every 45,200 yrs

25776
2148
550 B.C.
2698
2700BC

Aries
Pisces

550
2148
1598

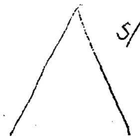
~~ON MONOTHEISM AND TRINITIES~~

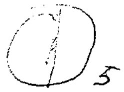
~~Jews, Muslims, and some Christians have great difficulty with the notion of the "Trinity". Those who subscribe to monotheism, one God, find the idea of a three-in-one deity contradictory, confusing and unnecessary. The Christian Trinity seems to have been the work of a committee that had to reconcile diverse interpretations of scriptures, and come up with a compromise acceptable to all parties, but not really understood by any. Father, Son, and Holy Ghost, what does it mean? What is it saying about the nature of God?~~

~~However, in a broader sense, many of the problems with a Trinity are problems with monotheism itself. The Hebrew Lord God is also a blend of gods, not just three, but of many. In His case, many spiritual and material attributes have been packaged in a single anthropocentric being. No problem for humans had these attributes been self consistent and mutually supportive, but they are contradictory and conflicting. We note that theologically there have been two approaches: The first is to postulate a different god to symbolize some aspect of material and spiritual experience. The second approach is to call these selected aspects of our experience a facet or attribute of a one God. The theological difference in these two approaches is that with multiple gods the inconsistencies experienced in the world, can be explained by each god having his/her own agenda, and not being particularly concerned with how it affects the agendas of the others. In the case of one God, monotheism, many problems arise because either this one God is not in full control, or this one God is schizoid and capricious, or this one God's agenda is too complex for us to understand. On the symbolic level, it is curious that monotheism ever replaced animism and pantheism and came to be held as a more advanced notion of God.~~

~~The Hindu Trinity and the Christian Trinity afford examples of these two approaches. The Hindus reasoned that three gods were primary. These were Brahma, the creator; Vishnu, the preserver; and Shiva, the destroyer. We experience Creation, the natural order, so we postulate a creator god, in the Hindu case named Brahma. We experience the ongoing existence and evolution of the natural order, we postulate a protector or preserver god--Vishnu. We experience impermanence, the ending and termination of world views and allegiances, we postulate a destroyer god--Shiva. This was a trinity of three distinct gods, not a single three-in-one God. The Christian trinity on the other hand is based on the second approach. The same three facets of God are again emphasized: The Father, God transcendent, the Creator; The Holy Spirit, God immanent, the preserver and comforter; and The Son, God incarnate, the redeemer.~~

Look up.

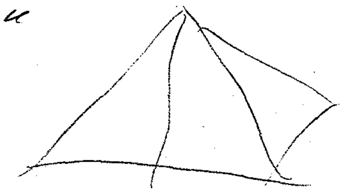
- Aknatm + Exodus
-  slope angles of any pyramids.
  esp Menkaure

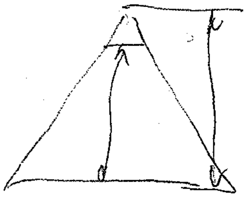


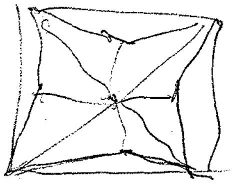
Tbl 1

Meroe Sudan	5:1	—78°	
fig 45	4:1	51°51'	
Meiddoin	3:1	44°	~43½ Red

- View showing South face







Why no record about pyramid construction?

- Want to keep it secret.
- One shot enterprise
- Done by super-priests
- Atlanteans built it.
- Plans not discovered yet — destroyed?

Not at site

- Ancient Astronauts — Extra terrestrial

How would we have done it?

How would we do it today?

Dictionary of Sciatific Biography p681

Math of ancient egypt.

R 925
Dictionary
V15
Supplement XV

The Riddle of
the pyramids
Kurt Mendelssohn

p 533 India
p 706 Astronom

Exodus
- 350 years

Why were built.

- tombs
- Great Pyramid as observatory
- Encyclopedia in Stone

---

max V/5

Angle of Repose
Accident - or coincidence
Calculation

Scenario

Pharaoh = P
Engineer = π
Priest = φ
Adviser - economist = E

P: Build me a great pyramidal tomb, surfaced with the finest stone.

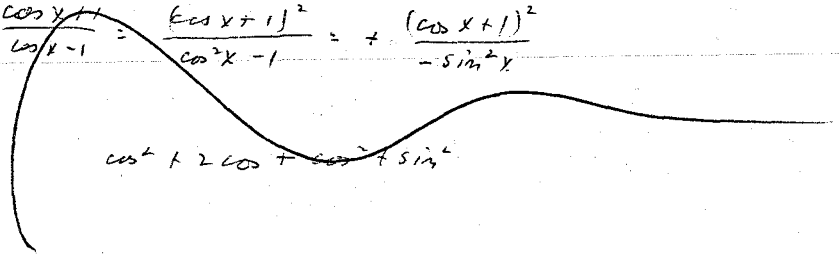
π: That means we should get the greatest volume but minimize the surface. What shape?

φ: For $\frac{S}{V}$ to be a minimum $\rho = 51°49'38"$

π: I have a practical device - rolling drum - that would give almost that value - substituting using circumference - horizontal
diameter - vertical
gives. 51°51'14"

φ: We could cut the peak from the pyramid - truncating it, so as to fit your value of 51°51'14" and yet have $\frac{S}{V}$ a minimum to do this we do not build the last —? feet

$$k = \frac{\cos x + 1}{\cos x - 1} = \frac{(\cos x + 1)^2}{\cos^2 x - 1} = + \frac{(\cos x + 1)^2}{-\sin^2 x}$$



$\cos^2 + 2\cos + \cos^2 + \sin^2$

Tompkins

As Davidson put it: "By reason of this unfortunate omission, scientists have been led to believe that the theory of the late Astronomer Royal of Scotland—Professor Piazzi Smyth—requiring a Great Pyramid base circuit of 36,524 inches, was nothing more than a delusion."

The ideal length postulated by Smyth for each side of the base in order to obtain the required length of 9131.5 Pyramid inches was 9141.1 British inches. Petrie's figure, revised by Davidson, came out to 9141.4, or about a third of an inch too long.

According to Davidson, the hollowing effect would give three basic lengths of the year as recorded in the base of the Pyramid: an outer or shortest length, from corner to corner, bypassing the hollowing, a second, slightly longer, which included part of the indentation of the four hollowed faces at the base; and a third, which included the entire angle within each hollowed face. These three measurements, which could have been performed by the ancients at their leisure, could have given the equivalents, according to Davidson, of the three lengths of the year as computed by modern science: the solar, the sidereal, and the anomalistic years, each of which is dependent on the system used for observation.*

The academicians rebutted that all this was purely attributable to chance. An American naval officer who dabbled in digging at Giza remarked that "if a suitable unit of measurement is found—say versts, hands or cables—an exact equivalent to the distance of Timbuctu is certain to be found in the roof girder work of the Crystal Palace, or in the number of street lamps in Bond Street, or the Specific Gravity of mud, or the mean weight of an adult goldfish."

furlongs
leagues

But Davidson's conclusions were to reopen the entire subject of Pyramid measurements and breed a whole new school of pyramidologists.

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* The solar year is obtained by observing the exact time between two successive vernal or autumnal equinoxes, when the day is exactly as long as the night. It is now 365 days, 5 hours, 8 minutes and 49.7 seconds, or in decimals: 365.2242. The sidereal year (from the Latin *sidus,* for star) is the time it takes a star to reappear in the same spot in the sky, as seen by an earth observer. It is about 20 minutes longer than the solar year, or 365.25636 days. This 20-minute lag causes what is known as the precession of the equinoxes, which come 20 minutes earlier each year in relation to the stars behind the equinoctial point. The anomalistic, or orbital, year is the time it takes the earth to return to the point in its elliptical orbit nearest the sun, or perihelion. This is about 4 3/4 minutes longer than the sidereal year. According to Davidson, not only does the Pyramid give this value, but it gives the number of solar years it takes for the perihelion to complete a full circle of 360°.

PYRCONCL.WPG

Reorganize
Conclusion about
the pyramid
w/
Conclusion from
the pyramid

THE GREAT PYRAMID

SOME CONCLUSIONS

After exploring the various geometric relationships built into the stones and their arrangement and reviewing the contextual factors of the pyramid, its location and size, the following general conclusions seem waranted:

about The pyramid is an encyclopedia in stone containing several basic, mathematical, physical, and metaphysical statements, which can be read using a code-book based on the universal laws of mathematics and physics.

about The pyramid is a model of the cosmos, replicating many of its properties that have been discovered in later times by sensory and instrumental means. How the designers of the pyramid acquired this knowledge is unknown to us.

about The pyramid is a cosmic metaphor. Hence, the statements that can be made about the pyramid are also statements that can be made about the cosmos. In being a model of the cosmos, the pyramid is a sacred place, inspiring awe and wonder in all who interact with it.

The pyramid makes the following statements:

from ► The ultimate or UR reality is number. [cf Pythagoras]

about ► Both the cosmos and the pyramid can accept a large number of different projections. All of which are correct.

from ► Both the cosmos and the pyramid are therefore constructed of many facets. Which facet is manifested depends on the initial assumptions and observations that are made. [cf quantum mechanics]

from ► But one facet emerges at a time, depending on the path chosen. [cf complementarity]

from ► A slight change in the initial assumption results in a different facet. [cf chaos theory]

from ► A different pyramid would result in a great loss of facets. [cf anthropic principle]

from ► The "Total Pyramid" cannot be grasped by generalization, only by inverse defacetization.

from ► The cosmos and the pyramid are both located at a high density confluence of simple algorithms.

from ▶ Existence occurs where the density of alternate possibilities is a maximum. or existence exhales an aura of possibilities

from ▶ The cosmos evolves so as to maximize its options and its potentialities.

from ▶ The cutting edge of a viable system seeks a region rich in alternatives.

about ▶ Ratios and proportions are purification devices.

about ▶ The designers and builders of the pyramid possessed a much greater mathematical sophistication than we have supposed.

from ▶ The pyramid speaks in two levels, to π people and to φ people.

see Martin Gardner
re π and φ

The pyramid exhibits chaos theory in that a very slight change in angle -> a different attractor, e.g. the φ attractor and the π attractor.

The Great Pyramid a metaphor for the cosmos?
earth?

Myth - the ~~manifestation~~ a description of an archetype ~~- a rather a description~~

Math - Number Vi reality { Number Archetypes }

Metaphor - we grope by analogies with something familiar
juxtapositions

GPAPH.P51 May 9, 1990

March 9, 1993

THE GREAT PYRAMID--A META DESIGN

SOME "APHORISMS"

We can impose order on nature, but we can impose greater order on the works of man.

The more complex the creation, the more interpretations possible, the more alternatives represented.

One argues, "This is yet another interpretation we can read into the pyramid". But the pyramid also accepts the reading.

Hoyle is right. "We cannot know what the builders had in mind, but we know what we can do with it."

While each generation projects its own emphases, the remarkable thing is that the pyramid adapts to them all.

It seems even more of a mystery than nature itself, that we can create an object which can contain so many projections (or has so many facets).

Knowledge of nature is not extracted from nature, it is projected onto nature. And a Cosmos or Universe is that which is capable of receiving all projections.

The pyramid can receive many projections. It is in this sense a Cosmos. The pyramidth~~i~~s can teach us facetism.
aspectism

The creation of a cosmology is a religious act, as is the creation of a temple or of any sacred space.

A sacred space is a place capable of receiving more than one projection. If there is more than one facet, the place becomes a "God Trap".

A mystery is like a partially silvered glass. It is both a window and a mirror, opening to the beyond but also showing us ourselves.
Rorsach Test

The great pyramid was built as an I.Q. test for man to figure out its real message.
Vogt and Sultan p287,290

In nature evolution tends toward increasing complexity. But human history is filled examples of loss of complexity, loss of knowledge and understanding. no, -> increasing variety

What is it that the builders of the pyramid knew that we do not know? What is it that they knew that we also know?

APHORISMS PAGE TWO

The great pyramid is not only a sacred space it is a theophany.

We project ourselves into other cultures just as we project ourselves into nature.

Robbing the facing stones of the pyramid to build other dwellings also robs the pyramid of its information--an even greater loss. than of the stones We burn the undergrowth on timber lands because it impedes lumbering operations, then we learn that the yew tree is valuable for curing cancer. Each endangered species may contain just the information we need for some future requirement.

The epistemology of archeology (exploration of artifacts) is not the same as the epistemology of natual science. ~~But both are projections~~.

Someday when we encounter ruins left by aliens, we shall need a third epistemology.

The detection of life and intelligence in the universe boils down to determining what is local as against what is global. Structures and activities that are local, not global, reveal the presence of opposition to the second law. Universal or global laws belong to the natural order, local belong to life and intelligence.

Behind the divisible there is always something indivisible. Behind the disputable there is always something indisputable.
Chuang Tzu

Sometimes we discover patterns in our own creations that we did not consciously build into them. Whenever we get more out than we have put in, we have tapped into truth.

Investigations and theories are often directed by prejudice and the "truth" that they come up with is often only one truth from many and that truth is the one which their predisposition has led them to discover.
Roger T. Stevens
Fractal Programming in C p21

Hermes Trismegistos (Thoth) built the pyramids to contain books of science and knowledge and other matters worth preserving from oblivion and ruin.
Ibn Batutal (1304-1377)
(Some hold that Hermes Trismegistus was a real human who lived about the same time as Moses. He was a sage, seer, sorcerer was made into a god.

APHORISMS PAGE THREE

The belief in a hidden relation between the great pyramid and the truths of science and religion never died.

Daniel J. Boorstin The Creators p86

The pentagon is the figure of life, growth, and change.
The hexagon is the figure of crystals, snowflakes, and stasis.

While the primeval state created the pyramids, the pyramids themselves helped to create the state in a focus of communal effort, of common faith in the living Sun God.

The method of our time is to use not a single model but multiple models for exploration. [cf Fritz Zwicky] The technique of the suspended judgement is the discovery of the twentieth century as the technique of invention was the discovery of the nineteenth.

Marshall McLuhan

Electric circuitry is orientalizing the West. the contained, the distinct, the separate--our Western legacy--are being replaced by the flowing, the unified, the fused.

Marshall McLuhan

In the last analysis magic, religion, and science are nothing but theories of thought; and as science has supplanted its predecessors so it may be itself superseded by some more perfect hypothesis, perhaps by some totally different way of looking at phenomena.

Frazer

In his **Accent on Form** L.L.Whyte regards pattern as the dynamic idea of the science of the future, just as number, space, time, atom, energy, organism, mind ,unconscious mind, historical process and statistics have each in turn been the dynamic ideas of the past, serving as he says, "directly as instruments for understanding the universe, To understand anything, one must penetrate sufficiently deeply towards the ultimate pattern. Only a new scientific doctrine of structure and form, i.e. pattern, can suggest the crucial experiments which can lead to the solution of the master problems of matter, life and mind."

Diagram p137

A tradition which has been credited by many learned men over the centuries is that the ancients encoded their knowledge of the world in the dimensions of their sacred monuments.

—John Michell

22

GPINT1.P51 **June_7,_1990**

THE GREAT PYRAMID--A META DESIGN

Sir Fred Hoyle, after a detailed analysis of the alignments of the stones and post holes of Stonehenge, concluded, "We cannot say for certain what the builders of Stonehenge had in mind, how or for what they used it, but we can say what we can do with it. We can use it as a calculator for predicting eclipses".

What we perceive or ascribe to an ancient monument may be far more or far less than the intentions of the builders. While the study of past cultures differs from the study of the natural order--the basic area of application of the methods of science--there are many similarities and the epistemology of the natural sciences can be used to a degree to reconstruct the probable motivations of earlier intelligent human beings who were more or less like us. We are asking: In what way is the study of the past like the study of nature? In what aspects can ~~do~~ the research ~~questions~~ of the archeologist and anthropologist employ ~~require~~ the same epistemology as the research ~~questions~~ of the natural scientist? And ~~when~~ is an epistemology designed for the natural order properly applied to systems of with purposeful design ~~order~~?

cf The 5 Gospels

With regard to the epistemology of natural science, we begin by declaring we do not know what nature has in mind. It may be totally improper to formulate the patterns and processes in nature in terms of purpose and motivation. However, we read from nature what we first read into it, and nature is very pliable, admitting many self consistent ways of viewing and selection. We must recognize that self consistency itself is a constraint we place in all our epistemologies in order to reduce the number of possibilities and ease the process of selection. Self consistency allows us a restricted set of interpretations, which is a useful way of accommodating our limited capacities to the unlimited number of potential constructs of the natural order. It is one way to permit~~s~~ the finite to cope with the infinite.

But what of an epistemology for the study of the past? It has a different built-in filter. It need not resort to self consistency. To appreciate this we need only look at the spectrum of our own purposes. In the end we find that Hoyle's dictum is the bottom line not only for the study of the past but also for the study of nature. "We know what we can do with it. We know what sense we can make of it according to our contemporary lights."

The remarkable thing about the Great Pyramid is that it, like nature, is a mystery, i.e. it is capable of receiving many interpretations or projections. The more interpretations receivable, the greater the mystery. Though science seeks a mono-view of nature (effected by an epistemological consensus), nature is nonetheless a mystery, i.e. there exist many alternative yet consistent interpretations. The pyramid is also telling us this. While we cannot with certainty divine the motives of the builders, we can project our motives. We find we can read into the pyramid many constructs ~~ratios~~, it ~~is~~ thus becomes l~~ike nature~~ a sort of local cosmos. ~~in that~~ in that it ~~And only a cosmos~~ can receive ~~all~~ many projections. Science is not the extraction of relations from the cosmos, it is the synthesis of a set of relations to be projected onto the cosmos for its acceptance. The pyramid is a symbol of this process.

See Crystal & Dragon p. 30ff

There is a sense in which the

message of the Pyramid is a most subversive message to our present world. It would replace our current mono-view approach with an approach incorporating the totality of possible views. It proclaims pluralism! We are thus admonished to seek the totality of viewpoints, of alternatives, of solutions, of answers and options. Each is a facet contained in the whole. Several may fit with our understandings, several may work for our ends, but each is only a facet. The task of the future is not the search for a path, it is the search for all possible paths, for all facets and then seek through the integration of the facets an image of a new whole which lies beyond any single projection or perception.

McCluhan Quote

[Two views of monism. The first or old, the monism of selection., the second or new, the monism resulting from defacetization] We thus proceed, not by fitting experience, through the filter of consistency, rejecting, modifying, adapting to an existing projection, but by creating freely all possible projections and going from facet to whole, which is not the same as ~~not~~ from part to whole. [A meta-epistemology is required, each facet has its own epistemology] [The process of defacetization is antithetical to generalization per abstraction]

If ∃ many facets, whose experience requires a different "head" (i.e. epistemology or state), Buddhists call all illusory

Defacetization ≠ generalization

→ The pyramid tells us that (existence) being occurs where the density of alternate possibilities (choices) is maximum!

!!!

cf. existence occurs at interstices

LOOTING NUMBERS FROM THE GREAT PYRAMID

For centuries the pyramids of Egypt have been looted for the treasures buried with the Pharaohs, for the stones from which they were built, and for information inscribed in the hieroglyphs. The present book follows in this tradition of looting, not for the metal and jewel treasure, not for the stone, not for glyphic messages, but for the numerical wisdom presumed to be encoded in the pyramid's dimensions. This kind of looting is not so ancient as that for treasure and stone, in fact it has been going on for only a couple of centuries. But it has in common with the other forms of looting, that what is taken from the pyramid is put to the uses of the looters, not to the uses originally intended. That is to say what we read in the pyramid's dimensions is in our heads, not necessarily in the heads of the builders. or as Sir Fred Hoyle said with respect to Stonehenge, " We do not know for what purpose the builders made the structure, but we know what we can do with it. We can use it to predict eclipses." So with the pyramid. We do not know what numerical quantities the builders had in mind in the construction, but we are free to interpret those we discover according to our own insights. Although it is great fun to speculate, we must avoid the temptation to project our interpretations onto the culture of the builders.

Past looters of the Great Pyramid seem to belong to one of two schools: the Π school or the Φ school. Those looters who are engineering minded, tend to the Π school view, while those who are mathematically minded tend to the Φ school view. The fact that there is an approximate equivalence of Π and Φ through the relation, $\Phi^2 = 5\Pi/6$, makes it almost impossible to decide which school is right, that is, which school the actual builders belonged to, (if either). This book will not attempt to decide between the Π and Φ schools. Rather its intention is to confuse the matter further by introducing a few more schools. Nor does it believe that this new loot leaves nothing further to be stolen. Their must remain many more dimensional chambers yet to be explored and looted.

and the relation

First, let us look at some of the loot that is already out there on exhibit in various books and in the museums of certain occult organizations.

The Orion Loot
Prophetic Loot

$\Phi^2 \doteq \frac{5}{6}\pi$ to within a difference of
0.000040

The Imagination Police
The Loot Thieves

also $\frac{\pi}{4} \doteq \frac{1}{\sqrt{\Phi}}$ $\delta = 0.0007532$

PYRLOOT, WP6

96/11/27

pyr&met1.wp6 December 30, 1994

While this is a study dealing with the dimensions of the Great Pyramid of Gizeh, its purpose is not to add to the already sizeable volume of speculations and interpretations concerning the shape, size and location of the pyramid. The present purpose is simply to generate some useful metaphors. The reason for doing this is that metaphors are one of our most valuable tools for cognitive exploration of the unknown, and it turns out that the dimensions of the pyramid provide us with some particularly useful ones. It has been claimed that the metaphors afforded us by science are as valuable as science's factual findings, and other application and perhaps in the long run as valuable as science's technological applications. This is because these metaphors are the keys and clues not only to further scientific exploration and discovery but are useful aids in thinking about almost ever anything. Where the pyramid comes in is that its metaphors differ from those that have been derived from science, but are also useful for thinking about almost anything, even about many of the problems of science.

Sir Fred Hoyle once said about Stonehenge that we do not know for what purpose its builders constructed it, but we do know what we can use it for: "We can use it to predict eclipses." Certainly we do not know what purpose the builders of the pyramid had in mind, but we do know ~~what~~ one thing we can use it for: We can use it to make metaphors.

The Basic ~~E~~pistemological/Ontological issue

What it is ~~w~~ what we can do with it
make of it

What the design is

explore or create

Comes down to ranges

Anthropic Principle

why the design?

vary the constants slightly
it doesn't work (Fit)

cf. Chaos

Math, Metaphor
Meditations on
The Great Pyramid

GTPYRIN2.WPW March 5, 1993

The great pyramid of Gizeh has the value of being a metaphoric cosmos, in that the pyramid, like the cosmos, is capable of receiving many projections.

The great pyramid is located at a confluence point of several configurations. It is a node gathering together many links.

There are two phenomena involved. 1)The phenomenon of the pyramid itself, its design and construction. and 2) The phenomenon of pyramid lore, its attraction of speculation and projections, its meaning and its mystery.

It is this second phenomenon that feeds on itself, ever creating deeper and deeper meanings and deeper mystery.

Among the uses to which the pyramid can be put: it can serve as a laboratory to study how to differentiate intrinsic structure from projected structure. We are at a loss to know what is implicit in the structure of the universe and what we have projected onto it confusing our own nature with that of the cosmos. What was in the original design and what have we ourselves placed there? Where is the interface between the authentic and the contrived? How do we tell what is original and what we project? And there may be a third class, neither original nor projected, but arising from fortuitous coincidences, numerical approximations, such as the approximation, $\Phi^2 = 5\pi/6$.

plagal

Eddington quote

Anthropologists have coined two useful terms. **Emic**, meaning to view a culture as a member of that culture views it, and **etic** meaning to view a culture from the viewpoint of some other culture. Science studies the culture of nature, though it claims objectivity which is to say that it is emic, in truth, science is very etic. Only shamans and mystics have a legitimate claim to being emic in their encounter with the world.

?

clarify this ¶

Objectivity is pretended emic.

It is very likely that we are getting out of the pyramid much more than the designers and builders put in. It is impossible to be emic with a culture that disappeared millenia ago. As Hoyle said, we cannot know what the builders had in mind, but we know what we can do [with the pyramid].

THE PENULTIMATE INTERPRETATION OF THE PYRAMID:
AN ILLUSTRATION OF THE NATURE OF FACETISM.

cf. Boorstin, p51
1993 (+)

MODELS01.P51 DISK: EPIONTOLOGY January 31, 1992

"TALL SKINNY BOX" REVISITED

Models are constructed as analogues, as metaphors, out of words, out of symbols, out of equations, out of archetypes,...
A model is a bridge between human understanding and a cosmos. A cosmos is multi-faceted, it can accept many projections, i.e be modeled in many ways. Examples are the spiritual world, the Great Pyramid, both can accept many projections. Humans as finite creatures must select facets to serve as the total, it is our finiteness that underlies our requirement of consistency.*

In selecting a cosmos and a model for it, we are trying to understand ourselves for we are also a cosmos. Thus a model is a device to match four cosmoses. Man and World, Material and Spiritual.

cosmota ?

The value of a model is measured basically by three parameters:

- Comprehensiveness or Inclusiveness (how many fits) i.e. the extent of the domain or range of phenomena fitted.
- Precision or Accuracy (how good the fits) i.e. the degree of closeness of fit
- Simplicity or Succinctness (how straight the edges) i.e. the number of axioms ("epicycles") in the model; the number of inputs, of arbitrary constants, etc.

There is also the matter of consistency, of which there are two kinds, self or internal and consistency with other models. (This is the domain of Ratna Sambhava). The criterion of consistency is related to the value of monism, the goal of total unity within the one. However, sometimes unity is a synonym for simplicity.

Other values, such as utility, range of applicability, or elegance are in large measure determined by the above three.

If we imagine a "cognition space" of three dimensions along whose axes are the measures of the above three parameters, then the value of a model is measured by the volume of the model in such a space. However, the reciprocal of simplicity must be used as the third axis.

In such a space we used to say the the notion of God, as a model or explanation, was like a tall skinny box. The inclusiveness was almost unlimited, the simplicity was in one sense ultimate, but the precision was almost entirely lacking, in that no predictions could be made with the model. A replacement hypothesis or model in modern times is the notion of 'Chance'. Its volume, like God's is very large in IP/S space. Its inclusiveness is somewhat less, its simplicity is about the same, but its precision is much greater. In any event at the present, the two models with the greatest volume are God and Chance. [randomness) Dice

The approach of Karl Popper is to look at the negations of the parameters: What is the extent of non-fits or contradictions of the model, what is the extent of precision. Negation either delimits the inclusiveness or stretches the precision.

* There's really no such thing as inconsistency
only there are different views
of a more profound whole.

What is the plural of cosmos? - a word for which ∄ a plural
of universe?

ONPATERN.P51 DISK: EPIONTOLOGY 10/22/87

ON PATTERNS

A pattern is a distribution in space of a set of nodes. If viewed with low resolving power, the various linkages connecting the nodes are invisible, and even more invisible are the various traffics that flow along the linkages from node to node. If viewed with high resolving power, the pattern may not be perceived at all, and its existence demonstrated only by a step by step process, node by node.

The recognition of pattern is a fundamental cognitive operation, where the key word is 'recognition'. In order for a pattern--whether static or dynamic--to be recognized it must belong to the class of previously perceived and remembered patterns. But perception of a pattern does not automatically take place in response to the occurrence of the pattern. Only certain patterns are perceived or remembered. Which ones? Generally, in order to be remembered the pattern must either posses a simple structure or a high frequency of occurrence. That is to say that the greater the information content of the pattern the more repititions are required for its perception and registration in memory.

How does a pattern cross over the threshold to perception and recognition? We tautologically say we recognize the familiar. What makes something familiar? One thing is frequency of occurrence. The more common and ubiquitous a pattern, the more likely we are to encounter it and the more readily become familiar with it. Certain simple patterns, linear patterns like triangles and squares and patterns possessing symmetries like circles are most apt to be recognized. Do we recognize them because they are simple or do we label them simple because they are so common and hence familiar?

Complex, subtle, and shimmering patterns are usually unpercieved or ignored as useless. Only simple and universal patterns are accepted because these are the species of pattern that are accessible to all. These are the patterns recognized by the epistemology of science--which emphasizes repeatability, reproducability and ubiquity. But the ease of perception or recognition of a pattern may have little to do with its basic importance or significance. Science may assume that the more ubiquitous the pattern, the more important, but we may take the occurrence of genius in human populations as a counter example. The deepest effects may result from complex shimmering patterns that only momentarily "tune in" but set up brief and powerful resonances with far reaching consequences. No statistical tests would convince us of their importance or even of their existence. These patterns lie beyond the ken of the scientific method.

PATERN0~~2~~3.P51 ~~DISK:PATTERN~~ November 13, 1992

Our mode of interacting with the world may be described as the search for, and the creation of, patterns. The patterns we discern in nature and the patterns we create constitute a multi-dimensional spectrum with a twilight zone wherein we are unsure which patterns we have perceived and are indigenous to the world and which patterns we have ourselves constructed and projected onto the world.

At one extreme there is a school that holds all patterns are of our own construction. The world is a great void capable of receiving and incorporating whatever we project on it. At the other extreme is the obverse school that holds the world is a great smorgasbord from which we select all patterns. It consists of myriads of patterns only a small subset of which we can recognize and assimilate. This school holds we create nothing only select what preexists.

realism
positivism
phenomenology

idealism
dualism
materialism

pattern v archetype

recognition vs recollection

FORMYST, WPW
3/10/93

ASK #153

FORMS AND PLACES OF MYSTERY

Certain forms invite projections onto themselves. And some such forms can accept many projections. For example, the Great Pyramid of Cheops has invited and accepted countless projections on its form, scale, and structure. People have projected onto it history and prophecy, mathematical relations, esoteric and practical applications.* Similarly, the great cathedrals have invited and accepted projections some of which may have been actually built in by the designers, but others have come into existence only later through the interaction of the cathedral with the mind and feelings of the beholder.

What is it in certain forms that invite and allow projections to be accepted? What is it that makes certain forms and places psychologically powerful and mysterious?
Is it

☐ Their history? Have past events stored stored their energies in the place or form. For example, does a library in some sense contain the presence of all who have written and been written about in the books on its shelves, or is some spirit present in the words themselves? Or on a battlefield is an essence of all who have sacrificed themselves there somehow forever present?

☐ Time? Does time by itself encrust a form or place with spiritual essences. Does just being ancient make a form or place assume magic and mystery?

☐ Place itself? Are some locations per se energy centers? Are there special places on the earth having properties that are found nowhere else? Sacred mountains, rocks, groves, rivers...

☐ Complexity? Are some forms intriguing because they are puzzles, their complexity inviting exploration in the hope of finding a hidden key, a secret treasure?

☐ that they Liberate us? Do some forms and places have the power to free us from the prison of the mundane? After we have been there we somehow know that our lives will forever be different.

☐ Ambiguity? The form can take on many aspects, and it cannot be reduced to one meaning, one interpretation. Its nature forbids an unequivocal catagorization. This intrigues and challenges us.

Which, if any or all, explain the power of these forms to entertain our projections? Perhaps such forms are mirrors, they reflect some part of ourselves back to us. We **recognize** something in the form that we already know because it is in us. Or perhaps such forms have "frequencies" with which we **resonate**. Both recognition and resonance are aspects of projection. Lastly, we ~~may~~ must say that a mystery permits no orthodoxy, and consequently there can be no heresies.

* The pyramid is unusual in that it can accomodate a wide range of interpretations and meanings. However, which if any, of these projected structures the builders actually had in mind remains speculation.

FORMYST.WPW 03/10/93

GTPYR05.WPW   DISK:GRTPYR   May 23, 1993

ON ~~CONGERIES~~ AND MYSTERIES

stet

MYSTERIA

Mysteri~~es~~a are of two species:

1) A congeries of systems concentrated in a small neighborhood of similarity space.   HAMMING SPACE
2) A system possessing many facets.

The allure in **case 1)** is based on the interpretation that one system of the congeries is the correct system and the challenge is to establish which one. An example of this is the Great Pyramid at Gizeh. It is assumed that the builders had a particular design in mind, but there are so many mathematically consistent designs that fit or nearly fit the actual pyramid that we cannot decide which, if any, the builders had in mind. Uncertainty and unanswerability, therefore mystery, allure, and challenge.

Another example is the set of Friedman models of the universe. In these models the task is to decide whether the curvature of space-time is positive, negative, or zero. The actual universe appears to be very near zero, i.e. near a value such that it is very difficult to identify whether the actual curvature lies above, below, or at zero.

In both of these cases, it is assumed that only one of the possibilities is correct. The intriguing part is that there is so little difference between the "real" value and the values of the alternatives. It is this latter attribute that creates the mystery. Thus a mystery is a) many things and b) undecidable which one. But it is we who have imposed the imperative of decidability, the monistic constraint that only one member of the set is "true".

Why do mysteries occur? Why do so many systems occur within a cluster of alternate possible values? There seems to be some propensity for a system to seek a region of high density in similarity space. Is this because there exist many viable alternatives near at hand and if one is blocked another is readily available. We might surmise a theorem: **The cutting edge of a viable system seeks a region rich in alternatives,** affording maximum choice, maximum option space. We could then say, for example, that the universe evolves so as to maximize its options, and the universe evolves so as to maximize its potential.

A similar, and possibly related theorem, would state that action occurs at the interface between different regions. New systems emerge in the interstices.

Case 2) involves many facets of a single system instead of a congeries of many similar systems. And instead of undecidability as in case 1), there is the inability to view but one facet at a time. (cf. complementarity).

SYMBOLS1.P51 DISK:THEO July 18, 1991

ON SYMBOLS AND MYSTERIES

Sir Fred Hoyle once remarked in reply to the question, 'for what purpose was Stone Henge built?', "We cannot know what purpose the builders of Stone Henge had in mind when they built it, but we do know what we can do with it. We can use it to predict eclipses."

So it is with many monuments, artifacts, devices, and, indeed with the world itself. We are not sure what their creators had in mind, but we have discovered what we can do with them.

I take two examples from my own experience. enneagram I do not understand the properties that the purveyors of the eneagram claim for it, but I do know one very important attribute contained in the structure of the eneagram. This is that there exist two causal paths, the outer, visible or peri-path and the inner, hidden, or dia-path. The outer sequence along ~~of~~ the arcs may represent the causality of the physical world as it appears to us, while the inner sequence of the chords may represent a deeper cosmic causality connecting the same events. Ordinary time revolves around the circumference, but some other kind of time, one which violates all notions of past, present, and future operates cutting across the interior to connect the same events. ⇒ synchronicity

A second example for me lies in the Sephirothic Tree of the Qabbalah. This tree is one of the great symbols of Jewish mysticism and it provides the infrastructure for many Talmudic concepts. Again, I possess no knowledge of what the designers of the Sephirothic Tree had in mind, nor how they used it symbolically, but I can use it as an infrastructure to display symbolically the relations in the three great events of Christian teaching: the Crucifixion, the Transfiguration, and the Resurrection.

Many monuments, artifacts, and devices are thus seen to be *mysteries*, which is to say they are receptacles capable of containing many constructs and projections. Thus a mystery is a special kind of symbol which is capable of containing many meanings, each of which may be but a facet of some ultimate great meaning which is in some way the quintessence of symbol. In the same manner many of the equations of mathematics are capable of representing widely diverse phenomena. They too may be said to be mysteries.

in this sense

THE AUBREY HOLES AND CROSS-QUARTER DAYS
4 X 56 = 224

We may never be able to construct the quintessence from its various facets - but the symbol, the mystery, in accepting all the facets, becomes for us the representation of the quintessence.

The surrogate quintessence

This is what underlies "proper" idolatry
including bibliolatry

43a

MYSTCONG.WP6 DISK:EPIONTOLOGY May 23,1993
REVISED AUGUST 19, 1994

This is a revision of 93-#40

ON MYSTERIES AND MYSTERIA

- A MYSTERY IS A SET OF POSSIBILITIES ONLY ONE OF WHICH IS TRUE.
- A MYSTERIUM IS A SET OF FACETS ALL OF WHICH ARE TRUE.
- A FANTASY IS A SET OF SPECULATIONS NONE OF WHICH NEED BE TRUE.

Sets of possibilities may be classified in two categories:

1) The first category we shall call a *mystery*. It is a collection or set of events or configurations only one of which is real or true, the others possibly differing from the true by only minute amounts or details. The task is to decide which is the real or true member of the set.
EXAMPLE: The Great Pyramid of Gizeh. Its design fits many mathematical models. The builders probably employed a particular model in their design. Which one?
EXAMPLE; The curvature of space-time. Do we live in a universe whose curvature is > 0, = 0, or < 0?
EXAMPLE: Any of the genre "who dunnit?" where there may be many suspects but only one culprit.

2) The second category we shall term a *mysterium*. It is a collection or set of events or configurations all of which are real or true. Usually the members or facets of the set may not be seen simultaneously, in fact it may be possible to view but one at a time. The task is to construct the set as an entity from knowledge of the attributes of its various facets. This is not the same as generalization.
EXAMPLE: Quantum reality. The nature of fundamental particles seems to depend on how they are observed. Each mode of observation results in a different aspect or facet of the particles (e.g. wave and particle). All are true but what is the "defaceted" structure?
EXAMPLE: Altered states of consciousness. There appear to be several states of consciousness only one of which can be present at one time. Can we construct **Consciousness** from the attributes of the various states or facets?

The "ur-problem" often is to determine whether we are dealing with a mystery or a mysterium.
EXAMPLE: Afterlife. Is there life after death, if so is it a mystery or a mysterium? Is there one true situation or are there many depending on ...? Is it decided or constructed?
EXAMPLE: Theology. Is the subject matter of theology a mystery or a mysterium?

When we are dealing with a mystery there is decision, selection, and exploration. When we are dealing with a mysterium there is construction, creation, and invention. Ultimately the quadric:

Pre-existing
Mystery - - - - - - - - | - - - - - - Mysterium
Currently Created

THE DYNAMIC OF MYSTERY

There is allure in the case of mysteries. This arises from the challenge to establish which possibility is the correct one. An example of this is again the Great Pyramid at Gizeh. It is assumed that the builders had a particular design in mind, but there are so many mathematically consistent designs that fit or nearly fit the actual pyramid that we cannot decide which, if any, the builders had in mind. Uncertainty and unanswerability, therefore mystery, allure, and challenge.

Another example is the set of Friedman models of the universe. In these models the task is to decide whether the curvature of space-time is positive, negative, or zero. The actual universe appears to be very near zero, i.e. near a value such that it is very difficult to identify whether the actual curvature lies above, below, or at zero.

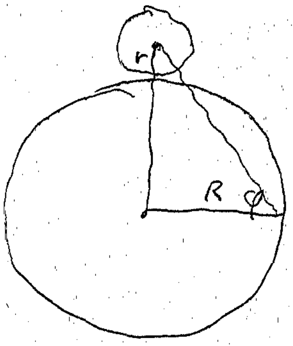
In both of these cases, it is assumed that only one of the possibilities is correct. The intriguing part is that there is so little difference between the "real" value and the values of the alternatives. It is this latter attribute, the difficulty of making the determination, that creates the mystery. Thus a mystery is a) many things and b) difficulty in deciding which one is correct.

Why do mysteries occur? Why do so many systems occur within a cluster of alternate possible values? There seems to be some propensity for a system to seek a region of high density in similarity space. Is this because there exist many viable alternatives near at hand and if one is blocked another is readily available. We might surmise a theorem: **The cutting edge of a viable system seeks a region rich in alternatives**, affording maximum choice, maximum option space. We could then say, for example, that the universe evolves so as to maximize its options, and the universe evolves so as to maximize its potential. A similar, and possibly related theorem, would state that action occurs at the interface between different regions, especially regions of different density (frequency). It seems that new systems emerge in the interstices. (Where there possibly exist beats)

But sometimes we convert a mysterium into a mystery by imposing the imperative of decidability, the monistic constraint that only one member of the set is "true", replacing the set of actual truths. We do this because we feel uncomfortable with alternatives, with ambiguity, with complexity.

We may assert apodictically that Creation is a Mysterium. And it must be emphasized that: **Mysteria and orthodoxy are incompatible. In mysteria there ~~are~~** can be **no heresies.**

THE GREAT PYRAMID
from
EARTH and MOON



R = Earth equatorial radius 6378.136 km

r = Radius of moon 1738.2 km

Cox p 308

$$\tan\varphi = \frac{r+R}{R} = \frac{8116.336}{6378.136} = 1.2725248$$

$$\operatorname{arc}\tan\varphi = 51^\circ.838344$$

Measured Great Pyramid base angle

W $51^\circ.828318$

N $51^\circ.841187$

Mean $51^\circ.834752$

Quantities proportional to R and r

$R+r = 7! = 5040$ units

Heath: Sun, Moon, and Earth p3

$2R = 11 \cdot 10 \cdot 9 \cdot 8 = 7920$ units

$$\frac{r+R}{R} = \frac{5040}{3960} = 1.2727273 = \tan\varphi$$

$$\operatorname{arc}\tan\varphi = 51^\circ.842273$$

i.e. $$\frac{r+R}{R} = 1 + \frac{2\cdot(7!)^2}{11!} = 1.2727273$$

PYRAMID SHAPE

PYRAMIDS

PYRAMID ===>		8	9	10	11	12	13	14
SYM	DEFINITION	$(H/E)^3 = 3/10$	$W = \pi/2$	$\sin b = \pi/4$	$\sin e = 2/3$	Vesica Piscis	$b = (2\pi)/7$	$\cos b = 5/8$
b	VALUE	51.8795	51.7850	51.7575	51.6712	51.6106	51.4286	51.3178
m	m=180-2b	76.2410	76.4300	76.4850	76.6576	76.7788	77.1428	77.3644
l	cot l = cos b	58.3122	58.2585	58.2429	58.1939	58.1596	58.0569	57.9946
f	f=180-2l	63.3756	63.4830	63.5143	63.6122	63.6808	63.8862	64.0108
e	$\sqrt{2}\tan e = \tan b$	42.0233	41.9267	41.8986	41.8103	41.7485	41.5629	41.4502
p	p=180-2e	95.9534	96.1466	96.2028	96.3794	96.5028	96.8742	97.0997
d	$d=\arccos(-\cos^2 b)$	112.4006	112.5000	112.5289	112.6199	112.6837	112.8761	112.9934
W	W=4d-360 sph deg	89.6026	90.0000	90.1158	90.4794	90.7346	91.5042	91.9736
A	A = 1/(2cosb)	0.8100	0.8083	0.8078	0.8062	0.8052	0.8019	0.8000
H	H = (tanb)/2	0.6372	0.6350	0.6344	0.6325	0.6311	0.6270	0.6245
E	E=1/(2cosl)	0.9519	0.9504	0.9500	0.9487	0.9478	0.9450	0.9434
δb	Difference in min sec	+2' 6"	- 3' 34"	- 5' 13"	- 10' 24"	- 14' 2"	- 24' 57"	- 31' 36"

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

PYRAMIDS

PYRAMID ===>		8	9	10	11	12	13	14
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All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

GPOVR.P51 May 9, 1990

THE GREAT PYRAMID--A META DESIGN

$\varphi = 0{,}618034$

MATHEMATICAL FACETS FOR THE PYRAMID

$\left.\begin{array}{l}\cot\beta = \sqrt{\varphi} \\ \cos\beta = \varphi\end{array}\right\}$ same

SHAPE PARAMETERS

LEHNER
51°50'40"
51°.84

The following values are for the face-base dihedral angle:
[Estimated measured value 51°51'= 51.85° to 51°52'= 51.8667°]
Criterion for consideration: 51°30'±30' = 51.5°±0.5°

1) 360°/7 = 51°25'43" = 51.4286° [KNOTTED ROPE METHOD]
2) ARCCOS(5/8) = 51°19'4" = 51.3178° [FIBONACCI RATIO]
3) ARCCOS(13/21) = 51°45'12" = 51.7533° [FIBONACCI RATIO]
4) ARCCOS(phi) = 51°49'38" = 51.8273° [GOLDEN RATIO]
5) 51°49'38" = 51.8273° [FACE AREA=HEIGHT SQD]
6) ARCTAN(4/π) = 51°51'14" = 51.8540° [ROLLING DRUM METHOD]
7) ARCSIN(π/4) = 51°45'27" = 51.7575° [HEIGHT/APOTHEM =π/4]
8) = 51°45'27" = 51.7575d [BASE/HEIGHT = π/2] ?

9) = 51°36'38" = 51.6106° [VESICA PISCIS METHOD]
10) = 51°40'16" = 51.6711° [EDGE/HEIGHT = 3/2]
11) = 51°16'41" = 51. ° [EDGE/DIAGONAL = 2/3]
12) π/2 STERADIANS = 51°47'6" = 51.7850° [APEX ANGLE = OCTANT]
13) eta=e^(1/e)-1 = 51°41'2" = 51°6839 [COS APEX FACE ANGLE]
14)
) (π/2-2/3)rad = 51°48'10" = 51.8028° [AN APPROXIMATION]

15) eta = e^(1/e) = 51° 41' 2" [COS(APEX FACE ANGLE)=(eta-1)]
16) = [SEMIBASE DIAGONAL/EDGE = 3/4]

SIZE PARAMETERS

OTHER PARAMETERS

1) THE FINE-STRUCTURE CONE

$51{,}79927 \longleftrightarrow \alpha\mu$

PHYSICAL FACETS FOR THE PYRAMID

1) SUN AT WINTER SOLSTICE
2) LONGITUDE OF THE PYRAMID
3) LATITUDE OF THE PYRAMID

GPOVR.P51 May 9, 1990

THE GREAT PYRAMID--A META DESIGN

NORTH 51° 50' 28"
WEST 51° 49' 58"
EAST 51° 49' 27"
SOUTH 51° 49' 0".1

MATHEMATICAL FACETS FOR THE PYRAMID

SHAPE PARAMETERS

The following values are for the face-base dihedral angle:
[Estimated measured value 51°51′= 51.85° to 51°52′= 51.8667°] 51.85 to 51.87
Criterion for consideration: 51°30′+30′ = 51.5°+0.5° whence?
51°

1) 360°/7 = 51°25′43" = 51.4286° [KNOTTED ROPE METHOD]
2) ARCCOS(5/8) = 51°19′4" = 51.3178° [FIBONACCI RATIO]
3) ARCCOS(13/21) = 51°45′12" = 51.7533° [FIBONACCI RATIO]
→ 4) ARCCOS(phi) = 51°49′38" = 51.8273° [GOLDEN RATIO]
→ 5) φ = 0.618034 51°49′38" = 51.8273° [FACE AREA=HEIGHT SQD] also max V/S
→ 6) ARCTAN(4/π) = 51°51′14" = 51.8540° [ROLLING DRUM METHOD] [π]
7) ARCSIN(π/4) = 51°45′27" = 51.7575° [HEIGHT/APOTHEM =π/4]
8) = 51°45′27" = 51.7575d [BASE/HEIGHT = π/2]
9) = 51°36′38" = 51.6106° [VESICA PISCIS METHOD] → fractal
10) = 51°40′16" = 51.6711° [EDGE/HEIGHT = 3/2]
11) = 51°16′41" = 51.2781° [EDGE/DIAGONAL = 2/3]
→ 12) π/2 STERADIANS = 51°47′6" = 51.7850° [APEX ANGLE = OCTANT]
13) eta=e^(1/e)-1 = 51°41′2" = 51°6839 [COS APEX FACE ANGLE]
14)
) (π/2-2/3)rad = 51°48′10" = 51.8028° [AN APPROXIMATION]

15) eta = e^(1/e) = 51° 41′ 2" [COS(APEX FACE ANGLE)=(eta-1)]
16) = [SEMIBASE DIAGONAL/EDGE = 3/4]

SIZE PARAMETERS

add $\frac{\pi}{2\sqrt{5}-1} = \frac{\pi}{4\varphi+1} = 51° 50' 29"$
51.8413889

$\frac{9}{10}$ rad = 51.°566202 = 51° 33' 58"

OTHER PARAMETERS

1) THE FINE-STRUCTURE CONE

PHYSICAL FACETS FOR THE PYRAMID

1) SUN AT WINTER SOLSTICE
2) LONGITUDE OF THE PYRAMID
3) LATITUDE OF THE PYRAMID

If ④	If ⑧
USE	also use
4-5	.7
6	.8
α	.9
12	

$\frac{V}{S} = 1 \Rightarrow$ A = 9.99060
~~A = 10.0009~~
for 51.°8273
of φ

when cos θ = φ = .618034

cuz $\frac{V}{S} = 1$, A = 10

what θ gives 10.0000...?

The 8-fold Pyramid
#6, #4
#7, #8
#12,

The truncated pyramids
inc. α → 51°49'42" (also Agatharchides)
→ other truncated 51 51 18 (best fit)
limit 51 51 48

G. ABLE 1, P51
6/7/90

THE GREAT PYRAMID--A META DESIGN

The most accurate and useful dimensionless measurement among the Great Pyramid parameters is the base-face dihedral angle. Its value is taken to lie between 51°51' and 51°52'. Let us assume its best value is near 51°51'30" or 51°.8583, which we shall designate by a_m. There are many simple ratios that give a good approximation to a_m. It is just this fact that creates the intriguing puzzle: Which (if any) of these ratios was used in the design? In the following table some of these ratios are listed. The first column gives the value of a, the base-face dihedral angle, which results from the ratio (or other definition). The second column gives the "error" in minutes of arc which is taken to be $|a_m - a|$. The third column gives a brief description of the ratio or definition leading to the value of a. More detailed derivations of each approach are given in §2.2
In the following $\pi = 3.14159$, $\phi = 0.61803$ (the Golden Ratio), and $\Phi = 1 + \phi$, the inverse ratio.

No	a	δ	DEFINITION
1	51°.8540	0'.258	$a = \arctan(\pi/4)$ or B:H :: π:2
2	51°.8442	0'.846	H:E :: 9:10
3	51°.8795	1'.272	volume of apex centered circumscribed sphere : volume of apex centered inscribed sphere :: 10:3
4	51°.8827	1'.464	$a = \pi - (\phi + \Phi) = \pi - \sqrt{5}$
5	51°.8273	1'.860	$a = \arccos(\phi)$, the Fibonacci limit, or area of face = H^2
6	51°.8028	3'.330	$a = (\pi/2 - 2/3)$ radians
7	51°.7850	4'.398	Ω = solid angle at apex = 1 octant (= $\pi/2$ steradians)
8	51°.7782	4'.806	$a = \arcsin(\Omega/2)$
9	51°.7575	6'.048	$a = \arcsin(\pi/4)$ or H:A :: π:4
10	51°.7533	6'.300	$a = \arccos(13/21)$, a Fibonacci ratio
11	51°.7038	9'.270	$a = (9/5 - 2\pi/7)$ radians
12	52°.0201	9'.708	$a = \arccos(8/13)$, a Fibonacci ratio
13	51°.6839	10'.464	cos(apex face angle) = e^(1/e) - 1
14	51°.6711	11'.232	E:H :: 3:2
15	51°.6565	12'.108	$\sqrt{(\Omega/2)} = 8/9$
16	51°.6106	14'.862	from the Vesica Piscis construction
17	52°.1148	15'.390	$a = F - (\pi + \phi)$ where F = Feigenbaum's constant = 4.6692
18	51°.5665	17'.508	$a = \arccos(9/10)$
19	51°.5662	17'.526	$a = (9/10)$ radian
20	51°.4979	21'.624	H:E :: 8:9
21	51°.4286	25'.782	$a = 2\pi/7$
22	51°.3931	27'.912	$2(\Sigma \text{ five vertices solid angles})^3 = 137.03598$
23	51°.3178	32'.430	$a = \arccos(5/8)$, a Fibonacci ratio
24	51.°2781	34'.812	D:E :: 3:2
25	51°.0576	48'.042	H:E :: 7:8

1) Fit to measured stone : 51 51 30 ± 30
2) 8 variations on theme

THE GREAT PYRAMID--A META DESIGN

51°.8500

51°.8667

The most accurate and useful dimensionless measurement among the Great Pyramid parameters is the base-face dihedral angle. Its value is taken to lie between 51°51' and 51°52'. Let us assume its best value is near 51°51'30" or 51°.8583, which we shall designate by a_m. There are many simple ratios that give a good approximation to a_m. It is just this fact that creates the intriguing puzzle: Which (if any) of these ratios was used in the design? In the following table some of these ratios are listed. The first column gives the value of a, the base-face dihedral angle, which results from the ratio (or other definition). The second column gives the "error" in minutes of arc which is taken to be $|a_m - a|$. The third column gives a brief description of the ratio or definition leading to the value of a. More detailed derivations of each approach are given in §2.2
In the following $\pi = 3.14159$, $\phi = 0.61803$ (the Golden Ratio), and $\Phi = 1 + \phi$, the inverse ratio.

rolling drum? Mendelssohn $\frac{360}{7} = 51.4286$

No	a	δ	DEFINITION
→ ✓ 1	51°.8540	0'.258 ✓	✓ a = arctan($\overset{4/\pi}{\cancel{\pi/4}}$) or B:H :: π:2 OR
X 2	51°.8442	0'.846	X H:E :: 9:10 · H: D/2 = 9/10 ✓ check this
3	51°.8795	1'.272	volume of apex centered circumscribed sphere : volume of apex centered inscribed sphere :: 10:3
4	51°.8827	1'.464 ✓	$a = \pi - (\phi + \Phi) = \pi - \sqrt{5}$
→ 5	51°.8273 = also $\dot{\omega} \approx 0$ also max $\frac{V}{S}$	1'.860 ✓⇐	a = arccos(φ), the Fibonacci limit, or area of face = H^2 (Herodotus)
6	51°.8028	3'.330	a = (π/2 - 2/3) radians The Apothem-Height angle = 2/3 radian
7	51°.7850	4'.398 ✓	Ω = solid angle at apex = 1 octant (= π/2 steradians)
8	51°.7782	4'.806	a = arcsin(Ω/2)
9	51°.7575	6'.048 ✓	a = arcsin(π/4) or H:A :: π:4
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✓ 14	51°.6711	11'.232 ✓	E:H :: 3:2
15	51°.6565	12'.108	$\sqrt{(\Omega/2)} = 8/9$
16	51°.6106	14'.862 ✓	from the Vesica Piscis construction
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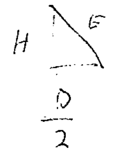
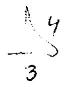
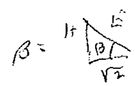
19	51°.5662	17'.526	a = (9/10) radian
X 20	51°.4979	21'.624	X H:E :: 8:9
21	51°.4286	25'.782 ✓	a = 2π/7 ~~Mendelssohn?~~ ~~knotted rope~~
22	51°.3931	27'.912	2(Σ five vertices solid angles)^3 = 137.03598
23	51°.3178	32'.430	a= arccos(5/8), a Fibonacci ratio knotted rope
24	51.°2781	34'.812	D:E :: 3:2
X 25	51°.0576	48'.042	X H:E :: 7:8

Note $\frac{10}{3} \doteq \Phi^{5/2}$ = 3.330





Min shape function
51.8273
≡ Herodotus
Gt. pyr has greatest vol for given surface



$\beta = \frac{11}{15}$ rad → 42°.016905
tan β = .9009 α = 51°.8731973
→ tan β = .9 β = 51°.844193

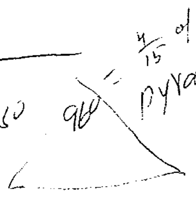
β = 51°.8583 → β = 42°.001654
β = 42° → β = 51°.856686
tan β = .9 → α=51.844193

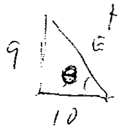
volum ratio prism

orbit inclination 51°.6
$\frac{9}{10}$ rad 51.°566

8 Fold Pyramid
1, 6,
7, 9
14,

also 90°





$\frac{2H}{D} = \frac{9}{10}$ $\frac{H}{E} = \frac{9}{10}$

12

51.84

	Measure	51° 50' 40"	$\delta = 0$
	$e = \tan^{-1}(0.9)$	51 50 39	$\delta = -1"$
	$b = \frac{\pi}{4\varphi+1}$	51 50 29	$\delta = -11"$
Π Arris ~~e = 42°~~ ≡	$b = \tan^{-1}\left(\frac{4}{\pi}\right)$	51 51 14	$\delta = +34"$
e = 42 ⋮	$p = 96°$	51 51 24	$\delta = +44"$
φ	$b = \cos^{-1}(\varphi)$	51 49 38	$\delta = -1' 2"$
	Vol Ration $\frac{3}{10}$	51 52 46	$\delta = +2'6"$
	(or Vol Ratio $\varphi^{5/2}$	51 53 43	$\delta = +3' 3"$)
	$b = \pi - \varphi - \frac{1}{\varphi}$	51 52 58	$\delta = +2' 18"$
	$b = \frac{\pi}{2} - \frac{2}{3}$ rad	51 48 10	δ $-2' 30"$
	$\Omega = 90°$	51 47 6	δ $-3' 34"$
	$b = \sin^{-1}\frac{\pi}{4}$	51 45 27	δ $-5' 13"$
	Vesica Dicsa	51 36 38	δ $-14' 2"$
	$e = \sin^{-1}(2/3)$	51 40 16	δ -10 24

Page 1
< 3'

> 3'

add	$\frac{2\pi}{7}$	51 25 43	δ $-24' 57"$
knotted rope	$\cos^{-1}\frac{5}{8}$	51 19 4	δ $-31' 36"$

Another page

Measure with p⟷d Dashur

with $\frac{1}{2}$ octahedron p⟷d $\frac{1}{6}$ cube

Why are there Analogies between Condensed Matter and Particle Theory?

Frank Wilczek

e idea that the microcosm some- ow reflects or embodies the mac- m is deeply appealing to the hu- imagination, and is prominent in ientific and mystical thinking. In there once appeared to be an vhelming argument for such a ection, often quoted in alchemical One could not conceive how :s as complicated and structured ants and animals are known to uld issue from tiny seeds, except owth from miniature templates; he homunculus would necessarily in the seeds of future generations, smaller . . . . This argument may : us as naive, but let us remember the elements of a true molecular nation of genetic encoding, deci- ng and development are only just emerging, and they are no less ing and inspiring! In any case, in still readily sympathize with um Blake's longing "To see a World Grain of Sand / And a Heaven in ld Flower, / Hold Infinity in the of your hand / And Eternity in our."

classical physics, it is a remark- fact that the form of the laws for and small bodies is essentially ime. Newton went to great pains, according to legend delayed for years publishing what became entral results of the *Principia*, to the theorem that the gravita- l force exerted by a spherically ietric body is the same as that o an ideal point of equal total at the body's center. This theo- provides quite a rigorous and pre- xample of how macroscopic bodies e replaced by microscopic ones, ut altering the consequent behav- More generally, we find that no- : in the equations of classical me- cs is there any quantity that fixes nite scale of distance. The same e of classical, Maxwellian electro- nics. In this sense, classical phys- nbodies a perfect match between icroscopic and the macroscopic.

r this very reason, however, clas- physics cannot account for salient features of the actual world—specifically, the existence of atoms with definite sizes and properties.

The quantum revolution, as we know, changed all that. It is interesting that the reason for this change has often been misstated, or at least stated confusingly, starting with Max Planck himself. Planck was fascinated with the idea that, by combining his new constant *h* with the speed of light *c* and the gravitational constant *G*, one could form a definite length scale, $(Gh/c^3)^{1/2}$. This is indeed a remarkable length: the Planck length. It evaluates to about 10^{-35} m, and is thought to be the scale below which the effects of quantum gravity become significant. It has, however, nothing directly to do with the size of atoms, and thus far its role in physics has been more inspirational than constructive. For practical purposes the crucial length is not the Planck length, but rather the Compton wavelength h/mc, which one can construct using the definite (quantized) value of the electron mass. Also crucial is the quantized unit charge *e*, used to construct the dimensionless fine structure constant.

With the emergence of a fundamental length scale whose influence permeates every aspect of physical behavior, one might have anticipated that the theory of matter at larger scales (solid-state, or condensed matter, physics) and of matter at smaller scales (elementary particle, or high-energy, physics)—of macrocosm and microcosm—would irrevocably diverge. It is a profound, and at first sight astonishing, fact that this did not happen. One finds, instead, startling and far-reaching resemblances between phenomena at very different scales of time and distance, occurring in systems as different superficially as the electromagnetic ether and a crystal of diamond, or empty space and the inside of a metal, or the deep interior of a proton and a magnet near its Curie temperature.

Consider first the earliest history of quantum mechanics itself. Planck was led to discover his constant, which became supreme in the microworld, by analyzing an essentially macroscopic phenomenon: the behavior of the electromagnetic field at finite temperature (blackbody radiation). Planck's early use of his constant, however, was quite limited. He first introduced it as a parameter in an interpolation formula to fit the experimental results of Heinrich Rubens and Ferdinand Kurlbaum. He soon made a model for how their radiation spectrum could be achieved; in this model, the exchange of energy between atoms and radiation occurs only in discrete units proportional to *h*. Einstein, in work of almost supernatural genius, made analogies between Planck's formula and the corresponding formulas for gases of particles, and he insisted that the energy in radiation was not merely exchanged, but also propagated, in discrete units. In this way, the physical phenomenon underlying Planck's formula was stated in a universal fashion, independent of a detailed model of atoms: It was the existence of a new kind of elementary particle, the light-quantum, or photon. (Although this was the first step, a fully satisfactory derivation of Planck's formula required additional ideas, specifically stimulated emission and Bose statistics, and was not achieved until almost 20 years later.) Thus, Einstein was the first to predict the existence of a new elementary particle.

His next step was almost equally remarkable, and wonderfully illustrates my theme. Einstein applied Planck's formula, which we could say describes the vibrations of the electromagnetic ether at finite temperature, to the analogous problem of the vibrations of a crystal. He found that it fit data on the specific heat of diamond at low temperature very well. The underlying physical phenomenon, of course, is that the vibrations are created and transmitted in discrete units:

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$\sqrt{2}\tan e = \tan b$ $\frac{\pi}{4} = \frac{1}{\sqrt{\Phi}}$ $\delta = 0.0007532$

$\Phi^2 = \frac{5}{6}\pi$ $\delta = 0.000040$

Measured:	$b = 51.8\bar{4}$	$= 51°50'40''$	$\delta = 0$	✓
$b = \frac{\pi}{4\varphi+1} = \frac{\pi}{4\Phi-3}$	$b = 51.8412\overset{93}{87}$	$= 51°50'28.63''$	$\delta = -\cancel{14''}\ 11''$	∘ ✓
$e = \tan^{-1}(0.9)$	$b = 51.844293$	$= 51°50'39.09''$	$\delta = -1''$	∘ ✓
(✱) $e = 42°$	$b = 51.856686$	$= 51°51'24.07''$	$\delta = +44''$	∘ ✓
$e = \tan^{-1}(7/8)$	$b = 51.057559$	$= 51°3'27.21''$	$\delta = -47'13''$	
$e = \tan^{-1}(8/9)$	$b = 51.497922$	$= 51°29'52.52''$	$\delta = -20'47''$	
$e = \cos^{-1}(3/4)$	$b = 51.277930$	$= 51°16'40.55''$	$\delta = -33'59''$	
$e = \sin^{-1}(2/3)$	$b = 51.671182$	$= 51°40'16.25''$	$\delta = -10'24''$	∘ ✓
(π) $e = \tan^{-1}\left(\frac{2^{3/2}}{\pi}\right)$ [Arris] 111	$b = 51.853974$	$= 51°51'14.31''$	$\delta = +34''$	∘ ✓
(π) $b = \tan^{-1}\left(\frac{4}{\pi}\right)$	$b = 51.853974$	$= 51°51'14.31$	$\delta = +34''$	∘ ✓
$e = 42° \equiv$ (✱) $\beta = \frac{\pi}{3} + \frac{\pi}{5} = 96°$	$b = 51.856686$	$= 51°51'24.07''$	$\delta = +44''$	∘ ✓
(φ) $b = \cos^{-1}(\varphi)$	$b = 51.827298$	$= 51°49'38.27''$	$\delta = -62'' = -1'2''$	∘
Vol Ratio(1) $\frac{H^3}{E^3} = \frac{3}{10}$; $\sin e = \sqrt[3]{\frac{3}{10}}$; $e = 42.023319$	$b = 51.879461$	$= 51°52'46.06''$	$\delta = +2'6''$	∘
Vol Ratio(2) ~~$\frac{H^3}{E^3} = \frac{1}{\Phi^{5/2}} =$; $e = 37.461053$ $b = 47°$~~ 13.3301907	$51.895\overset{279}{381}$	$= 51°53'\cancel{4}43.37$	$\delta = +3'3''$	∘
$b = \pi - \varphi - \frac{1}{\varphi} = \pi - \sqrt{5}$ rad	$b = 51.882742$	$= 51°52'57.87''$	$\delta = +2'18''$	∘
$b = \frac{\pi}{2} - \frac{2}{3}$ rad	$b = 51.802818$	$= 51°48'10.14''$	$\delta = -2'30''$	∘ ✓
$\Omega = 90°$	$b = 51.784999$	$= 51°47'6''$	$\delta = -3'34''$	∘ ✓
$b = \sin^{-1}\left(\frac{\pi}{4}\right)$	$b = 51.757517$	$= 51°45'27.06''$	$\delta = -5'13''$	∘ ✓
Vesica Piscis	$b = 51.610672$	$= 51°36'38''$	$\delta = -14'2''$	∘ ✓
$b = 0.9$ rad	$b = 51.566202$	$= 51°33'58.33''$	$\delta = -16'42''$	
$b = \frac{2\pi}{7}$ rad	$b = 51.428571$	$= 51°25'42.86''$	$\delta = -24'57''$	
knotted rope $\cos^{-1} = 5/8$	$b = 51.317812$	$= 51°19'4.12''$	$\delta = -31'36''$	
CHIOS	$b = 51.560927$	$= 51°33'39''$	$\delta = -17'1''$	

$\left(\frac{H}{E}\right)^3 = \varphi^{5/2}$ ✓ ∘

$= 0.300283$

$e = 42.039518$

51.895279 ∘

51 53 43

$\boxed{\text{Under } \pm 15'}$

REFERENCE FRAME

Why are there Analogies between Condensed Matter and Particle Theory?

Frank Wilczek

he idea that the microcosm somehow reflects or embodies the mac-sm is deeply appealing to the hu- imagination, and is prominent in cientific and mystical thinking. In , there once appeared to be an whelming argument for such a nection, often quoted in alchemical s: One could not conceive how cts as complicated and structured plants and animals are known to could issue from tiny seeds, except growth from miniature templates; the homunculus would necessarily ain the seeds of future generations, n smaller .... This argument may ke us as naive, but let us remember t the elements of a true molecular lanation of genetic encoding, deciring and development are only just emerging, and they are no less azing and inspiring! In any case, can still readily sympathize with liam Blake's longing "To see a World Grain of Sand / And a Heaven in Vild Flower, / Hold Infinity in the n of your hand / And Eternity in hour."

n classical physics, it is a remark- fact that the form of the laws for ge and small bodies is essentially same. Newton went to great pains, according to legend delayed for ny years publishing what became central results of the *Principia*, to ve the theorem that the gravita- al force exerted by a spherically metric body is the same as that to an ideal point of equal total ss at the body's center. This theo- provides quite a rigorous and pre- example of how macroscopic bodies be replaced by microscopic ones, hout altering the consequent behav-

More generally, we find that no-re in the equations of classical me-nics is there any quantity that fixes efinite scale of distance. The same rue of classical, Maxwellian electro-amics. In this sense, classical phys- embodies a perfect match between microscopic and the macroscopic.

For this very reason, however, clas- l physics cannot account for salient features of the actual world—specifically, the existence of atoms with definite sizes and properties.

The quantum revolution, as we know, changed all that. It is interesting that the reason for this change has often been misstated, or at least stated confusingly, starting with Max Planck himself. Planck was fascinated with the idea that, by combining his new constant h with the speed of light c and the gravitational constant G, one could form a definite length scale, $(Gh/c^3)^{1/2}$. This is indeed a remarkable length: the Planck length. It evaluates to about 10^{-35} m, and is thought to be the scale below which the effects of quantum gravity become significant. It has, however, nothing directly to do with the size of atoms, and thus far its role in physics has been more inspirational than constructive. For practical purposes the crucial length is not the Planck length, but rather the Compton wavelength h/mc, which one can construct using the definite (quantized) value of the electron mass. Also crucial is the quantized unit charge e, used to construct the dimensionless fine structure constant.

With the emergence of a fundamental length scale whose influence permeates every aspect of physical behavior, one might have anticipated that the theory of matter at larger scales (solid-state, or condensed matter, physics) and of matter at smaller scales (elementary particle, or high-energy, physics)—of macrocosm and microcosm—would irrevocably diverge. It is a profound, and at first sight astonishing, fact that this did not happen. One finds, instead, startling and far-reaching resemblances between phenomena at very different scales of time and distance, occurring in systems as different superficially as the electromagnetic ether and a crystal of diamond, or empty space and the inside of a metal, or the deep interior of a proton and a magnet near its Curie temperature.

Consider first the earliest history of quantum mechanics itself. Planck was led to discover his constant, which became supreme in the microworld, by analyzing an essentially macroscopic phenomenon: the behavior of the electromagnetic field at finite temperature (blackbody radiation). Planck's early use of his constant, however, was quite limited. He first introduced it as a parameter in an interpolation formula to fit the experimental results of Heinrich Rubens and Ferdinand Kurlbaum. He soon made a model for how their radiation spectrum could be achieved; in this model, the exchange of energy between atoms and radiation occurs only in discrete units proportional to h. Einstein, in work of almost supernatural genius, made analogies between Planck's formula and the corresponding formulas for gases of particles, and he insisted that the energy in radiation was not merely exchanged, but also propagated, in discrete units. In this way, the physical phenomenon underlying Planck's formula was stated in a universal fashion, independent of a detailed model of atoms: It was the existence of a new kind of elementary particle, the light-quantum, or photon. (Although this was the first step, a fully satisfactory derivation of Planck's formula required additional ideas, specifically stimulated emission and Bose statistics, and was not achieved until almost 20 years later.) Thus, Einstein was the first to predict the existence of a new elementary particle.

His next step was almost equally remarkable, and wonderfully illustrates my theme. Einstein applied Planck's formula, which we could say describes the vibrations of the electromagnetic ether at finite temperature, to the analogous problem of the vibrations of a crystal. He found that it fit data on the specific heat of diamond at low temperature very well. The underlying physical phenomenon, of course, is that the vibrations are created and transmitted in discrete units:

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π & φ

$\varphi = 1.618034\ldots$

$$\frac{5\pi}{6} = \varphi^2$$

$2.617994 \approx 2.618034 \qquad \delta = 0.000040$

$$\frac{\pi}{4} = \frac{1}{\sqrt{\varphi}}$$

$0.7853982 \approx 0.7861514 \qquad \delta = 0.0007532$

$\varphi = 1.618034$
$= \frac{1+\sqrt{5}}{2}$

$$\frac{\beta}{2} + \frac{\pi}{2} = \beta\left(\frac{1}{\varphi} + \varphi\right) = \beta\sqrt{5} \quad , \qquad \beta + \pi = \beta 2\sqrt{5}$$

$$\rightarrow \beta = \frac{\pi}{4\varphi - 3} = 51^\circ.841257 = 51^\circ 50' 28''.63 = \frac{\pi}{2\sqrt{5}-1} = 0.9048012 \text{ rad}$$

$2\varphi - 1 = \sqrt{5} = 2.236068 = \sqrt{5} = \frac{2\sqrt{5}-0}{2}$
$3\varphi - 2 = \quad = 2.854102 = \frac{3\sqrt{5}-1}{2} = \frac{3\sqrt{5}-1}{2}$
$4\varphi - 3 = \quad = 3.472136 = 2\sqrt{5} - 1 = \frac{4\sqrt{5}-2}{2}$
$5\varphi - 4 = \quad = 4.090170 = \frac{5\sqrt{5}-3}{2}$

$1.941611 = \frac{\pi}{1\varphi - 0} = 111^\circ.246$ $\quad \frac{90}{21^\circ}$

$\frac{2\pi}{2\sqrt{5}-0} \qquad \frac{\pi}{2\varphi - 1} = 80^\circ.498$

$\frac{2\pi}{3\sqrt{5}-1} \rightarrow \frac{\pi}{3\varphi - 2} = 63^\circ 067$

$\frac{2\pi}{2\sqrt{5}-7} \rightarrow \frac{\pi}{4\varphi - 3} = 51^\circ.841$ Great Pyramid

$\frac{2\pi}{5\sqrt{5}-3} \rightarrow \frac{\pi}{5\varphi - 4} = 44^\circ.008$ Bent Pyramid

Other slopes
53° whence?

$\frac{\pi}{7\varphi - 6} = 33^\circ.795$

$30^\circ 281$

$27^\circ 429$

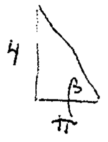
$\frac{2\pi}{6\sqrt{5}-4} \qquad \frac{\pi}{6\varphi - 5} = 38^\circ.231$

$\tan^{-1}\left(\frac{7}{\pi}\right) = 65^\circ.83$

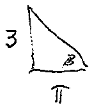
$\rightarrow \tan^{-1}\left(\frac{6}{\pi}\right) = 62^\circ.36$

$\tan^{-1}\left(\frac{5}{\pi}\right) = 57^\circ.86$

Rolling Drum



$\beta = 51^\circ.85$



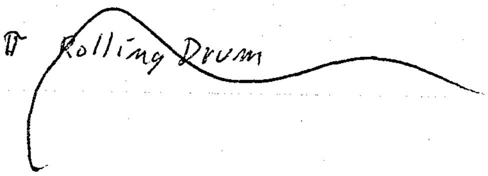
$\beta = 43^\circ.68$

Great → $\tan^{-1}\left(\frac{4}{\pi}\right) = 51^\circ.85$

Bent → $\tan^{-1}\left(\frac{3}{\pi}\right) = 43^\circ.68$

$\tan^{-1}\left(\frac{2}{\pi}\right) = 32^\circ.48 \qquad \tan^{-1}\left(\frac{\pi}{2}\right) = 57^\circ.52$

II Rolling Drum



p108

LEHNER
51° 50' 40"

B = 230.33 m
H = 146,59 m

$= 51.8\bar{4}$°

$\tan^{-1} \frac{H}{B/2} \rightarrow 51.84588$

C+P
The best measured valve of x is 51.°85 to 51.°86
or 51° 51' to 51° 51' 36"
Take: 51° 51' 18" as best

Rolling drum → 51° 51' 14."31
51.°853975

Faklrg p115
Original Height = 146 m
Present Height = 137m
Original Base = 230m
Present Base = 227m

$\frac{146}{115} \rightarrow 51.773513$

Krupp gives H = 481.4 ft.
today −31' = 450.4 ft.

Tompkins p. 373 and p206
B = 230,363m

$\frac{146,59}{115,181} \rightarrow 51.842014$

Cap b = 9' p.377

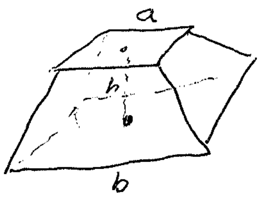
E.T. BELL
DEVELOPMENT OF MATHEMATICS [2° ED]

p. 43

Formula for a truncated square pyramid.

$$Vol = \frac{1}{3} h (a^2 + ab + b^2)$$

by an Egyptian
mathematical c 2800 BCE



SOME PYRAMID NOTES:

(I) FROM THE GREAT PYRAMID DECODED
Peter Lemesurier

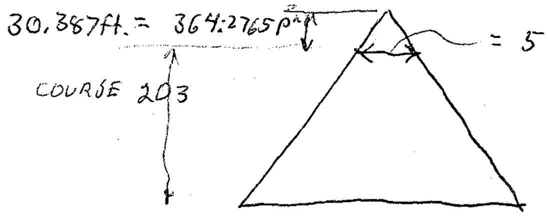
p 314, 336, 337
Uses Primitive inch = 1.001+ British Inches
1" = 0.999 P"
1 ft. = 11.988 P"

$\frac{\pi}{4} \doteq \frac{1}{\sqrt{\varphi}}$, $\frac{5}{6}\pi \doteq \varphi^2$

$\varphi = \frac{1+\sqrt{5}}{2}$

Slope (~π) = 51° 51' 14.3"
Apex Angle = 76° 17' 31.4"

THE "CAPSTONE"



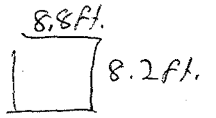
= 572.2 P" = 47.731 ft.

BASE 5448.736 P" = 554.515 ft.

THESE GUYS ARE IN TOTAL DISAGREEMENT

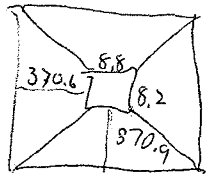
(II) SECRETS OF THE GREAT PYRAMID
PETER TOMPKINS
p. 372, 374-375

THE "PYRAIDION" (GNOMON)



Height = ?

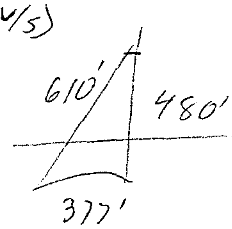
Petrie p 368



Each face had a different slope
North 51° 50' 40" ± 1".05" [Best measured Slope)
West ~π 51° 51' 14".3 (rollin drum)
~φ 51° 49' 38" (also max v/s)

W 51° 49' 58".26
N 51° 50' 28".42
51° 49' 27".47
S 51° 49' 0".06

Base in millimeters
P. 366
W 230,357 mm 377.882
N ,251 377.708
E ,391
S ,454



51.832851
51.841227
51.824296
51.816684

height 146,515.174 mm 480.693 ft.

using 304.8 mm = 1 ft

EL-90 PERFORMANCE DISK CONTENTS

DISK:

TRACK	TITLE OF PERFORMANCE	REGISTRATION
01		
02		
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Tompkins p. 68

51°51'

Base 763.62 ft.

⇒ 147.9 meters
or 485.5 ft

Missing Capstone

Fakhry p. 115 H=137m

Orig 146m

orig B=230 m present 227m

θ = 51°50'

Mendelssohn p ^{13}74

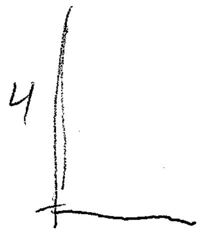
43½

51

3:1

4:1

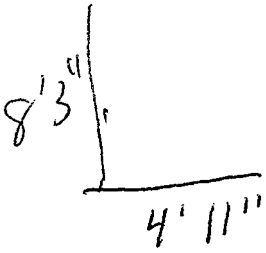
51°52'



Mend.
p. 64

Red + Upper Bent 43½°

Jomard with Napoleon
51°19'4" by ratio
Horizon p



⇒ B = 764 ft.
H 480'9"

51°50'

Howard-Vyse by casestone

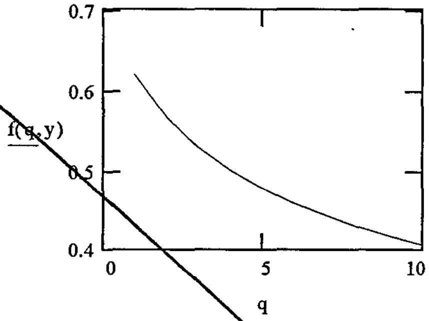
FRUSTPYR.MCD

$q := 1, 2 .. 10$

$y := .618034$

$f(q,y) := \mathrm{root}\left(q \cdot y^3 + 2 \cdot y^2 - 1, y\right)$

q	f(q,y)
1	0.618033989
2	0.565415295
3	0.528198712
4	0.500081108
5	0.477431121
6	0.458725844
7	0.44283433
8	0.429078253
9	0.416995233
10	0.406256569



Take circle of radius 1
side of inscribed
pentagon =

side of inscribed
decagon =

THE GREAT PYRAMID.

Take $\begin{cases} a=1 \\ b=\varphi=0.618\ldots \end{cases}$

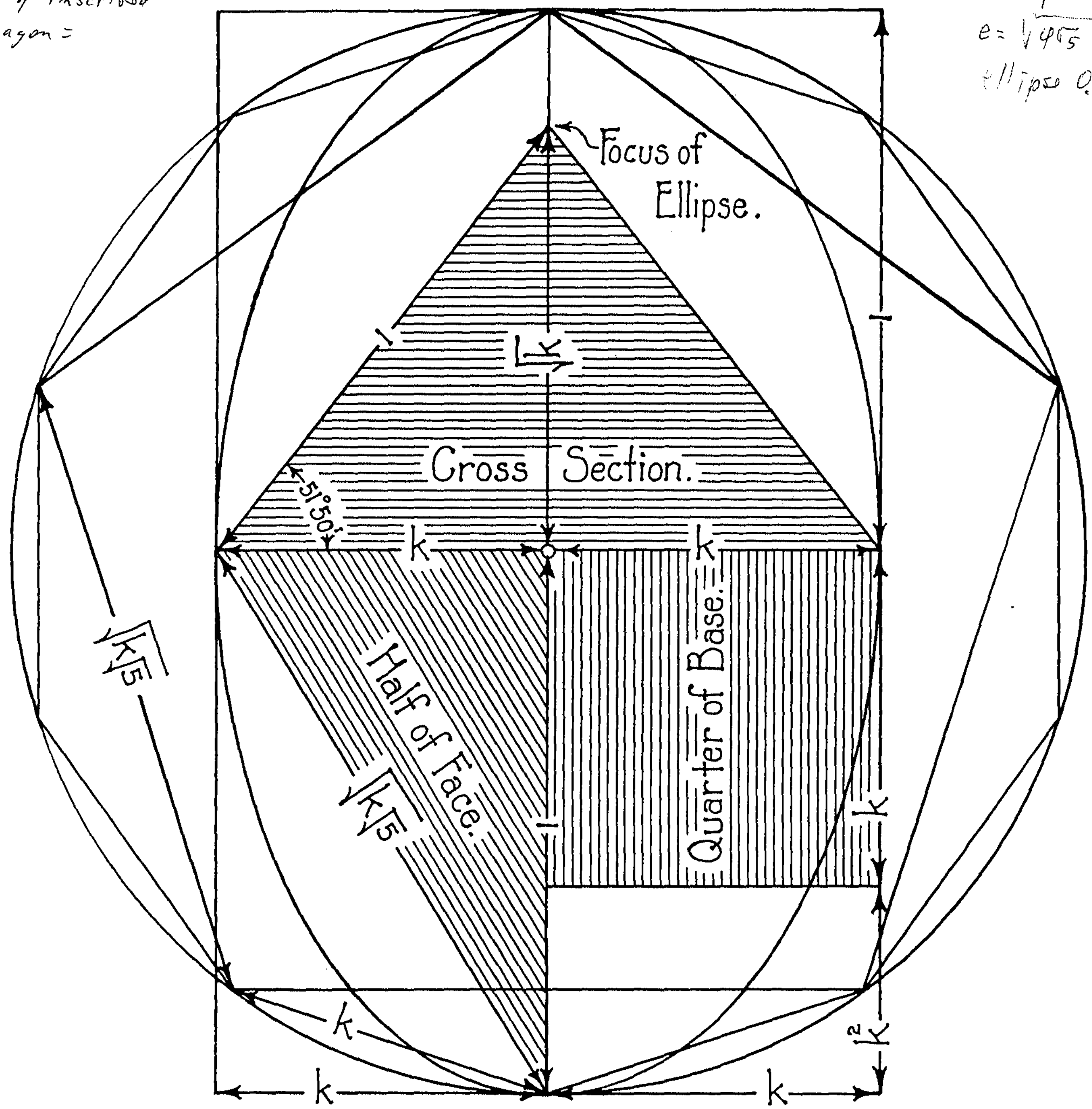
$h^2 = 1-\varphi^2 = \varphi = ab$ ✓

$h = \sqrt{\varphi}$ ✓

$e^2 = 1+\varphi^2 = \varphi\sqrt{5}$ ✓

$e = \sqrt{\varphi\sqrt{5}}$ ✓

ellipse O.K. ✓



Item	Intact.- Feet.	Slant Height Ratio.	$k=\frac{1}{2}\sqrt{5}-\frac{1}{2}=0.618034$*	
Height.–	481.33	$\sqrt{k} = 0.786151$	Square of Height $=(481.33)^2=$ 231679.	
*Base.–	$(755.73)^2$	$(2k)^2=(1.236068)^2$	Face Triangle $=\frac{1}{2}\times 611.93\times 755.73=$ 231229.	
*Slant Height.–	611.93	$\sqrt{k\sqrt{5}} = 1.175570$	* $\frac{377.87}{611.93}=0.6175$	$\frac{377.87}{481.33}=0.7851$

VESICA PISCIS

The radii of the small circles = 1

The radii of the large circles = 3

$$\sin\alpha = \frac{\frac{\sqrt{3}}{2}}{3} = \frac{BC}{AB}$$

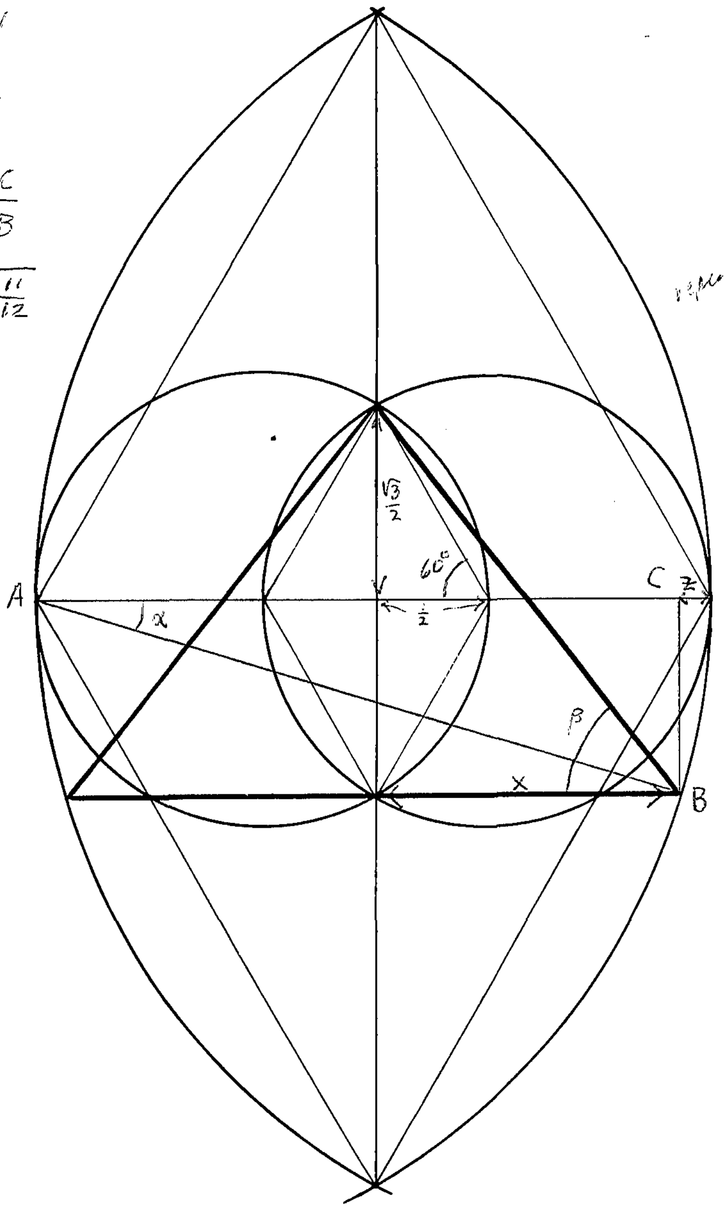
$$\cos\alpha = \sqrt{1-\sin^2\alpha} = \sqrt{\frac{11}{12}}$$

$$z = 3 - 3\cos\alpha$$
$$= 3\left(1 - \sqrt{\tfrac{11}{12}}\right)$$

$$x = \frac{3}{2} - z$$
$$= 3\left(\sqrt{\tfrac{11}{12}} - \tfrac{1}{2}\right)$$

$$\tan\beta = \frac{\sqrt{3}}{x}$$
$$= 1.2621689$$

$$\beta = 51^\circ.610672$$
$$= 51^\circ 36' 38''$$



Fractal
radii 1
repeated radii 3
...

triangle base through intersection extended to outer circle

The dimensions and geometry of the Great Pyramid relate symbolically to the 'number of fusion', 1746, in that the Pyramid's height of about 481 ft. forms the longer axis of a vesica piscis made by the intersection of two equal circles of circumference 1746 ft. The perimeter of the rhombus contained within the vesica is 1110 ft. and the area of the rhombus 66600 sq. ft. approximately. When the twin circles forming the inner vesica are enclosed in a greater vesica, the base angle of the Pyramid can be constructed, as in the diagram, accurate to within a few minutes of its true 51° 51′ slope.

vocabul
penetrat
such co
being th
circles fo
of 3, or
1746 ft.
These
centre o
feature
modern
Of th
the Gre
Captain
during a
his ship
mysterie
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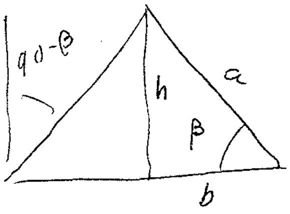


cross section

$$\cos\beta = \frac{b}{a} = \varphi = 0.618034$$

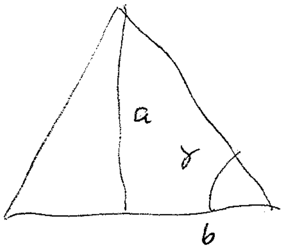
$$\tan\gamma = \frac{a}{b} = \frac{1}{\varphi} = 1.618034$$

$$\gamma = 58°.282526 = 1.017 \text{ rad} : 1.017222 \text{ rad}$$

$$\beta = 51.°827291 = 51° 49' 38''$$

$$90 - \beta = 38°.172709 = 0.6662395 \text{ rad}$$

$$\therefore \beta \doteq \left(\frac{\pi}{2} - \frac{2}{3}\right) \text{ rad}$$



FACE

Taking $\beta = \left(\frac{\pi}{2} - \frac{2}{3}\right) \text{ rad} = 0.9041297 \text{ rad}$

$$\beta = 51°.802814 = 51° 48' 10''$$

If we take $\gamma = 1$ rad

$\cos\beta = \frac{1}{\tan\gamma}$, $\beta = 0.8735716$ rad

$= 50°.051963$

REGISTRATION DISK:

REG	TRACK 1	TRACK 2	TRACK 3	TRACK 4	TRACK 5	TRACK 6	TRACK 7	TRACK 8	TRACK 9	TRACK 10
13										
14										
15										
16										
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7										
8										
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10										
11										
12										

Take the features that converge at 51°

∃ a confluence at 51°

Definition   Value of Angle

They could have chosen some other confluence
to illustrate the point.
But $\frac{\hat{V}}{S}$ works <u>only</u> at 51°

Is it important that there be many other confluences, i.e. pyramids with so many <u>simple</u> definitions giving the same angle?

Measure Definition	51°51' - 51°52' Angle	51.85 - 51.87
• Knotted Rope $\frac{360}{7}$	51°25'43"	51°.4286*
• Golden Ratio Arccos(φ)	51° 49' 38'	51°.8273
• $H^2 = \frac{AB}{2}$ (Herodotus)	" "	" "
• Max $\frac{V}{S}$	" "	51°.822292
• Rolling Drum arctan($\frac{4}{\pi}$)	51 51 14	51.8540
• Arcsin ($\frac{\pi}{4}$)	51 45 22	51.7575
• BASE / HEIGHT = $\frac{\pi}{2}$	" "	" "
• EDGE / HEIGHT = 3/2	51 40 16	51.6711
• VESICA PISCIS	51 36 38	51.6106
• $\frac{\pi}{2}$ steradians	51 47 6	51.7850

- <u>The truncated</u> pyramid

Other ad hoc contrived not simple

to mediate the changeless and the changing; and paradoxically the changeless ground which it generates is that which renders change visible.

Finally, the Journey of the Year is preparation for a new theophany, a preparation to receive a revelation of further attributes of God. It thus participates in theosis, the sacrilization of the earth

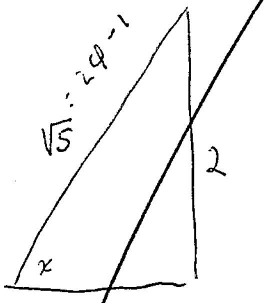
.

The Journey of the Year is a teacher. It teaches us to:

- Understand the basic physical and psychological cycles we all share.
- Become familiar with the timbre of time, to know the best of times and the worst of times for our activities.
- Learn to interact with our personal rhythmic patterns.
- Learn and participate in rituals useful for spiritual growth.
- Unlearn those dogmas which have inhibited our growth.

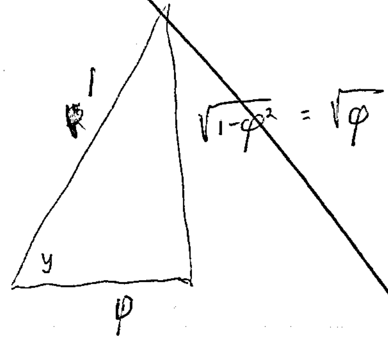
$\varphi^2+\varphi-1=0$

$\varphi = 0.618034$
$= \frac{\sqrt{5}-1}{2}$



$\tan x = 2$

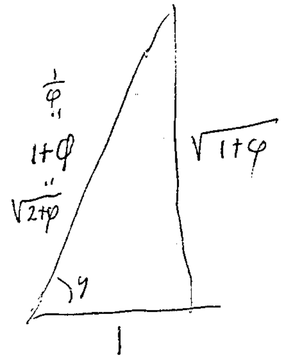
$x = 63.^\circ 4349$



$\cos y = \varphi$

$y = 51.^\circ 827291$

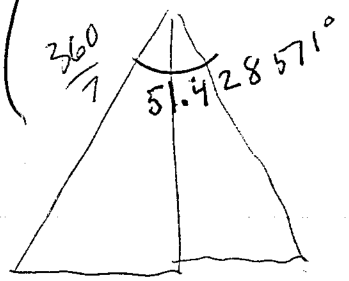
$\tan y = \frac{1}{\sqrt{\varphi}}$



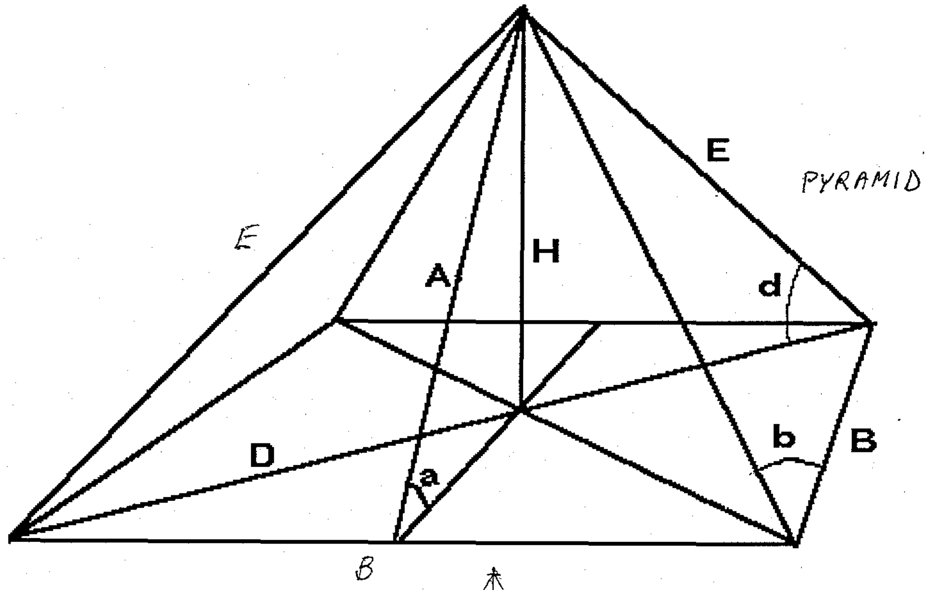
$\cos y = \varphi$

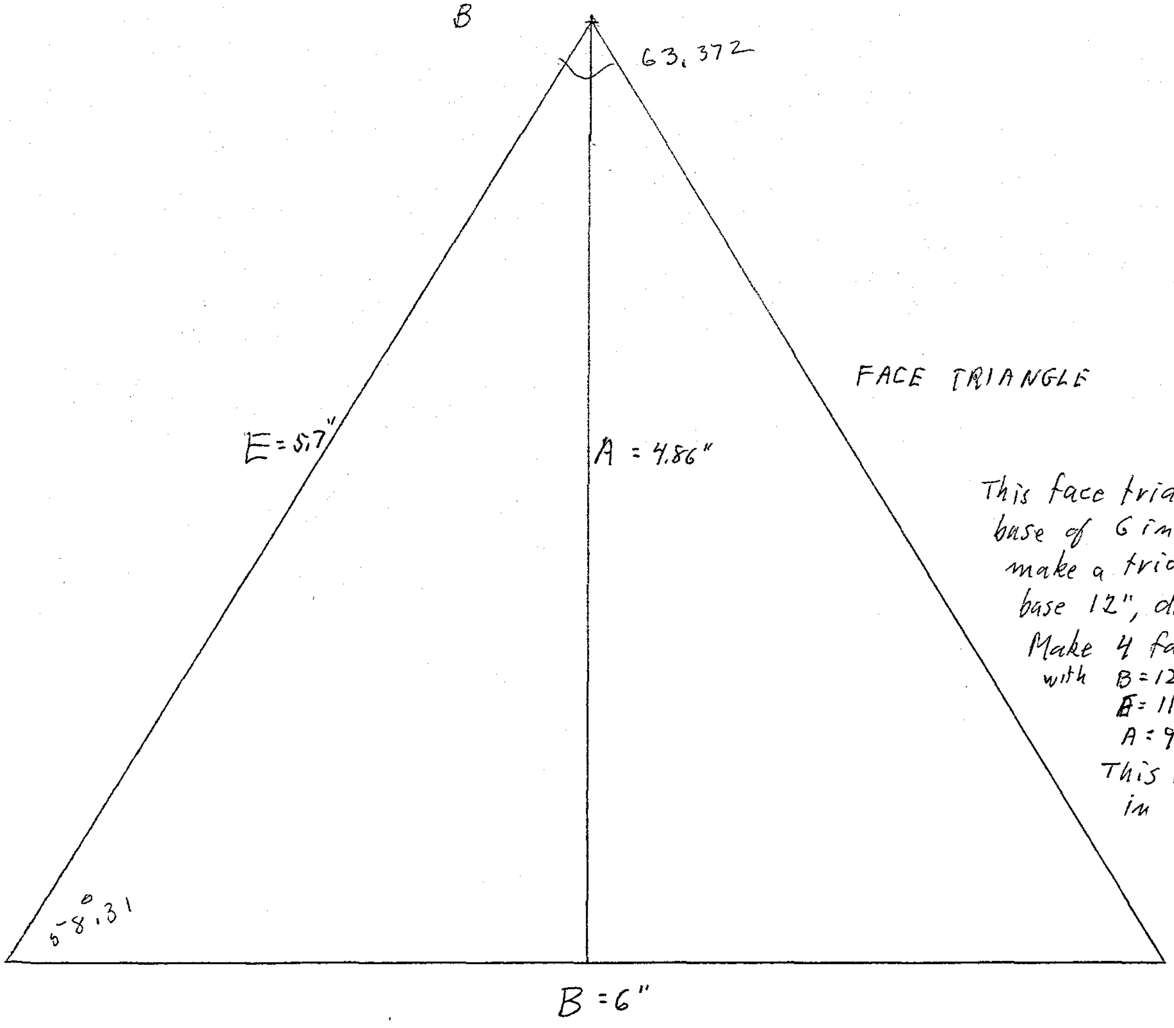
$y = 51.^\circ 827291$

$\frac{360}{7}$



5^{-8}



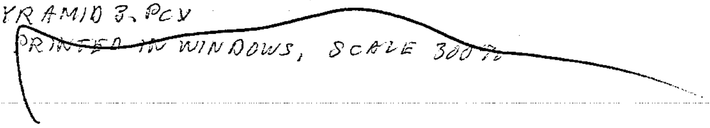


This face triangle has a
base of 6 inches. To
make a triangle with
base 12", double B, E, A.
Make 4 face triangles
with B = 12"
E = 11.42"
A = 9.71"
This would result
in H = 7.64"

7 Cross section triangle

PYRAMID3.PCX

PRINTED IN WINDOWS, SCALE 300%



Present Height 137 m   limiting frustrum

Orig 146

$h = 9m$

$p = \frac{9}{146} = 0.0616438$ $p^2 = .0038$

$q = \frac{1.0038}{.9962} = 1.007629$

$\cos(x) = 0.6175377$

$x = 51°.863450$ 51°51'48"

$b = pB = 14.2$

$B = 230.363$

Best Fit   51° 51' 18"

51.3

146
7.9
138.1

$\boxed{51°.855}$

146

.617654
.618016
514943
.617538
51 51 48
.617650
51.855302

$q = 1.000284$
1.007629
q 1.0059

51 51 19"

b
12.49

$p = 0.054234$

J%YPLG04.P51 DISK:JOURNYEAR03 May 15, 1991

JOURNEY OF THE YEAR
PROLOGUE

Our lifetime on Earth is but a segment of a great spiritual journey, a journey whose origin and destination are veiled in mystery and in which only the immediate path can be perceived. Since most is hidden from us we can proceed only by taking one step at a time. However, on rare occasions we can glimpse lofty summits on a distant horizon and we feel assured that an important destination ~~exists~~ waits for us. Whatever the reason our spiritual journey has brought us to Earth, while here, we are children of the Earth living under her protection. While here, our destiny is interwoven with the Earth's destiny and our spiritual journey is alongside the Earth's journey. It is only with the help of the Earth that we can continue our journey and fulfill our cosmic purpose, and it is only with our help that the Earth can fulfill her cosmic purpose. It is vital that we appreciate and understand the essence of our shared destiny.

Among those things which the Earth teaches us are the seasonal rhythms of her great yearly cycle. These rhythms become part of the inner heritage of all who live on earth and their beauty and mystery become deeply engraved in us. Though we shall each depart from Earth, the pattern of Earth's rhythms will remain with us and perhaps we shall find in those patterns a key to the mastery of what lies ahead. For all journeys write upon each other. The day writes on the year and the year writes on the day, the year writes on our life span and our span writes on the year. And all write on our greater journey. We thus come to the Journey of the Year, the part of our journey that we share with the Earth.

The Journey of the Year is many things:

The Journey of the Year is a meditation. It is a meditation to awaken in us an awareness of our greater journey by our developing in us an awareness of the sacred relationship that binds us with the Earth. It is a meditation which focuses on one of the most elemental bonds that we share with the Earth—the basic cycle of the year. By living in accord with the prescriptions of each season, the wheel of the year can transport us to a higher place in each of its successive cycles. But unless we are in tune with its rhythm, the opportunity is lost and the wheel merely turns. When the spiritual meaning of the yearly cycle is grasped, the seasons constitute a continuing sacrament enabling the healing and transforming of both ourselves and the Earth.

The Journey of the Year is a infrastructure framework. It is a framework that links the mythic traditions and symbols of the peoples of the Earth. It is a great tapestry whose weft and warp ~~is~~ are woven from the festivals and remembrances of many heritages. Before we can begin to understand the common wisdom in our diverse heritages we need a framework that will allow us to weave together and integrate the

GT PYRAMID 95/03/05

π β φ = an example of two views coupled ~~linked~~ by a fixed β. i.e. complementarity

3 levels of Pattern exploration
- The form itself inc. shafts
- The environs - lay out (e.g ~ ORION)
- The Globe - long, lat, etc. N/S alignment...

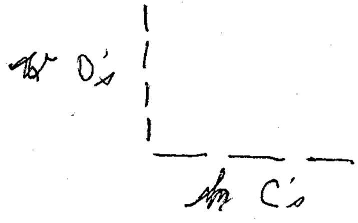
The π view: We have discovered the mechanism by which the shape of the GTP (and others) a was determined.

viz: 51.1 diam for vert. 4315°
DRUM circumfem for horiz.

The DRUM is the answer for π types.

The φ view: The drum was the agent ~~for~~ effecting the design. The design was v/s max.
A deeper principle is to be found in the design. The φ types search for principles

Note what were the β's of the other near by pyramids and ~~were the~~ did they also have cap-stones?



C = πD

Table

v	h	v/h	β = arctan v/h
1	1	1	45°
2	1	2	63.43°..
3	1	3	71.57..
4	1	4	75.96
1	2	1/2	26.57
2	2	1	45
3	2	3/2	56.31
4	2	2	63.43
5	2	5/2	68.20

63.434949 line of Apsides

v	h	v/h	β
1	3	1/3	18°.43
2	3	2/3	33.69
3	3	1	45
4	3	4/3	53.13
5	3	5/3	59.04
6	3	2	63.43
7	3	7/3	66.80

It is unspokenly recognized that tuning to the major and subtle seasons in the cycle of the year is an important discipline in the religious life of man. It is consequently not surprising that in the liturgical years of many religious traditions we find the occurrence of the same motifs, observances, and dates. Today many assume that the times set aside for various festivals and celebrations are arbitrary, subject only to the decisions of ecclesiastical or civil authority. But the temporal coincidences between celebrations in various liturgical calendars are not accidental. The dates are empirically derived from the patterns in the timbre of time. These patterns offer great opportunities to those who disciplinedly study and tune to them while frustrating and depressing those who are ignorant and ignore them.

Euphoria and anxiety, joy and depression flow and ebb like the tide. We customarily ascribe the fluctuations in our moods to specific local and personal causes such as, success or failure, acceptance or rejection, etc. The question is not whether fluctuations in our moods are real, but whether they are properly attributable to local or personal causes. Since many experience the same mood at the same time, our moods possibly derive from some broader influence beyond the local and the personal. There is something flowing through us all collectively like a psychic blood. We observe such seasonal phenomena in animals and birds, yet tend to deny that such forces could be operating in us. We continue to search unconsciously for specific causes on which to hang our collective moods rather than entertain the possibility that the mood may be primary and our "causal hooks" secondary. The Journey of the Year informs us that the seasons of the spirit, like the seasons of the sun, are real and not to be explained away in terms of local and personal factors.

> It is impossible to understand by intellect alone the yearly sequence of rituals and Holy Days, why one comes after the other or why this one now and that one later. Yet there is a profound logic in them and the sequence leads people to something higher, provided they are in a state of openness, being neither enthusiastic nor rejecting. Otherwise it all passes you by.
>
> The Metropolitan Anthony

When we consider that awareness and sensitivity to the outer seasons have greatly diminished in the present century, it is not surprising that there is little or no recognition of the less visible and more subtle seasons of the spirit. Our losing touch with the great rhythms of nature about us has resulted from the homogenization impressed on our lives by technology and urbanization. Electric lighting, in all but removing the former drastic limitations imposed on human activity by darkness, has equalized day and night. Central heating and air conditioning have

Need 8 pyramids.

- Rolling Drum
- Herodotus
- Max $\frac{v}{s}$
- Frustrums
- Solid Angle = $\frac{1}{8}$ sphere
- "Squaring the circle

) = same value of β

= same value of β

$\frac{H}{\frac{B}{2}} = \frac{4}{\pi}$

$\frac{H}{B} = \frac{2}{\pi}$

$\frac{H}{2B} = \frac{1}{\pi}$

$\frac{v}{h} = \frac{1}{\pi}$

Drum

vert unit = 1 ~ diam

hor unit = π ~ circum

select 4:1

i.e. $\frac{H}{B/2} = \frac{4}{1}$

$H = 2B$

but hor unit is π

$H = \frac{2B}{\pi}$

units diam

Drum 1 vertical = π horizontal

$4m = \pi m$

$\frac{v}{h} = \pi \rightarrow \frac{H}{B/2} = \pi$

re-do

Squaring the Circle

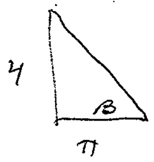
$H = R$

$2\pi H = 4B$

~~or $\pi H^2 = B^2$~~

$\pi H = 2B$ relate to drum

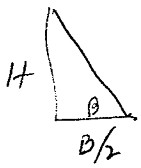
$\frac{B}{H} = \frac{\pi}{2}$ $\frac{B/2}{H} = \frac{\pi}{4}$



$\rightarrow \tan\beta = \frac{4}{\pi}$

$\beta = 51.853974 = 51° 51' 14.''3064$

$\pi H^2 = B^2$, $\frac{\sqrt{\pi}}{2} H = \frac{B}{2}$



~~$\cot\beta = \frac{\sqrt{\pi}}{2}$~~

~~or $\tan\beta = \frac{2}{\sqrt{\pi}}$~~ $\rightarrow$? $48°.45$

myet

Take as measured range

$51° 51' \pm 2'$

lower $51° 49' 30''$
upper $51° 52' 30''$

$\boxed{51° 51' \pm 1.'5}$

~~$\pm 1.'5$~~

lower $51.°825$
upper $51.°875$

Print Sample

April 30, 1992 WordPerfect 5.1 for Windows 8:03 am

WordPerfect® for Windows™ combines the incomparable set of features that made WordPerfect famous with a terrific implementation of the Windows graphical user interface (GUI). You can view your fonts and graphics right on the screen while you work.

WordPerfect for Windows unlocks the power of desktop publishing in a word processor. Graphic images can be easily scaled and moved on the screen with a mouse. Kerning, word and letter spacing, and line height adjustments are a snap. And changes in document format are reflected automatically in the document window. You can also edit up to nine documents at once.

Other new features make document handling easier and more efficient. The Ruler speeds up document format changes such as margins, tabs, and columns. It also provides a handy shortcut for creating tables with a mouse. The Button Bar™ lets you attach commonly used features or macros to a button for instant access. And Quick List™ gives you swift and easy access to your most frequently used directories and files.

WordPerfect for Windows can use the same printer drivers that are available in WordPerfect for DOS. Or, if you like, you can use the Windows system printer drivers.

WordPerfect for Windows provides a smooth step into the Windows world. Documents created in WordPerfect for Windows and WordPerfect for DOS are completely interchangeable. In short, WordPerfect for Windows is the answer for the person looking for a powerful, reliable, and easy to use Windows word processor.

Appearance

Italic
Outline
Shadow
Small Caps
Redline
~~Strikeout~~
Double Underline
Color

Size

$^{\text{Super}}/_{\text{Sub}}$script
Fine
Small
Large
Very Large
X-Large

Equation

$$\frac{1}{Z}=\sqrt{\frac{1}{R^2}+(\omega C-\frac{1}{\omega L})^2}$$

Table

Graphic Characters	
International	ま
Legal	§
Math	≠
Scientific	Σ
Typographical	Ⓜ

Print attributes (italic, shadow, font size, etc.) and quality of graphic characters are dependent upon the capabilities of each printer.

Metaphors

- The rolling drum method → a specific value that fits in the measured value range.
- The frustrum maximization $\frac{V}{S}$ → a range of values f(upper base b size). This range can be made as close as one wishes to the measured range.

But this is done by selecting ~~the~~ value of an independent parameter

More powerful – more flexible

[but ∃ also restraint on the b parameter

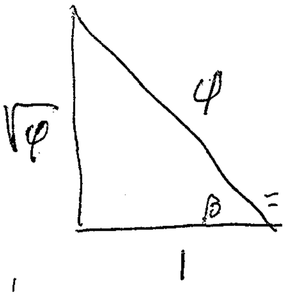
The way it is $\nrightarrow$ the ways it can be $\nrightarrow$ the ways we can make it to be

---

- $$H^2 = \frac{AB}{2}$$ Herodotus $$\frac{H}{A} = \frac{B/2}{H}$$

sin = cot

$$\varphi = \frac{\varphi}{2} 2$$



$$\sin^2 = \left(\frac{\sqrt{\varphi}}{\varphi}\right)^2 = \frac{1}{\varphi}$$

$$\cos = \frac{1}{\varphi}$$

2,36

.61

$$\sin\beta = \frac{1}{\sqrt{\varphi}}$$

$$\tan\beta = \sqrt{\varphi}$$

$$\sin\beta = \cot\beta$$

$$\sin^2\beta = \cos\beta = 1 - \cos^2\beta$$

$$\cos^2\beta + \cos\beta - 1 = 0$$

$$\cos\beta = \frac{-1 \pm \sqrt{5}}{2} = \varphi = .618$$

Same as $\frac{V}{S}$ maximization for full pyramid

MACRO.DOC

04/30/92

This WordPerfect document contains information intended to complement the WordPerfect 5.1 for Windows Reference Manual. It provides information about the following topics:

- Macro Information Sources
- The WordPerfect Macro Command Inserter
- Converting WordPerfect 5.1 for DOS Macros into WordPerfect 5.1 for Windows Macros
- Commonly Used WordPerfect for DOS Macro Commands and their WordPerfect for Windows Equivalents
- Macro Programming Commands
- User-definable Dialog Boxes (see the macro programming commands that begin with "Dialog")

Mendelssohn p. 64. ff

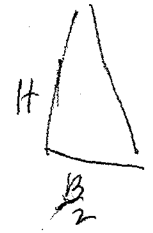
T. E. Connolly's suggestion:

$$\text{Cir} = \frac{H}{4B} = \frac{1}{2\pi}$$

$$\frac{H}{B} = \frac{2}{\pi} = 0.6366198 \Rightarrow 50^{\circ}.459$$

The unit is π
rather than 1
because drum → circu

Height in cubits
$\frac{B}{2}$ in rolls



4:1

Royal cubit = 52cm
= diameter of drum

They chose 4:1 and 3:1
1 rolled cubit
1 roll = π cubits

$H = 4 \cdot m$ cubits

$\frac{B}{2} = m$ rolled cubits
$= m\pi$ cubits

4:1

$$\frac{H}{\frac{B}{2}} = \frac{4m}{m\pi} = \frac{4}{\pi}$$

a tan = $51^{\circ}.853974$

$51^{\circ} 51' 14''.31$

circumference $= \frac{8B}{2} = 4B = 8\pi m$ cubits

$$\frac{\text{Cir}}{H} = \frac{8\pi m}{H} = \frac{8\pi m}{4m} = 2\pi$$

3:1

$H = 3m$

$\frac{B}{2} = m$ rol $= \pi m$

Cir $= 8\pi m$

Cir $= 4B = 8\pi m$

$$\frac{\text{Cir}}{H} \quad \frac{8\pi m}{3m} = \frac{8\pi}{3}$$

$$\frac{H}{4B} = \frac{3m}{8\pi m} = \frac{3}{8\pi} = 0.1193662$$

3:1

$$\frac{H}{\frac{B}{2}} = \frac{3m}{\pi m} = \frac{3}{\pi}$$

a tan = $43^{\circ}.679297$

$43^{\circ} 40' 45''.47$

p. 64
Many Pyramids
~ 52°
but
Red Pyramid
and upper
part of the
Bent Pyramid
43½°

But Egyptian
called π = 3

If $\frac{V}{S}$ max, i.e greatest vol
for fixed S (so much facing
limestone)

Pharaoh: "I want the biggest pyramid possible with
S available surface material

- See Appendix I: Macro Facility in WordPerfect Reference for more information about the WordPerfect Macro Facility. You may also want to look at Macro, and Macro: Assign to Menu.

WordPerfect 5.1 DOS Codes

The Macro Facility can convert the following WP51 DOS codes into the WP51 Win macro format.

Beep Error
Beep Hyphenation
Beep Search
Center Page
Columns Off
Columns On
Comment Convert to Text
Comment Edit
Date Code
Date Text
Endnote Create
Font Bold
Font Double Underline
Font Extra Large
Font Fine
Font Italic
Font Large
Font Normal
Font Outline
Font Redline
Font Shadow
Font Small
Font Small Caps
Font Strikeout
Font Subscript
Font Superscript
Font Underline
Font Very Large
Footnote Create
Force Even
Force Odd
Hyphenation State
Hyphenation Zone
Justification Center
Justification Full
Justification Left
Justification Right
Kerning
Leading Adjustment
Line Numbering (Off Only)
Line Spacing
Margins-Left/Right
Margins-Top/Bottom
Print Full Document
Print Page
Save As 4.2
Save As 5.0
Search and Replace
Search Backward
Search Extended Backward
Search Extended Forward
Search Extended Next
Search Extended Previous
Search Extended Replace
Search Forward
Search Next
Search Previous
Widow Orphan

WordPerfect 5.1 DOS Macro Commands

The Macro Facility can convert the following WP51 DOS macro commands into the WP51 Win macro format. The items preceded by an asterisk (*) should convert in most cases. However, the Macro Facility may not be able to convert the statement fully depending on the combination of parameters you have used with the command.

*{ASSIGN}
{BELL}
{CALL}
{CANCEL ON}
{CANCEL OFF}
{CASE}
{CASE CALL}
{CHAIN}
{COMMENT}
{DISPLAY OFF}
{DISPLAY ON}
{ELSE}
{END FOR}
{END IF}
{END WHILE}
*{FOR}
{FOR EACH}
{GO}
*{IF}
{LABEL}
{NEST}
{ON CANCEL}
{ON ERROR}
{ON NOT FOUND}
{PAUSE}
{QUIT}
{SPEED}
*{WHILE}

WordPerfect 5.1 for DOS Macro Keystrokes

The Macro Facility can convert the following WP51 DOS keystrokes into the WP51 Win macro format.

Function	WP51 DOS Keystroke(s)	WP 5.1 DOS Macro Code
Backspace	Backspace	{Backspace}
Center	Shift-F6	{Center}
Delete	Delete	{Del}
Delete Word	Ctrl-Backspace	{Del Word}
Dot Leader-Center	Shift-F6, Shift-F6	{Center}{Center}
Dot Leader-Center Tab	Home, Home, Shift-F6	{Home}{Home}{Center}
Dot Leader-Decimal Tab	Home, Home, Ctrl-F6	{Home}{Home}{Tab Align}
Dot Leader-Flush Right	Alt-F6, Alt-F6	{Flush Right}{Flush Right}
Dot Leader-Left Tab	Home, Home, Tab	{Home}{Home}{Tab}
Dot Leader-Right Tab	Home, Home, Alt-F6	{Home}{Home}{Flush Right}
Double Indent (L/R Indent)	Shift-F4	{L/R Indent}

POSITION, SIZE, ETC.

Notes: from J. B. GILL's
"THE GREAT PYRAMID SPEAKS"   pyramid units are days

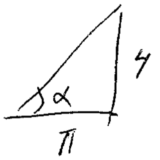
p26,27: The unit ① assumption: the average side = ~~630.7137 mm~~ of 230,363.25 mm corresponds to 36~~5~~.2422 p.u.
i.e. 630.71~~37~~ mm/p.u.
a pyramid unit is 630.7137 mm = .63 m

∃ 2 ways
Not 1 ∴ the other
cf. Mary Baker Eddy

∑ was there an extinction ~ Atlantis?

---

② $/\!\!/ \frac{4}{\pi}$ assumption



$\tan\alpha = 1.273240 = \frac{4}{\pi}$

$h \sim = 232.52040$ p.u. $= \frac{365.2422}{2} \times \frac{4}{\pi}$

p31 ~ rolling drum

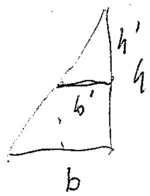
$\frac{b}{2} = 182.6211$ p.u.

If square and circle have equal perimeters i.e. $4s = 2\pi r$

ratio of areas $= \frac{\pi r^2}{s^2} = \frac{4\pi r^2}{\pi^2 r^2} = \frac{4}{\pi}$ which $= \tan\alpha$

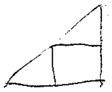
---

p32



$\frac{b'}{b} = \frac{h'}{h} = \frac{1}{2}$

true for <u>any</u> pyramid



$\frac{b'^2}{b^2} = \frac{1}{4}$

$\frac{b'^2}{b^2} \cdot \frac{h'}{h} = \frac{1}{8}$

---

p32 question is King Chamber level area $\frac{1}{2}$ i.e. down $\frac{1}{\sqrt{2}}$ height?

---

p35 $\frac{2 \times 365.2422}{\pi} = 232.52040$ ✓ same as above

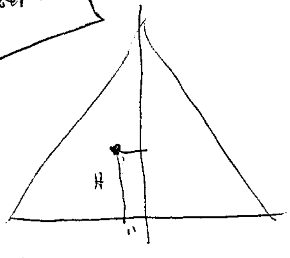
obfuscations!!

The MF is crap!

---

p40

Is the entrance offset?

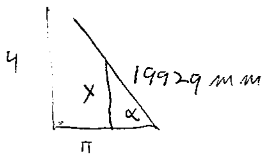


365.2422 day units
days   offset 11.559 days

31.59 d.u.

Day Units or Pyr Units × 630.7137 =		MM
OFFSET	11.559	7290.43.
H	31.598	19929

$\frac{Y}{OS} = H = 31.598$



$X = 19929 \sin\alpha = 15673.19$ mm
.786439

15673.19 mm = 24.85 days

```
 Volume in drive B is WORKDISK1
 Directory of B:\

PLAYER       <DIR>        07-02-97   9:30a
GRAPHICS     <DIR>        07-02-97   9:31a
QBASIC       <DIR>        07-02-97   1:42p
DISKLABL 301         2498 01-21-97   4:16p
LIFE     EXE         2095 05-01-85  12:00p
KITCHEN  INV         3093 11-23-93   9:54a
ARCHORD1 MCD         2998 08-19-97   1:04p
7327OCCI ROD         1825 06-24-97   6:15p
HEBREW   W60         2574 11-30-93   8:39a
CYRILIC  WP6         3611 09-09-95   8:37p
CYRILLIC WP6         2009 12-14-95   5:32p
NAMES97  WP6         4236 02-06-97   6:57a
CLIENT97 WP6         2229 08-18-97   2:34p
HEBREW   WPW         5892 11-30-93   8:57a
       14 file(s)         33060 bytes
                         779776 bytes free
```

$h = 232.5204$ pu or days

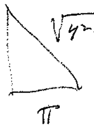
$\frac{365.2422}{2} \times \frac{4}{\pi} = h = 232.5204$ days.

$\frac{x}{h} = 0.1068719$ not interesting

Height & to entrance = 24.8499 days $= x$

$x = 15,673.19$ mm

$\{\{ \quad \frac{4}{\pi} \neq$



$\sqrt{4^2+\pi^2} = 5.0862171 = k$

$\frac{k}{\pi} = 1.61899 \qquad \frac{\pi}{k} = 0.6176678$

1 day =

$\boxed{630.7137}$ mm

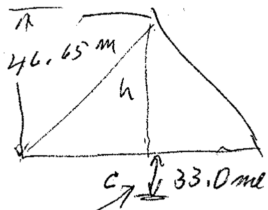
→ first item with any meaning if dimensions are correct.

p 43 height = 1201.81mm ~ 1,9054763 days
width = 1039.87mm ~ 1.6487195 days

$h \times w = \pi$
in day units

"π passage"

The "π descending passage"



$\frac{h}{\frac{b}{2}} = \frac{4}{\pi}$

h 146.6538 m

b = 230,36325 m

$\frac{b}{2} = 115.1816$

33.0 meters = 52.257768 days

$$\begin{array}{r} 232,6204 \\ \hline 284.7782 \end{array}$$

146.6538 + 33 = 179.6538

$.816 = \sqrt{\frac{2}{3}}$

$\frac{h+c}{h} = \sqrt{\frac{3}{2}} = 1 + \frac{c}{h}$

$\left(1+\frac{c}{h}\right)^2 = \frac{3}{2}$

$\boxed{\text{if 33 is correct}}$

$c = \left(\sqrt{\frac{3}{2}} - 1\right) h$

$\{\{ \quad \frac{1}{\sqrt{3}-\sqrt{2}} = 3.146$

---

p. 47. not a right angle

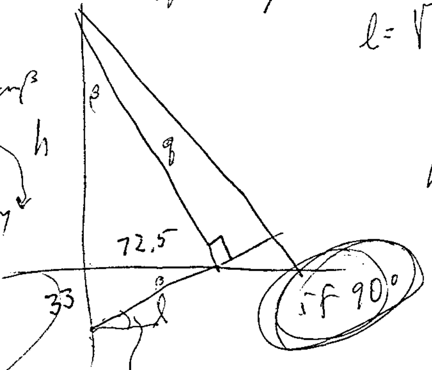
if □

$\frac{72,5}{146.65} = \frac{33}{72,5} = \tan\beta$

5256.25 ≠ 4839.45

0.49437 ≠ 0.45517

Nyet



26°.319
tan = 0.49464

a = 100
b = 79.657
7965.7

$l = \sqrt{33^2 + 72.5^2} = \sqrt{6345.25} = 79.657$

1089 + 5256.25
1089

h + 33 = 179.6538

$q = \sqrt{179.654^2 - 79.657^2}$

$q = \sqrt{(a+b)^2 - b^2}$

$\sqrt{a^2 + 2ab}$

$q = \sqrt{10000 + 15931.4} = \sqrt{25931.4} = 161.032$

SCIREL01.WP6 August 28, 1997

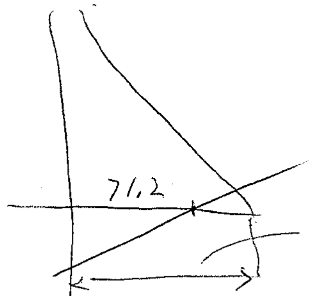
Religion uses several approaches to a single subject.
Science uses a single approach to several subjects.
—Li Kiang

Both religion and science do 'packaging'. Religion packages morality, psychology, and cosmology into a bundle tied together by the teachings (scriptures, gospels, dharma, etc.) of a particular teacher (Moses, Jesus, Buddha, etc). Science packages astronomy, physics, chemistry, biology, ... into a bundle tied together with a single epistemology called the 'scientific method'. In both cases consumers are forced to buy packages and are locked into sets of associations that violate human experience, creating areas of dispute, avoidance, and unapproachability.

How do we acquire freedom from packaging? disolve habitual associations, re-examine traditional structures? Cut the cords of the package without damaging the contents?

p 48

③



230.36325 ÷ 2
115.1816

$$\frac{71.2}{115.1816} = 0.6181543$$

72.5 → 71.2 why? This is pure crap!
ad hoc

$$\frac{71.2}{146.65} = 0.4855$$

$$\frac{33}{71.2} = 0.46348$$

---

p.33 e passage Queen Chamber passage
width = 1.648 72127 p.u.
Height = 1.819591979 p.u.
w × h = 2.99999 ... = 3

all passages have the same width

Kings Chamber square
height 1.64872127
width 1.64872127 } h × w = 2.718281828 ... = e

Descending area = π
Queen area = 3 See p 77
King area = e

---

all based on b = 365.2422 unit

SCRAPS 1997

1.	FREELIB2.WP6	97/01/01	LIBERTY AND FREEDOM
2.	MONOTHSM.WP6	97/01/02	ON MONOTHEISM
3.	MUSICTF.WP6	97/01/06	OF TIME AND FREQUENCY
4.	TIMENER1.WP6	97/01/14	OF TIME AND ENERGY
5.	MESMES1.WP6	97/01/16	MESSAGE AND MESSENGER
6.	EXGEN.WP6	97/01/16	EXCERPTS AND NOTES FROM GENESIS
7.	SOGYAL1.WP6	97/01/17	NOTES ON LIVING AND DYING
8.	SHANTIDV.WP6	97/01/17	WISDOM AND COMPASSION OF SHANTIDEVA
9.	TRINITY.WP6	97/01/22	ON TRINITIES
10.	THREEVIL.WP6	97/01/25	THREE VIEWS OF EVIL
11.	FISHPLUS.WP6	97/01/29	ON FISH AND ENLIGHTENMENT
12.	FISHHOOK.WP6	97/01/30	ON FISH AND CAPITALISM
13.	CAPITO3.WP6	97/02/04	ON CAPITALISM
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16.	HUBBLE1.WP6	97/02/08	THE FIRST TIME I SAW HUBBLE
17.	EPISTOL1.WP6	97/02/10	ESCAPE FROM THE WEST
18.	PREFACE1.WP6	97/03/16	A PROPOSED PREFACE
19.	ONDREAMS.WP6	97/03/23	PLAY WITHIN THE PLAY
20.	LOVEHATE.WP6	97/03/23	THE LOVE-HATE PARADOX
21.	EMDEF1.WP6	97/03/31	EMERGENCE
22.	EMERG01.WP6	97/03/03	ON EMERGENCE
23.	ORGAPRCH.WP6	97/04/03	AN APPROACH TO ORGANIZING
24.	BRAHMTAB.WP6	97/04/06	TABLES FROM THE HANDBOOK OF BRAHMA
25.	LPGROWUP.WP6	97/04/30	WHEN I GROW UP
26.	SIVRAM01.WP6	97/05/02	SOME TEACHINGS OF SIVARAMKRISHNA
27.	SMOKERS.WP6	97/05/12	SMOKE
28.	DIALECT0.WP6	97/05/12	DIALECTICAL PROCESSES
29.	PERCON01.WP6	97/05/12	CONCEPTION AND PERCEPTION
30.	NONAGON.WP6	97/05/12	CONSTRUCTION OF A NONAGON
31.	DEEPBLU1.WP6	97/05/19	SOME IMPLICATIONS OF DEEP BLUE
32.	PARTIME.WP6	97/05/23	WAVES,PARTICLES,TIME,FREQUENCY
33.	3ONTOL01.WP6	97/05/24	SOME MORE ONTOLOGIES
34.	2NEW0527.WP6	97/05/27	ONE DAY IN THE NEWS
35.	RMS2.WP6	97/06/07	A DREAM
36.	RMS.WP6	97/06/07	SOME COMMENTS ON SQUARING
37.	OSTRO.LTR	97/06/12	GEOGRAPHOS AND ECA's
38.	MEMORIUM,WP6	97/06/14	IN MEMORIUM
39.	BRAHMA01.WP6	97/06/20	WORLD CLASS CONCEPTS
40.	GUPGEP01.WP6	97/06/22	UNIQUENESS VS. HOMOGENIZATION
41.	SQUIRREL.WP6	97/06/23	OF SQUIRRESL AND MEN
42.	BRAHMA02.WP6	97/06/25	BRAHMA'S TABLES II
43.	SOMATH01.WP6	97/06/28	ON CONTINUED FRACTIONS AND ROOTS
44.	ORIG.WP6	97/06/29	ORIGINALITY--by W.A.MATHIEU
45.	PYTHCOS2.WP6	97/06/29	MORE ON PYTHAGOREAN COSMOLOGY

97/11/11

If, as has been pointed out, the location of the 3 principal pyramids at Giza represent the stars in the belt of Orion, then the possibility exists for determing an important scale factor

First. we can identify

Khufu	with	δ Ori	Mintaka
Khafre	with	ε Ori	Al Nilam
and Menkure	with	ζ Ori	Al Nitak

by the comparative separations and departure from straight alignment.

Next the angluar separations in the sky and the linear distances on the Grond

SKY		GIZA	
$\delta - \varepsilon$	4989" arc	Gt - K	2875
$\varepsilon - \zeta$	4883" arc	K - M	2438
ratio	1.0217	ratio	1.1792

(low accuracy)

In principle, If the ground locations accurately mapped the star positions of 2500BC and if $\exists$ any differential proper motions, the dating of the pyramids could be determined

so the layout does not accurately correspond

2 factors: Flat sky was assumed
No proper motions taken into account

Measures made A Fakhry p100

	Base
Khufu	756'
Khafre	708'
Menkure	356'

Gt - K 4.18 cm
Gt base 2.0 cm

$$\frac{4.18}{2} = \frac{x}{756} \quad \therefore \text{Gt} - K \sim 1580\text{ft}.$$

and $\delta - \varepsilon \sim 4989$" arc

1 rad = 206264.8" arc

$$\boxed{S = R\theta} \quad \theta = \delta - \varepsilon = 0.024874 \text{ rad}$$

S = 1580ft.

R = 65,332 ft

or 19913 meters or 19.913 km

about <u>20 km</u> [considering the accuracy]

What is the significance of this number?

2.30 × 10^4

R = 1.9913 × 10^6 cm

$\mathcal{L}$ 10^{-33} cm

+6 cm

-32

38

$\frac{R}{\mathcal{L}} =$ 39 = S

-33.792
6.299
39.091

ln $\frac{19...}{227}$ 4.474

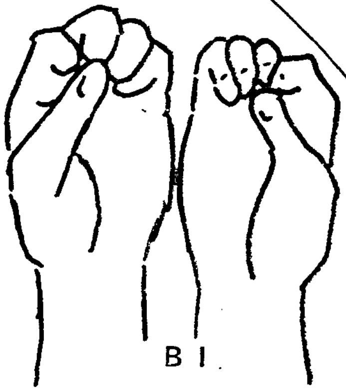
$$\frac{R}{\mathcal{L}} = S$$

$$\boxed{R = S\mathcal{L}}$$

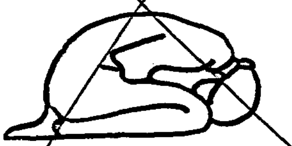
NABHI KRIYA: FOR DIGESTION

Yogi Bhajan 6/14/71

A



B I

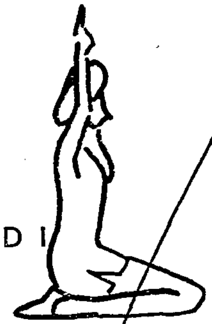


B 2

A) Lie on the stomach and make both hands into fists. Place the fists under the navel point at the hernia areas just inside the hip bones. (A) Lift the legs as high as possible with knees straight. Place the chin on the ground and begin breathing long, deep, and slow. Continue for 3 minutes.

B) Sit on the heels. Place the fingertips of both hands on the navel point and press in. (B1) Lean forward, place the head on the ground, and begin breath of fire. (B2) Continue breath of fire for 3 minutes. Inhale and exhale completely applying mulbandha. Relax

C) Remain in the same position and begin long, deep breathing. Inhale through the nostrils long and slow and then exhale with a snake breath: out through the teeth with the tongue pressed on them to make a hiss noise. While exhaling, press the navel in with the fingertips and apply mul bandh. Continue 3 to 5 minutes and then begin long, deep, slow breathing through the nose for 3 minutes.



D I

D 2

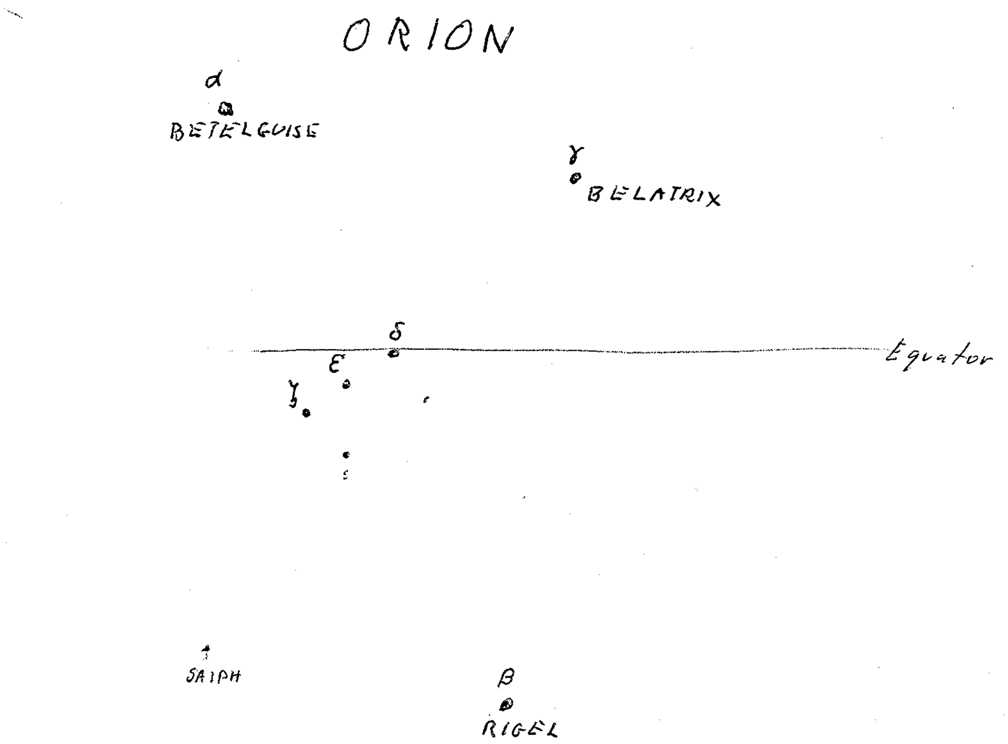
D) Sit on the heels and lock the hands over the head for Sat Kriya. Use the hand lock with the index finger straight up, other fingers interlaced, and thumbs crossed. (D1 & D2) Begin to chant SAT NAM emphatically in a constant rhythm of about eitht times per ten seconds. Chant the sound SAT from the navel point and solar plexus and pull the umbilicus all the way in toward the spine. On NAM, relax the belly. Continue Sat Kriya for 3 minutes. Then inhale, exhale, and apply mulabandh. Meditate.

COMMENTS:

If digestion is slow and imbalanced, disease rejoices. Most colds and influenza come from an energy imbalance that begins in the digestive track. To stimulate good digestion and improve concentration, the navel point must be stimulated and the energy distributed through the two main nadis that pass on either side of the navel point. All the facets of the kriya do this. Exercise "C" can be slowly extended to 31 minutes of long, deep, and slow breathing. Exercise "D" can be extended to five minutes.

THE GREAT PYRAMID

ORION



		m	sp	α	δ
Mintaka	δ ORI	2.5	B0	$5^h\ 30^m\ 16.^s1$	−0° 19′ 22″
Al Nilam	ε ORI	1.7	B0	$5^h\ 34^m\ 29.^s2$	−1° 13′ 20″
Al Nitak	ζ ORI	2.0	B0	$5^h\ 39^m\ 2.^s5$	−1° 57′ 33″

conversion to angular (omit the 5^h)	δ	7° 34′ 1.5″	−0° 19′ 22″
	ε	8° 37′ 18″	−1° 13′ 20″
	ζ	9° 45′ 37.5″	−1° 57′ 33″

ORIGIN
δ = 0
α = 5^h

into ″ arc	δ	27242	− 1162″
	ε	31038	− 4400″
	ζ	35138	− 7053″

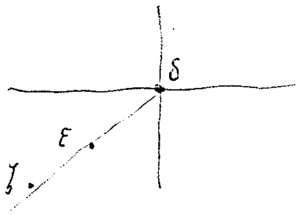
Normalizing on δ Ori	δ	0	0
	ε	− 3796	−3238
	ζ	− 7896	−5891

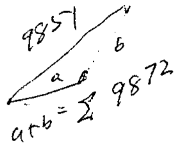
separations

δ−ε	4989
δ−ζ	9851
ε−ζ	4883

5891
3238
2653

7896
3796
4100





F1

F2

F) Stand up straight. Raise the arms over the head so they hug the ears. Press the fingers back so the palms face the sky. (F1) Exhale and bend forward to touch the ground with the palms. While bending, keep the arms straight overhead and touching the ears. (F2) Inhale and raise up. Do this very slowly with a deep breath. On the exhale, apply mulabandha. Continue for 2 minutes, then increase the pace more rapidly for 1 more minute.

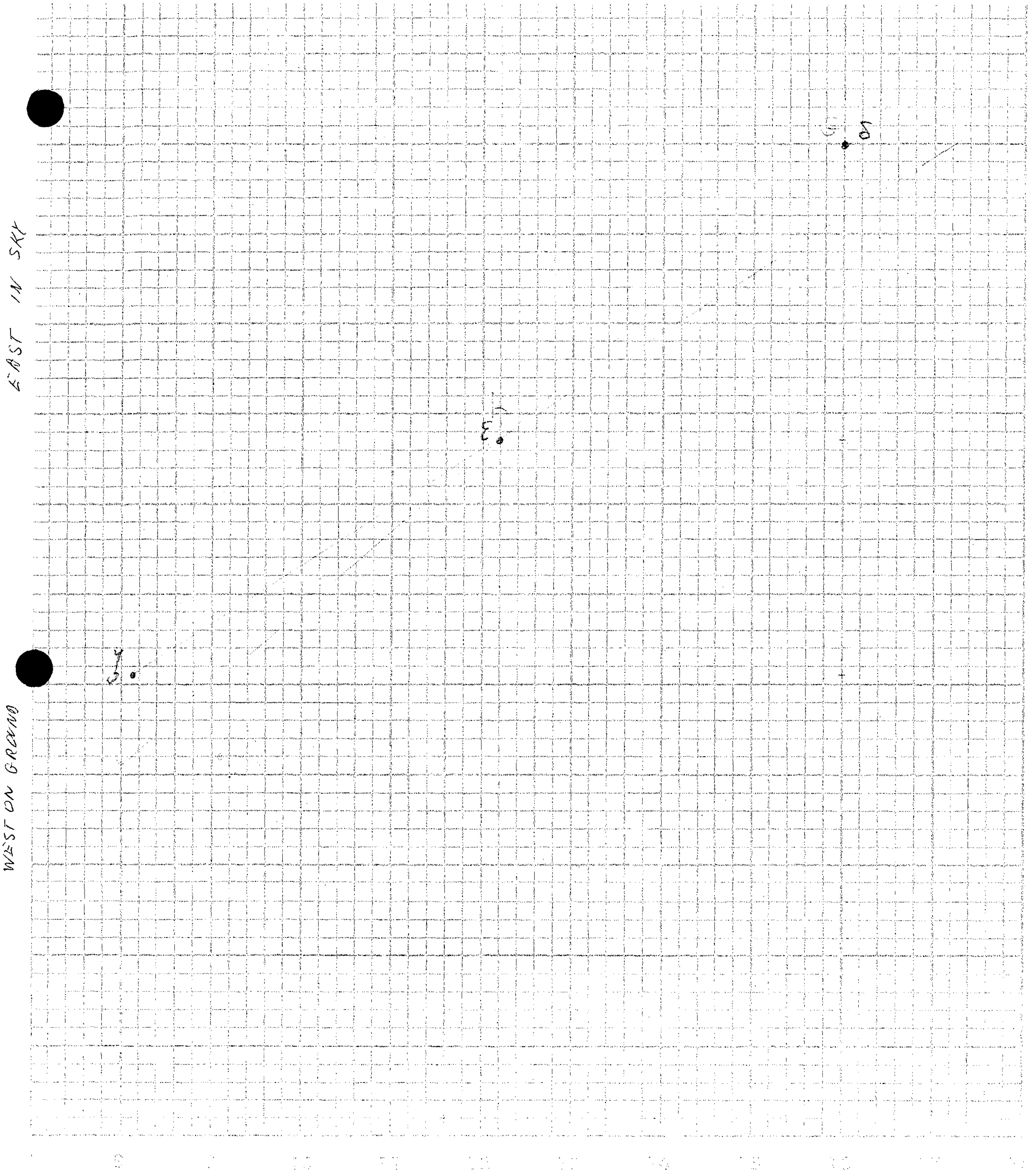
G) Totally relax or meditate for 10 to 15 minutes.

COMMENTS:

This set focuses on developing the strength of the navel point. The times indicated for each exercise are for advanced students. To begin the practice, start with 3 to 5 minutes on the longer exercises.

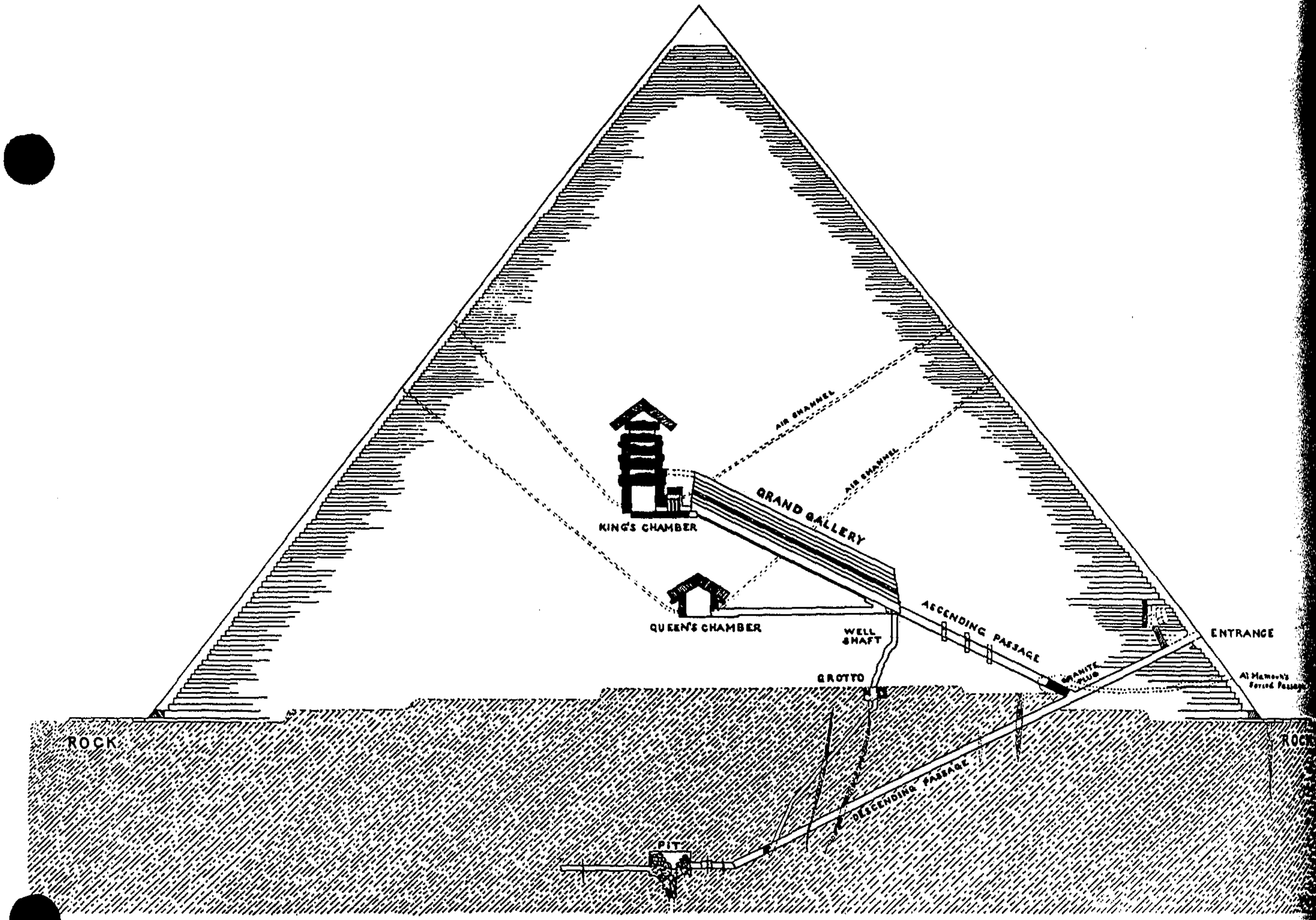
Exercise "A" is for the lower digestive areas. Exercise "B" is for the upper digestion and solar plexus. "C" eliminates gas and relaxes the heart. "D" charges the magnetic field and opens the navel center. "E" sets the hips and lower spine, and "F" is for the entire spine, spinal fluid, and the aura. Together, these exercises will get the abdominal area in shape very quickly.

ORION GIZA N SKY AND GROUND



δ ~ Great Pyramid Khufu
ε ~ Khafra
ζ ~ Menkaura

Gt - K	2875	δ - ε	4989"
K - M	2438	ε - ζ	4883"
ratio	1.1792	ratio	1.0217



Davidson's rendition of the Great Pyramid passages, showing three large fissures in the natural rock.

Their reason for starting so far down, says Davidson, instead of taking a shorter route past the plugged Ascending Passage, was to cut their way through, and carefully observe, two large fissures that had appeared in the bedrock. A third fissure, present at the time of construction, had already been shored up by the builders.

The problem of the priests, says Davidson, was to determine if the fissuring was severe enough to cause further subsidence.

Digging in a gradual upward slope, says Davidson, the keepers worked their way through both fissures, finding them in not as bad condition as they had expected. At the level of the Grotto the keepers made a staging area for tools, for rest, and for the bypassing of workers and material.

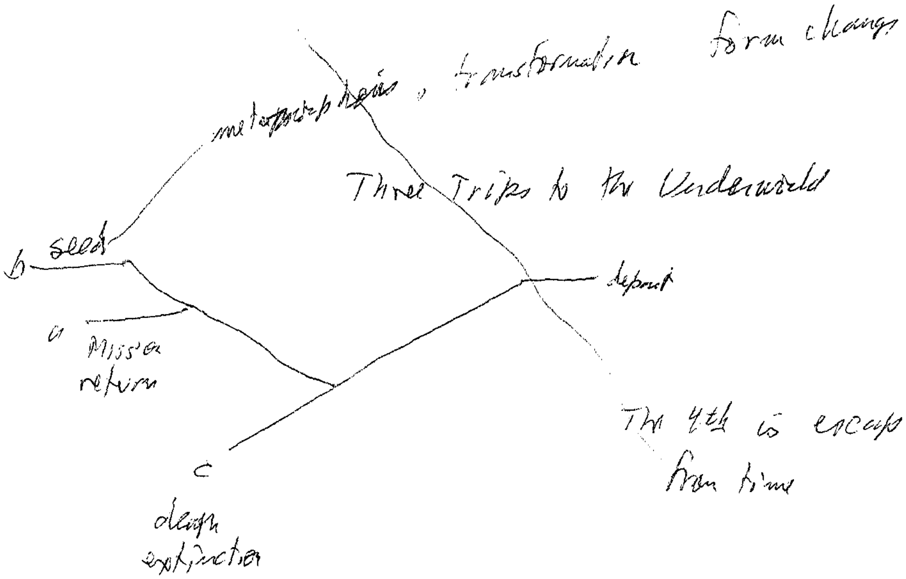
From the Grotto they continued their shaft up toward the commencement of the Grand Gallery. Having somehow made an accurate survey of exactly where they were, they

TOMPKINS

Interior of the Pyramid

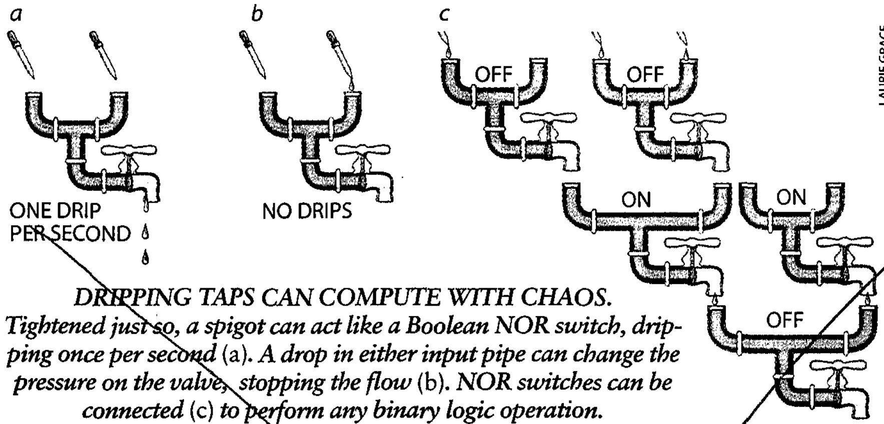
For the Great Pyramid

4 Trips to the underworld
(Kore)
Persephone #4 ⟶ Transcends
Orpheus → retrieve Eurudice
Psyche → water from Styx, box of divine beauty from Kore
Hercules → to get Ceberus



a: A mission to the underworld - in + return   reincarnation
b: emergence + metaphrosis,
c death & extinction   no return

4th Transcendence - a Buddha   die to time
or
liberated from time



LAURIE GRACE

DRIPPING TAPS CAN COMPUTE WITH CHAOS. *Tightened just so, a spigot can act like a Boolean NOR switch, dripping once per second* (a). *A drop in either input pipe can change the pressure on the valve, stopping the flow* (b). *NOR switches can be connected* (c) *to perform any binary logic operation.*

ence in Madras, India, published the first design for a chaotic computer. Their novel species of machine would exploit the very instabilities that other kinds of computers do their utmost to squelch.

So far the machines have been only simulated mathematically; it will take several months to actually build one. Daniel J. Gauthier, a chaos researcher at Duke University, says the design is "very interesting" nonetheless because chaotic machines appear able to add and multiply numbers, handle Boolean logic and even perform more specialized calculations. Together, Ditto says, such operations provide the bare necessities needed to make a general-purpose machine. Whereas quantum computers and DNA seem suited to only certain problems, such as code breaking or complex mathematics, chaotic computers might be able to do nearly everything current computers do and more.

Whether they can do so better is an open question. "Better means faster or cheaper, and semiconductors have a huge head start," Gauthier points out. But devices with a heart of chaos will certainly be different.

They will come in many forms. The first machines will probably be assembled out of lasers or analog electronic circuits. But in principle, Ditto says, chaotic computers could be made by connecting a bunch of almost any devices that slip easily into chaos—not randomness, but cyclic behavior that cannot be predicted very far in advance because it is so sensitive to tiny perturbations. The "processors" could theoretically be something as simple as dripping faucets.

Building a computer out of leaky spigots is easier than you might think, and it illustrates well how a chaotic computer would work. If a faucet is very leaky, its drips fall in a chaotic rhythm that varies wildly depending on the water pressure. Slightly leaky faucets, however, drip steadily. So the tap handle can control both the rate of dripping and whether it is regular or chaotic.

To add three numbers—*x, y* and *z*—simply place a funnel under three faucets, adjust them to drip *x, y* and *z* times a minute, respectively, and then measure how many drops of water leave the funnel after a minute. Boolean logic, the foundation of all digital computing, is only slightly harder. The trick is to set the water pressure and handle position to just the right point at which the spigot drips exactly once per minute if left alone but not at all if a single extra drop of water is added to the pipe behind it. Almost all chaotic systems will have such critical points, and chaos theory tells you how to find them. By arranging many faucets on a wall so that the drips of higher taps start or stop lower faucets leaking, one can program with plumbing.

Of course, Ditto and his colleagues plan to use considerably faster components: advanced lasers that, instead of dripping, send out femtosecond pulses, trillions of which can fit comfortably into one second. "Coupling them together, so that each leaks light into the next, might allow us to perform billions or trillions of calculations per second," he says, giddy at the prospect.

"We're also working on using silicon chips to control living neurons," which behave chaotically, Ditto reports. A web of such cybercells could work on many different parts of a problem at the same time. "This really is a whole new paradigm for computers," Ditto says.

New computing paradigms are claimed entirely too often and too cavalierly. But now that chaos theory has matured from naive science to fulsome technology, perhaps this particular spinster is worth a long, thoughtful look. *—W. Wayt Gibbs in San Francisco*

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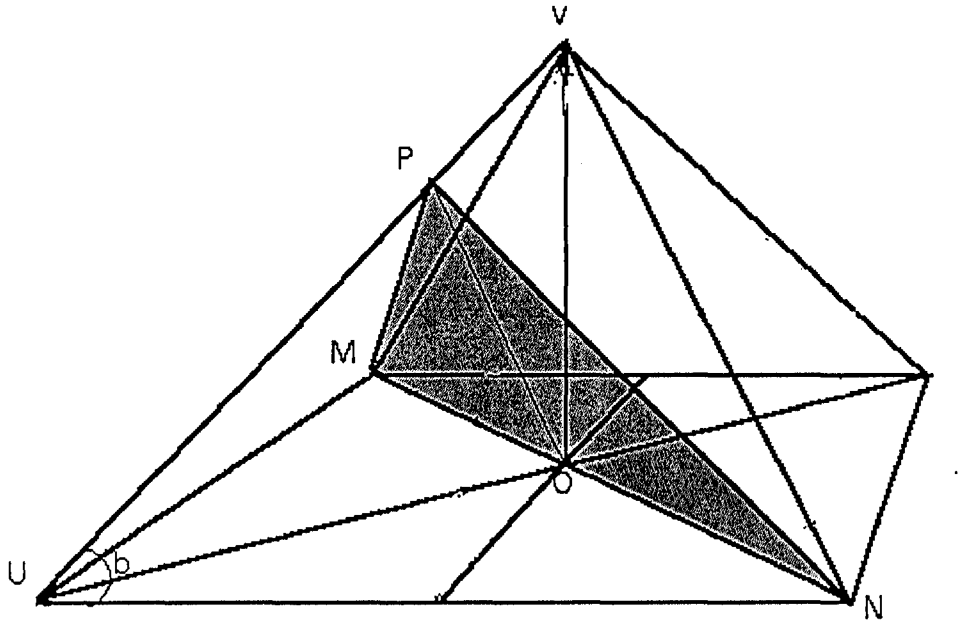
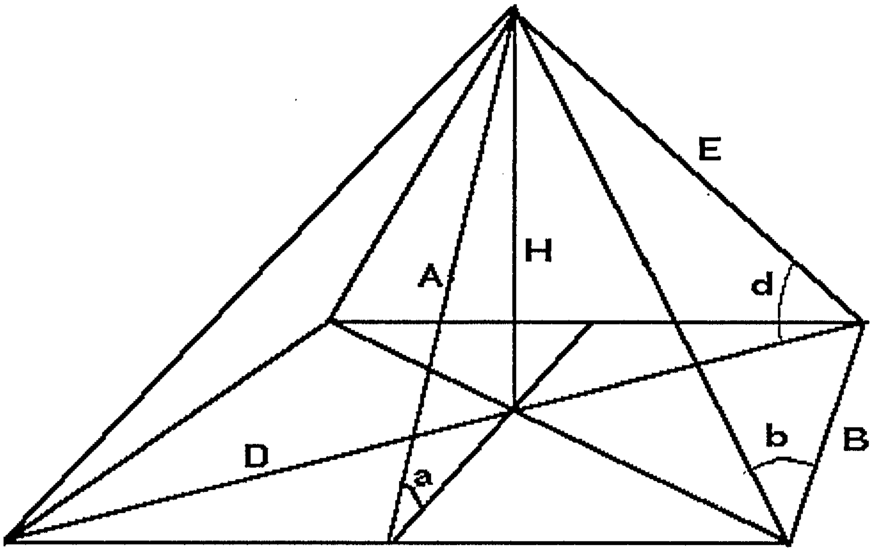
PYRAMIDS

PYRAMID ===>								
SYM	DEFINITION							
b	VALUE							
m	m=180-2b							
l	cot l = cos b							
f	f=180-2l							
e	$\sqrt{2}$tan e = tan b							
p	p=180-2e							
d	d=arccos(-cos^{2}b)							
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...


V
P
M
O
U
b
N


E
H
A
d
B
b
D
a

PYRAMIDOLOGY

PYRAMIDOLOGY

THE GEOMETRY OF PYRAMIDS

FILES
FORMS
GENERA INTRODUCTION

- BASIC GEOMETRY
  - Rhind Papyrus: Seked
  - Moscow Papyrus: Frustrum Formula
  - Limits
  - Tables

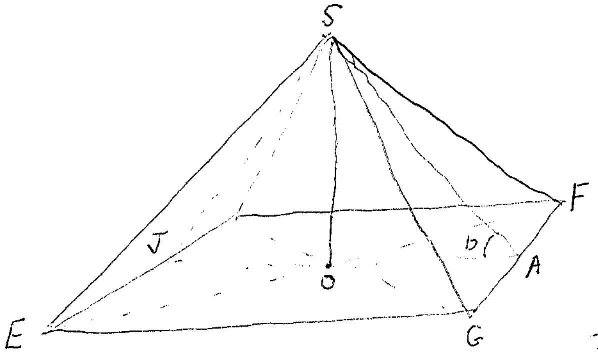
- Extrema
  - $\frac{V}{S} = \frac{Vol}{Area}$ max: B fixed, H fixed, A fixed, E fixed, fixed A → $\cos b = \varphi$
    - $\frac{V}{S}$ max AB fixed, HB fixed, EB fixed
- SHAPE INDICES
  - : $\frac{S^3}{V^2}$ Shape Indices fulcrum at 288 "obverse" pyramids
  - $\frac{P^2}{Area}$ Shape Indices
  - Min Ω total interior solid angle = Half Octahedron

- Families
  - H, A, E, D Ratios
  - Trig Fn = $N, \sqrt{N}, 1/N, 1/\sqrt{N}, \cdots$
  - Trig Fn = Trig Fn
  - Pyramids with 3 = angles (3)
  - Pyramids with 2 = angles (6)
  - Key Angles → $\boxed{6}$ positions

- MISCELLANEOUS
  - SHAPE + SCALE
  - "KABBALA"
  - SPIRALS
  - VARIATIONS on a theme of Herodotus
  - Hipparcus of Chios Problems
  - Historic Pyramids:
    - Egypt US Seal
    - Mexico
    - Ziggarats

BASIC GEOMETRY

THE 6 BASIC ANGLES



b = OAS = base ~~face~~ dihedral

m = ASJ = opposite face dihedral

l = AFS = edge - base

f = FSG = edge-adjacent edge

e = OFS = base-edge

p = ESF = edge-opposite edge

∃ a seventh angle d
the face-adjacent-face dihedral

8 BASIC ANGLES

add Face-Face dihedral $F = 180 - 2\alpha$

CODICES
SEED
MATHCAD 6.0

PYRAMID EQUATIONS PART I

This set of equations calculates the angles m, l, f, e, and p given base angle d = b.

$b := d$

$m := 180 - 2 \cdot b$

$$l := \frac{\operatorname{atan}\left(\frac{1}{\cos(b \cdot deg)}\right)}{deg}$$

$f := 180 - 2 \cdot l$

$$e := \frac{\operatorname{atan}\left(\frac{\tan(b \cdot deg)}{\sqrt{2}}\right)}{deg}$$

$p := 180 - 2 \cdot e$

Input d = b here

$d \equiv 51.8273$

$b = 51.8273$

$m = 76.3454$

$l = 58.2825$

$f = 63.4349$

$e = 41.9699$

$p = 96.0602$

PYRAMID EQUATIONS PART 2

$b1 := d$

$m := d$

$$b2 := \frac{180 - m}{2}$$

$l := d$

$$b3 := \frac{\mathrm{acos}\left(\frac{1}{\tan(l \cdot deg)}\right)}{deg}$$

$f := d$

$$g := \frac{180 - f}{2}$$

$$b4 := \frac{\mathrm{acos}\left(\frac{1}{\tan(g \cdot deg)}\right)}{deg}$$

$e := d$

$$b5 := \frac{\mathrm{atan}\left(\sqrt{2} \cdot \tan(e \cdot deg)\right)}{deg}$$

$p := d$

$$h := \frac{180 - p}{2}$$

$$b6 := \frac{\mathrm{atan}\left(\sqrt{2} \cdot \tan(h \cdot deg)\right)}{deg}$$

This set of equations evaluates the angle b when the input angle d is substituted for m, l, f, e, or p These values of b are labeled b2, b3, b4, b5, b6 respectively.

Enter the value of d here

$d \equiv 70.5287$

$b1 = 70.5287$

$b2 = 54.7357$

$b3 = 69.2951$

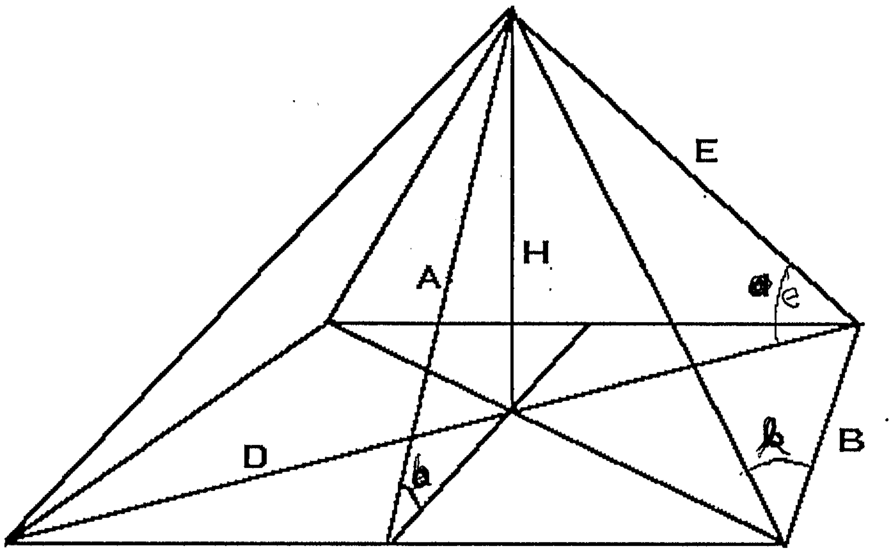
$b4 = 45.0001$

$b5 = 75.9637$

$b6 = 63.435$

GEOMETRIC PROPERTIES OF SQUARE PYRAMIDS

[1 parameter defines shape]



FACE TRIANGLE $f = 180 - 2l$

MERIDIAN TRIANGLE $m = 180 - 2b$

DIAGONAL TRIANGLE $p = 180 - 2e$

Equations:

$$\cot l = \frac{B}{2A} = \cos b$$

$$\sqrt{2} \cos l = \sqrt{2} \frac{B}{2} \frac{1}{E} = \cos e$$

$$A = \frac{B}{2 \cos b}$$

$$H = \frac{B}{2} \tan b$$

$$E = \frac{B}{2 \cos l}$$

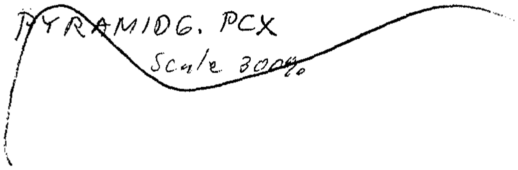
$$H = A \sin b$$

$$E = \frac{A}{\sin l}$$

$$\frac{H}{E} = \sin e = \sin b \sin l$$

$$\tan b = \frac{H}{B/2}, \quad \tan e = \frac{H}{\sqrt{2} B/2}$$

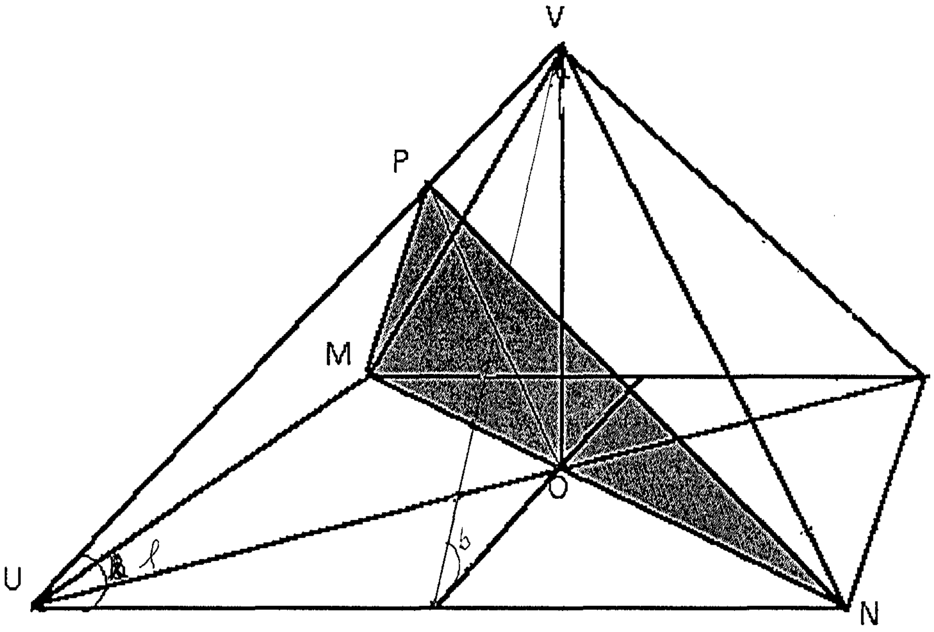
$$\sqrt{2} \tan e = \tan b$$



PYRAMIDG. PCX
Scale 300%

THE FACE-FACE DIHEDRAL ANGLE

UV ⊥ to OP



PASS PLANE MON INTERSECTING UV AT P, SUCH THAT THE PLANE IS ⊥ to UV. OP WILL THEN LIE IN THE PLANE MONP AND BE ⊥ to UV AND PON IS A RIGHT ANGLE

PROBLEM FIND THE FACE-FACE DIHEDRAL ANGLE NPM = g

$$PN = B \sin l, \quad ON = \frac{B}{\sqrt{2}}$$

$$\sin\left(\frac{g}{2}\right) = \frac{ON}{PN} = \frac{1}{\sqrt{2}\sin l}$$

but $\cot l = \cos b$ $\therefore$ $\sin l = \dfrac{1}{\operatorname{cosec} l} = \dfrac{1}{\sqrt{\operatorname{cosec}^2 l}} = \dfrac{1}{\sqrt{1+\cot^2 l}} = \dfrac{1}{\sqrt{1+\cos^2 b}}$

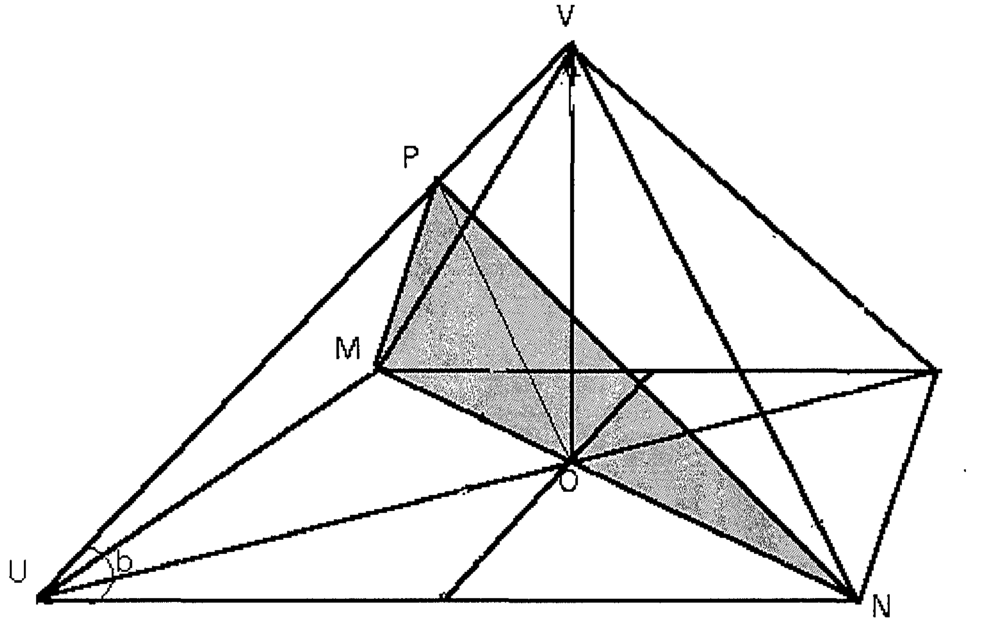
$\therefore$ $\sin\left(\frac{g}{2}\right) = \dfrac{\sqrt{1+\cos^2 b}}{\sqrt{2}}$, and $-\cos^2 b = 1 - 2\sin^2\left(\frac{g}{2}\right) = \cos g$

$$\therefore \cos g = -\cos^2 b$$

$\overline{\text{Solid Angle at V}}$

FIGURE 2

UV ⊥ to OP



Prove ⊥ to MN
at O goes
through P
⊥ to MN at O generate
the plane UOV
This plane ⊃ P

Let g be the angle MPN, where the plane MNP containing the diagonal intersects the edge UV at P, with UV perpendicular to MNP.
OP is perpendicular to MN and lies in plane MNP

Find the face-face dihedral angle g

$$PN = B \sin b \ , \quad ON = \frac{B}{\sqrt{2}}$$

a is the base-apothigm angle
= face-base dihedral

$$\sin\left(\frac{g}{2}\right) = \frac{ON}{PN} = \frac{1}{\sqrt{2}\ \sin b}$$

but $\tan b = \sec a$ or $\cot b = \cos a$ ∴ $\sin b = \frac{1}{\sqrt{1+\cos^2 a}}$

$$\therefore \ \sin\left(\frac{g}{2}\right) = \sqrt{\frac{1+\cos^2 a}{2}} \quad \text{and} \quad -\cos^2 a = 1 - 2\sin^2\left(\frac{g}{2}\right) = \cos g$$

$$\boxed{\cos(g) = -\cos^2 a}$$

The solid angle at the vertex V = Ω_V = $4g - 2\pi$ steradians
The solid angle at the base vertex N : $2a + g - \pi$ steradians

PYRAMIDS.PCX

I THE APEX SOLID ANGLE

Half-apex triangle

face angles are $g, \frac{g}{2}, \frac{g}{2}$

solid angle $= \frac{\text{Area}}{R^2}$ = Spherical Excess $= g + \frac{g}{2} + \frac{g}{2} - 180 = 2g - 180$

total $= \times 2 = 4g - 360$

$\cos(g) = -\cos^2 a$

$a = 51.^\circ 85$

$g = 112.^\circ 43$

Apex solid angle $= 89.^\circ 73 = 1.56608$ ster

$\doteq \frac{\pi}{2}$ steradians $= 1,5708$[illegible] ster

II A BASE VERTEX SOLID ANGLE

The 3 face angles are a, a, g

$E = 2a + g - 180$

$= 36.^\circ 13 \doteq \frac{\pi}{5}$ ster

THE TOTAL INTERIOR SOLID ANGLE

$I + 4 \cdot II$

$\mathcal{T} = 4g - 360 + 8a + 4g - 4 \cdot 180$

$= 8(g + a) - 6 \cdot 180 = 234.^\circ 25$

$\mathcal{T} = 234.^\circ 25$ sp deg

4.08843 ster

$\frac{\pi}{2} + \frac{4\pi}{5} = \pi\left(\frac{13}{10}\right)$

$= 4.084$ ster

what about Pyramids with $\mathcal{T} = 4.000$ ster ?

$= 8(a+g) - 6\pi = 4$

solve $\begin{cases} a + g = \frac{4 + 6\pi}{8} \\ \cos g = -\cos^2 a \end{cases}$ $\left[\exists \text{ another eq. } \sin a = \sqrt{2}\cos\left(\frac{g}{2}\right)\right]$

$\cos\left(\frac{4+6\pi}{8} - a\right) = -\cos^2 a$

$\cos(135.5 - a) = -\cos^2 a$ (a in degrees)

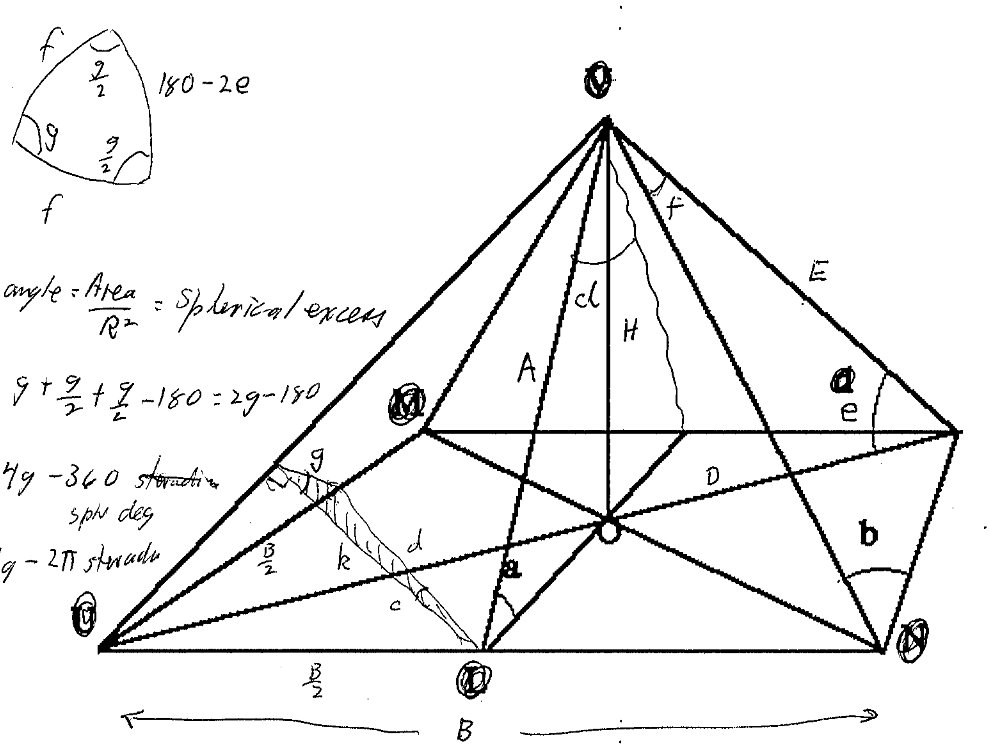
$X^2(X^2 + 2MX + 1) = N^2$

$X = \cos a$

$M = \cos(135.^\circ 5) = -0,7$[illegible]$905$

$N = \sin(135.^\circ 9) = 0,700909$

$\frac{W}{2}$ spherical triangle



Solid angle = $\frac{\text{Area}}{R^2}$ = Spherical excess

$\frac{W}{2} = g + \frac{g}{2} + \frac{g}{2} - 180 = 2g - 180$

W = 4g − 360 ~~steradian~~ sph deg

= 4g − 2π steradian

W
g
c

$V = \frac{1}{3} B^2 H = \frac{H}{3}$

$S = \frac{4AB}{2} + B^2$

$= 2A + 1$

$\frac{V}{S} = \frac{H}{3(2A+1)}$

B = 1 $D = \sqrt{2}$

No.	Pyramid Name	A	H	E	a	b	f	e	g	[illegible]	W
		a	b	e	~~A~~	~~A~~	~~4H~~	E	g	W	

$\tan a = \frac{2H}{B}$ $\sin a = \frac{H}{A}$ $\cos a = \frac{B}{2A}$

$\tan b = \frac{2A}{B}$ $\sin b = \frac{A}{E}$ $\cos b = \frac{B}{2E}$

$\tan e = \frac{2H}{D}$ $\sin e = \frac{H}{E}$ $\cos e = \frac{D}{2E}$

$\cot b = \cos a$

$\tan b = \sec a$

$\tan a = \sqrt{2} \tan e$

$b + \frac{f}{2} = 90$, $f = 180 - 2b$

$c = \frac{1}{2}(180 - g)$

$g = 180 - 2c$

$\sin\left(\frac{g}{2}\right) = \frac{E}{\sqrt{2} A}$

$D = \sqrt{2} B$

$d \cos 45 = \frac{B}{2}$

$d = \frac{B}{\sqrt{2}} = \frac{B}{2}\sqrt{2}$

$\frac{B}{2} \sin b = k$

$k \cos c = \frac{d}{2}$

$\boxed{\cos g = -\cos^2 a}$

$\sin b = \frac{1}{\sqrt{1+\cos^2 a}}$

$\sin\left(\frac{g}{2}\right) = \sqrt{\frac{1+\cos^2 a}{2}}$

$\sin \frac{g}{2} = \cos c = \frac{1}{\sqrt{2} \sin b} = \frac{E}{\sqrt{2} A}$ $\frac{B}{2} \sin b \cos c = \frac{B}{2\sqrt{2}}$

P[illegible]ABLE, WBI

PYRTABLE, WBI

O[illegible]1/93

PYRAMID TABLE

BASE = 1 in all pyramid

Definition

PYRAMID NAME	a 736	b	e f	g	W	A	E	H	Ø
HALF OCTAHEDRON	54.~~785~~	▨ 60.000	60.000	109.471	77.885	0.867	1.000	0.708	
GREAT PYRAMID	▨ 51.854	58.300	63.400	112.423	89.693	0.809	0.952	~~0.393~~	.636
OCTANT PYRAMID	51.785	58.258	63.483	112.500	▨ 90.000	0.808	0.950	~~0.394~~	.635

shaded cell is ~~input~~ definition

Note the n

FORMULAS

$\cos(a) = \cot(b)$

TAN(b) = SEC(a)

COS(g) = -COS^2(a)

W = 4g - 2PI

f = 180 - 2b

A = 1/(2COS(a))

E = 1/(2COS(b))

H = ~~1/(2TAN(a)~~) = A sin(a) stet

$D = \sqrt{2}$

$\sin(b) = \frac{\sqrt{2}}{2\cos(c)}$

$E \sin(e) = H$

$\tan(e) = \frac{1}{\sqrt{2}\tan(a)}$

$\tan(e) = \sqrt{2} A \sin(a)$

$\tan(e) = \sqrt{2} H$

V

a = face-base dihedral angle → β

b = edge-base angle → ℓ

f = face angle at apex

γ

W = Solid angle at apex

e = edge-diagonal angle

g = face-face dihedral angle

A = apothem

B = base = 1

E = edge

H = height

D = diagonal = $\sqrt{2}$

C : ~~180~~ diagonal-normal angle = $\frac{1}{2}(180-g)$

V: VOLUME : H/3

S : SURFACE = 4 Faces + Base = 2A + 1

F : Area of Face = A/2

$R = \frac{V}{S} = \frac{H}{3(2A+1)}$

A better table

Forget A, H, E

use sines, tan, cos ...

of angles

THE OBLATENESS OF THE EARTH CAUSES ROTATION OF THE LINE OF APSIDES OF ARTIFICIAL SATELLITES. A SATELLITE WITH AN ORBITAL INCLINATION OF 63°.4349 WILL HAVE ω = 0

i.e. its line of apsides will be stationary

9/11/08

Note ω = 0 angle of 63°.4349

and Gt. Pyr. apex of 63°.4000

δ = 2′6″ arc

of φ pyramid

apex = 63.4349

PYRTABL2.WB1

length or scale
unit of B = 1   D = √2

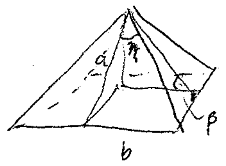
PYRAMID TABLE

B = 1 Always

PYRAMID	DEFINITION	deg a	deg b	deg f	deg e	deg g	sph deg W	A	E	H
HALF OCTAHEDRON	b = 60 deg	54.78500	60.00000	60.00000	57.40068	109.42185	77.68741	0.86708	1.00000	0.70840
GREAT PYRAMID	measurement	51.85400	58.29772	63.40455	51.58437	112.42744	89.70976	0.80950	0.95146	0.63662
OCTANT PYRAMID	W = PI/2 steradians	51.78500	58.25848	63.48304	51.45668	112.50000	90.00000	0.80826	0.95041	0.63504
B:H :: PI:2	a = ARCTAN(4/PI)	51.85397	58.29771	63.40458	51.58433	112.42747	89.70987	0.80950	0.95146	0.63662

07/10/94

SOME SQUARE PYRAMID PROPERTIES



If $\eta = \frac{2}{3}$ rad

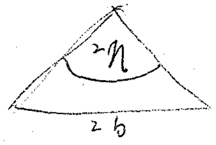
$\beta = 0.6651$ rad

$\delta = .0015$

$2\eta = \frac{4}{3}$ rad $= 76^\circ.34$

$2\eta = 2\beta$

$\eta = \beta = 38^\circ.173$



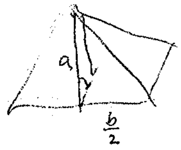
If $2\eta = 57^\circ.065$

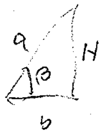
$\beta = 57^\circ.065$

1 rad $= 57^\circ.29578$

$\frac{2}{3}$ rad $= 38.197$

$\frac{4}{3} \times 38.173 = 50.9$





$\tan\eta = \frac{b}{2a}$

$\cos\beta = \frac{b}{2a}$

$$\boxed{\tan\eta = \cos\beta}$$

$\frac{9}{10} \times \frac{180}{\pi} = \frac{9.18}{\pi} = \frac{2.9^2}{\pi}$

$= 51^\circ.566202$

$\frac{8}{9}$ rad $= 50^\circ.92958$

$\frac{9}{10}$ rad $= 51^\circ.566$

$\frac{10}{11}$ rad $= 52.087$

$16'.6833$

errors

1 rad $= 57^\circ.29$

1 deg $= 0.0174533$ rad

$1' = 0.0002909$ rad

∴ in 1000 ft.

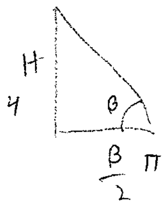
an error of 1' arc $= 0.29$ ft.

$= 3.49''$

1.75

1.5' arc. $5.23''$

or $.523''$ in 100'



$\frac{B}{2H} = \cot\beta = \frac{\pi}{2}$

$\tan\beta = \frac{\cancel{H}}{\cancel{\pi}} = \frac{2H}{B}$

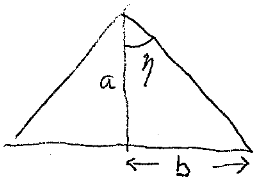
$\frac{B}{H} = \frac{\pi}{2}$

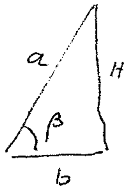
360
60
21600
5400

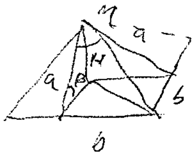
90
60
5400

Given: 2η

Find: slope angle β







$a = b \cot \eta$

$\frac{b}{a} = \tan \eta$

$\frac{b}{a} = \cos\beta = \tan \eta$

$\boxed{\cos\beta = \tan \eta}$

if $\eta > 45°$, $b > a$

n	2η	η	β
4	90°	~~90~~45°	0°
5	108°	54°	
6	120°	60°	
7	128.57°	64.28°	
8	135°	67.5°	
9	140°	70°	
10	144°	72°	
11			
12	150	75°	

no solutions

$2\beta = 2\eta$

$\beta = \eta$

38.62 38

38.36 38.1

38.10 38.2

38.23 38.15

.15 .18

.179 .17

.167 .175

.169 .174

$\frac{360}{8} = 45$

.175 .172

.172 .173

$\boxed{\text{If } 2\eta = 57.065° \quad \beta = 57.064785°}$

$\boxed{1 \text{ rad} = 57.29578°}$

$\boxed{\text{If } \eta = 38.173 \quad \beta = 38.172}$

$2\beta = 2\eta = 76.34°$

1.33 rad

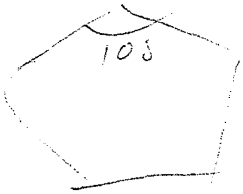
$\boxed{\beta = 2\eta}$

$\boxed{1\frac{1}{3} \text{ rad}}$ very close

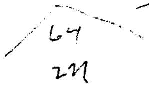
$\boxed{\eta = \frac{2}{3} \text{ rad} \quad \beta = 0.6651 \text{ rad}}$

$\beta = 60$ $\eta = 26.56$

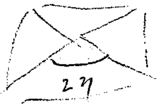
$2\eta = 53.13$



$\frac{360°}{64} = 5\frac{5}{8} = \frac{45}{8}$



$\rightarrow \beta = 51.33$



			2η	β
4	90	45	55	58.6
	60	30	56	57.9
			57	57.11
	54	27	57.10	57.03
			57.08	57.05
			57.07	57.06
			57.065	57.064785

$\frac{360}{8} = 45°$ $180 - 45 = 135$

180

36

144

$\frac{360}{7} = 51.43$

$$\begin{array}{r} 180 \\ 51.43 \\ \hline 128.57 \end{array}$$

$5 \overline{)360}$

72

36

30

$\frac{360}{11} = 32.727$

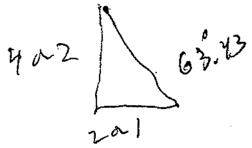
	2η	η	β
9	80	40	32.95
10	72	36	43.40
11	65.46	32.73	50.004
12	60	30	54.74

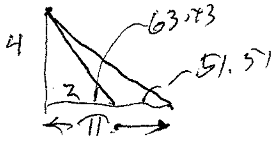
n	2η	η	β
~~3~~	~~120~~	~~60~~	
4	90	45	0
5	72	36	43.40°
6	60	30	54.74
7	51.43	25.72 ~	61.20
8	45	22.5	65.53
9	40	20	68.65
10	36	18	
11	32.73	16.37	
12	30	15	

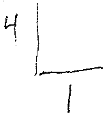
$\frac{B}{H} = \frac{\pi}{2}$
arccos(φ)

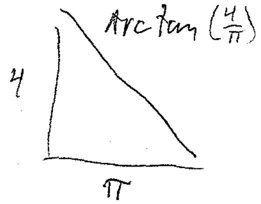
Rolling Drum Arctan $\frac{4}{\pi} = 51.854$
arc sin $\frac{\pi}{4}$

vertical	horizontal			
v	h	$\frac{v}{h}$	β	
1	4	$\frac{1}{4}$	14°.036	
2	4	$\frac{1}{2}$	26.57	
3	4	$\frac{3}{4}$	36.87	
4	4	1	45	
5	4	$\frac{5}{4}$	51.340192	= 51° 20′ 24″.69
6	4	$\frac{3}{2}$	56.31	
7	4	$\frac{7}{4}$	60.255	~ half octahedron
8	4	2	63.43	
9	4	$\frac{9}{4}$	66.0375..	





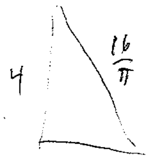




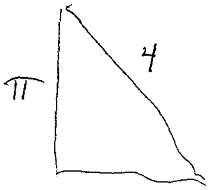
1 rad = 57.29578

v	h	$\frac{v}{h}$	$\beta = \arctan \frac{v}{h}$	
1	π	0.3183	17°.66	
2	π	0.6366	32.48	
3	π	0.9549	43.68	DRUM = 51° 51′ 14″.3064
4	π	1.2732395	51.853973	
5	π	1.5915	57.858093	
6	π		62.3635	

4	3	2π	25°.52
4.5	5	2π	38.51
4.$\frac{5}{3}$	7	2π	48.09
$\frac{13}{3}$	9	2π	55.08



3.1524947

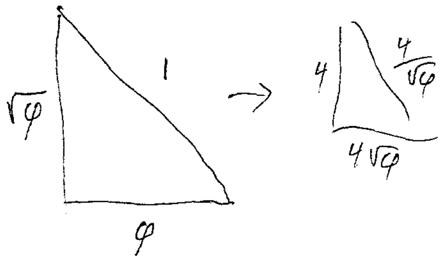


ARC SIN ($\frac{\pi}{4}$) = 51.757517

$\boxed{51° 45′ 27″.0612}$

$\sqrt{1-\varphi^2} = \sqrt{\varphi}$

$4\sqrt{\varphi} = 3.1446055$
$\pi = 3.1415927$
$4\sqrt{1-\frac{16}{\pi^2}} = 3.1524947$



Arccos(φ) = 51.827292

$\boxed{51° 49′ 38″.2476}$

Of all the rhythms of the earth the cycle of the year is the one most related to renewal and transformation. This in part because of the variety and richness of its temporal components and in part because we can experience many repetitions in a lifetime. But besides renewal and transformation, the Journey of the Year ~~has~~ serves ~~performs~~ many functions.

The Journey of the Year is a framework that links the ~~many~~ mythic symbols and stories of the many peoples of the Earth. When we recognize how much of ~~our~~ a culture derives from the common experience of the rhythms of the earth, we begin to perceive the ties that link our different heritages The Journey of the Year gives each culture a ground on which to organize and integrate its social order. The festivals and celebrations that arise from the experience of the seasons give meaning and guidance to human activity. It is in this sense that a people's view of time lies at the base of their religion, ~~culture~~, and social order! Further, our celebrations and anniversaries afford ~~the~~ a perspective of our diversities ~~which~~ that shows them to be but facets of some greater journey on which we are all are embarked. And as we discover the deeper meaning of this journey, we learn that our differences are both important and necessary. They do not divide us, they facilitate and enrich us. The Journey of the Year is thus an affirmation of the truth of each tradition. While all of us have a special affection for the tradition in which we were raised, and emphasize with its particular interpretations, we can learn from the Journey of the Year confidently to appreciate and share all heritages without seeking to proselytize or homogenize. Thus in the framework provided by the journey of the year, by juxtaposing our many heritages together with their contrasts and commonalities we can begin to see who we really are.

empathize

Second, the Journey of the Year is a mediator. It mediates sky and earth, integrating the cycles of the Heavens and the rhythms of the Earth. It links the worlds of spirit and matter. And through unchanging repetition of changing seasons mediates the changeless and the changing, creating the ground which renders all change visible.

Third, the Journey of the Year is a meditation awakening us to the existence of our greater journey. It makes us aware of the relationship binding us with the Earth. It helps us to understand the power of life implicit in its varied seasons. And by living in accord with the prescriptions of each season, the cycle of the year can transport us to a higher place with each successive turning. When the spiritual meaning of the yearly cycle is grasped, and its seasons duly honored, the year becomes a perpetual sacrament enabling the healing and transforming of both ourselves and the Earth. But unless we assimilate its processes, the opportunity is lost and the wheel merely turns.

not only

but also

v	h	β			
2	3π	11.°98			
3		17.66			
4		22.997			
5		27.95			
6		32.48			
7		36.60			
8		40.32			
9		43.68			
10		46.696			
11		49.41			
12	3π	51.853974	~	4	π
15	4π	50.045			
16	4π	51.853974			
20	5π	50.418 51.8539			
21	5π	53.20			
25	6π	52.98			

related to renewal and transformation and variety when young Alters repetition

But Of all the rhythms of the earth the cycle of the year is the one that most ~~enables us to transform our~~ lives. This is because of the richness of its parts and the fact that we may experience many ~~cycles~~ times in a lifetime. At first we for experience the cycle's patterns and moods, then as we can we tune to them and participate in them, and finally, ~~allow~~ their power to enter into us.

if we ~~persist~~ holdfast begin

We find ~~the~~ Journey of ~~this~~ Year to be many things:

First, the Journey of the Year is a schema that links the mythic symbols and stories of the peoples of the Earth. We begin to understand the ties between our diverse heritages when we recognize how much of our cultures derive from the common experience of the rhythms of the earth. The Journey of the Year gives each culture a ground on which to organize and integrate its social order. The festivals and celebrations that arise from the experience of the seasons give meaning and guidance to human activity. It is in this sense that a people's view of time lies at the base of their religion, culture, and social order. Further, our celebrations and anniversaries afford a perspective of our diversities which shows them to be but facets of the same great journey on which the Earth and all its children are embarked. And as we discover the deeper meanings of this journey, we learn that our differences are both important and necessary. They do not divide us, rather they facilitate and enrich us. The Journey of the Year is thus an affirmation of the truth of our own tradition and simultaneously an affirmation of the truth of other traditions. While each of us will have a special affection for the tradition in which we were raised, and will emphasize its particular interpretations, we can confidently share our heritages without proselyting or seeking to homogenize. Thus in the framework provided by the journey of the year, by juxtaposing our many heritages complete with their contrasts and commonalities we can begin to see who we really are.

Second, the Journey of the Year is a mediator. It mediates sky and earth, integrating the cycles of the Heavens and the rhythms of the Earth. It links the worlds of spirit and matter. And through unchanging repetition of changing seasons mediates the changeless and the changing. It creates the changeless ground which renders change visible.

Third, the Journey of the Year is a meditation awakening us to the existence of our greater journey. It makes us aware of the relationship binding us with the Earth. It helps us to understand the power of life implicit in its varied seasons. And by living in accord with the prescriptions of each season, the cycle of the year can transport us to a higher place with each of its successive turnings. When the spiritual meaning of the yearly cycle is grasped, and its seasons duly honored, the year becomes a continuing sacrament enabling the healing and transforming of ourselves and the Earth. But unless we assimilate its processes, the opportunity is lost and the wheel merely turns.

LIMITING VALUES

	FLAT(=)	SHARP
	$W \leq 360°$	$W > 0$
	$d \leq 180°$	$d > 90$
	$b \geq 0$	$b < 90$
	$m \leq 180$	$m > 0$
	$l \geq 45°$	$l < 90$
	$f \leq 90°$	$f > 0$
	$e \geq 0$	$e < 90$
	$p \leq 180$	$p > 0$
$b=1$	$A \geq 0.5$	$A > H$
	$H \geq 0$	$H < \infty$
	$E \geq \frac{1}{\sqrt{2}} = 0.707$	$E > A$

4 pyramids

φ Pyramid Family based on A, E, H

B = 1

MER ✓

PYRAMIDS

same

FACE ✓

DIAG

PYRAMID ===>		φ Pyr		↓		impossible		
SYM	FORMULA	$b = \cos^{-1}\varphi$ ~~51,8273~~		$b = \cos^{-1}\sqrt{\varphi}$	$b = \cos^{-1}\sqrt{\varphi}$	could be empty	↓	
b	VALUE	51,8273	58.2825	38.1727	38.1727		60.9306	62.2677
m	m=180-2b	76,3464	63,4349	103.6545	= 2l 103,6545		58.1387	55,4626
l	l=arccot(cosb)	58.2825	62,2677	51.8273	51.8273	38.1727	64.0864	65.0465
f	f=180-2l	63.4349	55.4646	76.3451	= 2b 76.3454	103.6545	stet ~~51.8273~~	49.9090
e	e=arccos(√2cosl)	41.9699	48.8455	29.0694	29.0694		51.8273	53.3608
p	p=180-2e	96.0603	82.3091	121.8612	121.8612		76.3454	73.2613
A	A=1/(2cosb)	0.8090	0.9511	0.6360	0.6360		1.0291	1.0748
H	H=(tanb)/2	0,6360	0,8090	0.3931	0,3931		0.8994	0.9511
E	E=1/(2cosl)	0,9511	1.0745	0,8090	0,8090	0.6360	1.1441	1.1857
d	d=arccos(-cos²b)	112.4550	108.0456	128.1727	128.1727		$= 2\cos^{-1}\varphi$ 103.6546	102.5060
W	W=4d-360 sph deg	89,8226	64.1803	152.6909	= 4b = 2f 152.6909		54.6183	50.0240
δb'	Difference in min arc							

d-b = 90° d-b = 90° d = m

All angle values are given in degrees and decimal fractions of a degree
The values for A, H, and E are derived assuming the length of the base B to be unity.
The symbol ϕ represents the golden ratio = 0.618034...

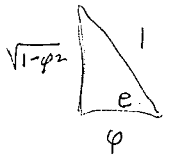
$\sin e = \sin b \sin l$, $\cos e = \sqrt{2} \cos b \sin l$

$\sqrt{2} \tan e = \tan b$

$e = \cos^{-1}\varphi$

$\tan e = \frac{\sqrt{1-\varphi^2}}{\varphi}$

$\tan b = \frac{\sqrt{2(1-\varphi^2)}}{\varphi}$



EXTREMA

Extrema Pyramids

Max $\frac{V}{S}$	$b = 51.827292$	$\cos b = \varphi$	A fixed	$2H^2 = AB$ $H^2 = \frac{AB}{2}$
Min $\frac{S^3}{V^3}$	$b = 70.5288$	$S^3/V^3 = 288 = 8 \times 36$		
Min Ω	$b = 54.7356$	$= 233.65464761$ sp deg		$\sim \frac{1}{2}$ octahedron
Min APS=0	$b = 63.4349$			
Max $\frac{V}{S}$	$b = 57.0650$	$\sin^2 e = \cos b$ $\left(\frac{H}{E}\right)^2 = \frac{B}{2A}$	E fixed also $b = f$	$2AH^2 = BE^2$ $H^2 = \frac{BE^2}{2A}$

OPERATIONS

Families	Groups	Clans	Obversion	Conversion
per $M \leftrightarrow E$	per $M \leftrightarrow F$	per $E \leftrightarrow F$	$V \leftrightarrow b$	$\alpha_i \longleftrightarrow \alpha_j$

inversion
about fulcrums
e.g. tetrahedra
above extremes

$\cos \varphi \longleftrightarrow$ APS bridge 63.4349

$\exists$? bridge for E fixed pyr?

X-Mailer: Netcomplete v4.0, from NETCOM On-Line Communications, Inc.
MIME-Version: 1.0
Content-Type: text/plain; charset=us-ascii

maximization of $\frac{V}{S}$ → 51°49'38"

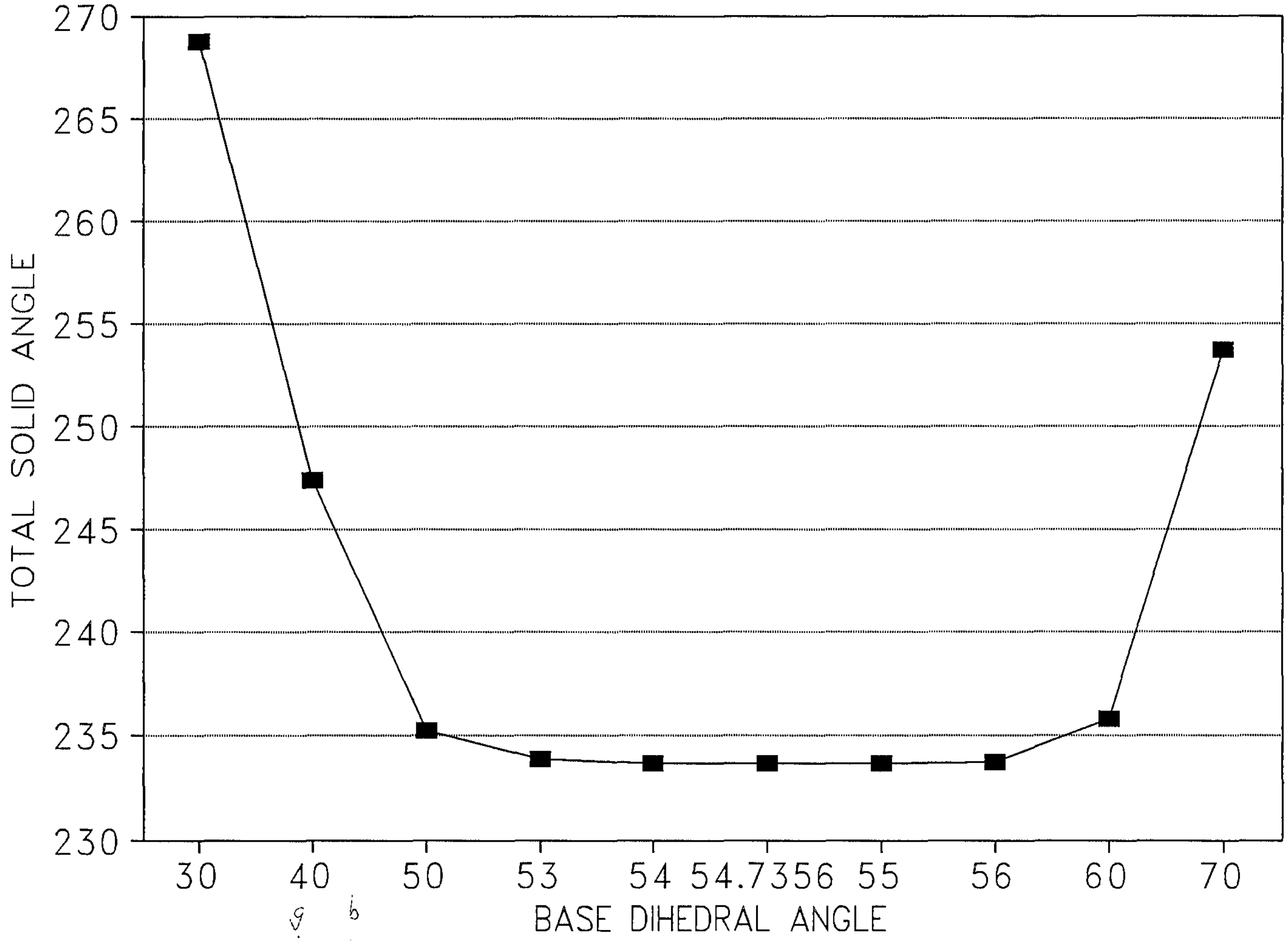
minimization of $8(\theta+\alpha)-6\pi$, the total solid angle of a pyramid → 54°.7356 or a half octahedron

or

$8(g+b)-6\pi$

THIS PAGE DOES not ~~explain~~ why minimum ~~with other solid angle calculations~~

TOTAL SOLID ANGLE



[illegible] this

$\Sigma\omega = 8(\theta+\alpha)-6\pi$ = Total Solid Angle for a square pyramid

where $\sin\alpha = \sqrt{2}\cos(\frac{\theta}{2})$

→ ∃ a minimum of $\Sigma\omega$ at $\alpha = 54°.7356$

for which $\Sigma\omega = 233°.65464761$ spherical degrees ✓

or

4.078042913 5 steradians. $= 1.298081375 6\pi$

if $\alpha = 137.3045$

$\Sigma\omega = 1000°.00..$

Note that 54°.7356 is the face-base dihedral for a pyramid with equilateral triangular faces, i.e. half an octahedron

Solid Angles

g = face - face dihedral angle
b = face - base dihedral angle

$\omega = (a + B + C - \pi)$

a, B, C dihedrals

Vertex solid angle

$$2\{ \frac{g}{2} + \frac{g}{2} + g - \pi) = 4g - 2\pi$$

Each corner solid angle ×4

$$4\{ g + 2b - \pi \} = 4g + 8b - 4\pi$$

$$\boxed{\text{total} = \Omega = 8g + 8b - 6\pi}$$

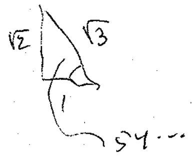
$\cos g = -\cos^2 b$

$\cos x = \cos^2\frac{x}{2} - \sin^2\frac{x}{2} = 2\cos^2\frac{x}{2} - 1$

$1 + \cos g = \sin^2 b$

$\sin b = \sqrt{1 + \cos g}$ but $\sqrt{1+\cos x} = \sqrt{2}\cos\frac{x}{2}$

$\sin b = \sqrt{2}\cos(\frac{g}{2})$ ✓



Octahedron

$\tan 54 = \sqrt{2}$
$\cos 54 = \frac{1}{\sqrt{3}}$

$b = 54^\circ.73561$ $\cos^2 b = \frac{1}{3}$ $g = 109.47122$

$\frac{g}{2} = 54.73561$ ∴ $g = 2b$

$\Omega = 24b - 6\pi$

$1313.6546 - 1080 = 233.6546$ ✓ sp deg   [illegible]

~~How to show this is a minimum~~

~~$\Omega = 8\cos^{-1}(\cos^2 b) + 8b - 6\pi$~~

~~$F = \frac{-\Omega + 6\pi}{8} = b + \cos^{-1}(\cos^2 b)$~~   ~~$\frac{d}{dx}\cos^{-1}(x) = \frac{-1}{\sqrt{1-x^2}}$~~

~~$\frac{dF}{db} = 1 + \frac{1}{\sqrt{1-\cos^4 b}} 2\cos b \sin b = 1 + \frac{2\cos b}{\sqrt{1+\cos^2 b}} = 0$~~

~~$1 + \frac{2\cos b \sin b}{\sqrt{(1-\cos^2 b)(1+\cos^2 b)}}$~~   ~~$\cos b = -\frac{1}{2}$~~   ~~$\sqrt{1+\cos^2 b} = 1 + 2\cos b$~~

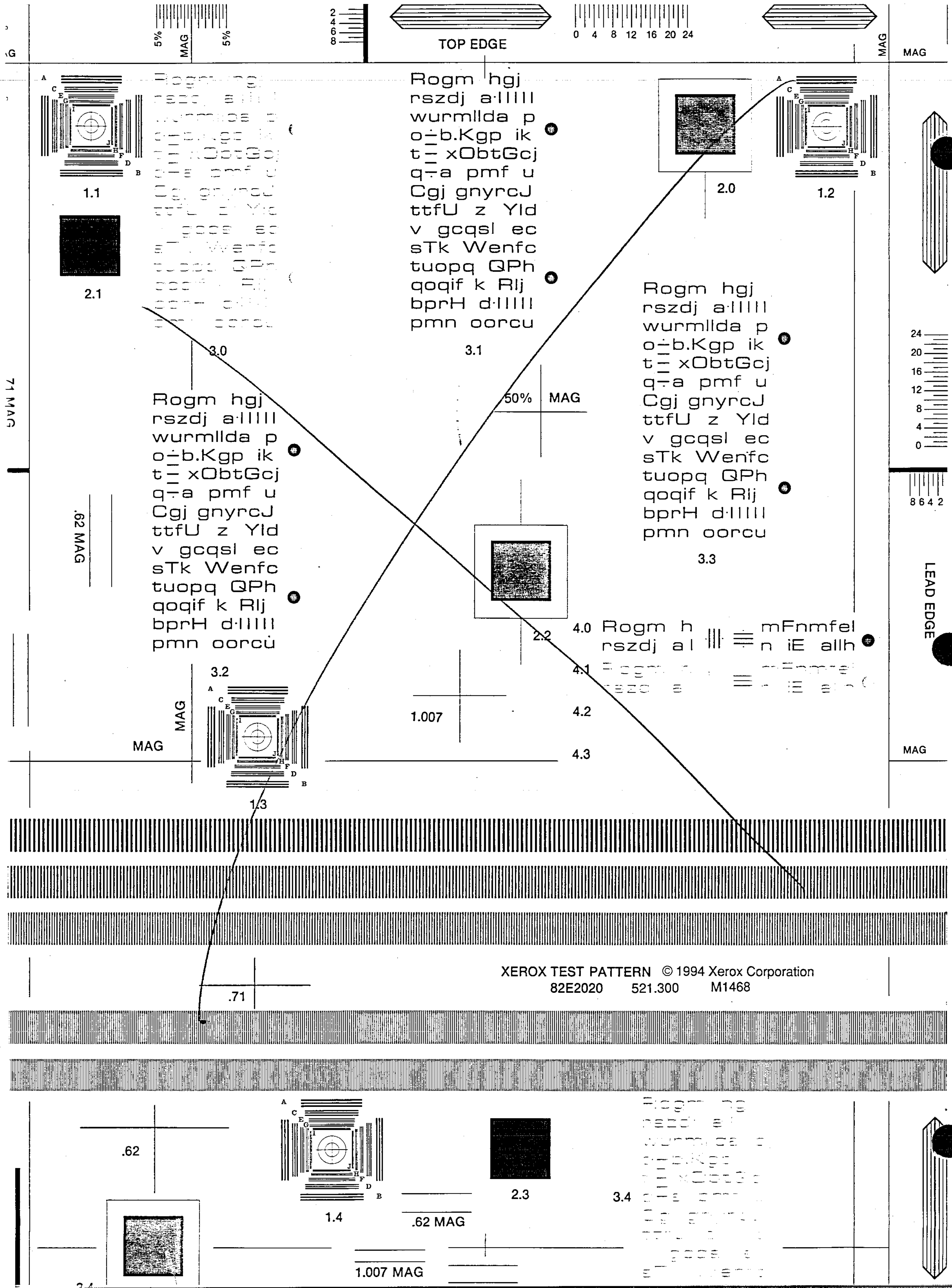
~~$1 + \frac{2\cos b}{\sqrt{1+\cos^2 b}} = 0$~~   ~~$b = 120^\circ$~~   ~~$1 + u^2 = 1 + 4u + 4u^2$~~

~~$4u + 3u^2 = 0$~~

~~$2\cos b = -\sqrt{1+\cos^2 b}$~~   ~~$u = -\frac{4}{3}$~~   ~~$u = 0$~~   ~~$u = 90^\circ$~~

~~$4\cos^2 b = +(1+\cos^2 b)$~~   ~~$b = 45^\circ$~~   ~~$3u = -4$~~

~~$\cos^2 b = \frac{1}{2}$~~   ~~$\cos b = \frac{1}{\sqrt{2}}$~~



Rogm hgj
rszdj a·lllll
wurmllda p
o÷b.Kgp ik
t= xObtGcj
q÷a pmf u
Cgj gnyrcJ
ttfU z Yld
v gcqsl ec
sTk Wenfc
tuopq QPh
qoqif k Rlj
bprH d·lllll
pmn oorcu

Rogm h mFnmfel
rszdj a l n iE allh

XEROX TEST PATTERN © 1994 Xerox Corporation
82E2020 521.300 M1468

Find the minimum of

$$\Omega = 8b + 8g - 6\pi \quad , \qquad \cos g = -\cos^2 b$$

$$f(b) = b + g = b + \cos^{-1}(-\cos^2 b) \qquad\qquad \frac{d\cos^{-1}(x)}{dx} = -\frac{1}{\sqrt{1-x^2}}$$

$$\frac{df}{db} = 1 \cancel{+} - \frac{2\cos b \sin b}{\sqrt{1-\cancel{\cos}\cos^4 b}} = 0$$

$$\cancel{\sqrt{}}1-\cos^4 b = 4\cos^2 b \sin^2 b = 4(\cos^2 b - \cos^4 b)$$

$$1 - u^4 = 4u^2 - 4u^4$$

$$3u^4 - 4u^2 + 1 = 0$$

$$u^2 = \frac{4 \pm \sqrt{16-12}}{6} = \frac{4+2}{6} , \frac{4-2}{6}$$

$$\cos b = u = 1, \frac{1}{\sqrt{3}}$$

$$\cos b = 1, \quad b = 0^{\circ}$$

$$\cos b = \frac{1}{\sqrt{3}} , \quad b = 54^{\circ}.73561$$

$$\cos^2 b = \frac{1}{3}$$

$$g = 109^{\circ}.47122$$

$$= 2b$$

Octahedron

Subj: **Trip to PA**
Date: 2/25/1999 1:01:54 PM Pacific Standard Time
From: nrinker@ix.netcom.com
To: alw1871@aol.com

Hello Dad,

I have made our reservations and they are as follows:

Flying United:
Saturday March 27, leaving Oakland 10:00am, arriving Pittsburg 7:08pm.
Saturday April 3, leaving Pittsburg 1:40pm, arriving Oakland 6:12pm.

Please let us know what your plans will be.

Have you heard from Art? I hope they are all planning to come. It would be nice to see everyone.

Charles Henry is going to be in PA too. He is going to surprise Rindy. He informed Kirk of his plans. He is arriving in Pittsburg at noon, Friday, April 2nd. He leaves Pittsburg Sunday, April 4th at 5:35pm.

Rindy said she can put you up at her place. She has a three story house. You can be on the second or third floor. The third would be completely private. We plan to stay with her on Saturday and Sunday nights when we first arrive because the Bed and Breakfast place will not be available until Monday. Then we will stay at the B and B the rest of the time.

Let me know what you want to do and I'll pass it on to Rindy. I'll call her after I hear from you.

I hope you are doing well. We look forward to seeing you soon.

Love,

Nan

———————— Headers ————————
Return-Path: <nrinker@ix.netcom.com>
Received: from rly-yc03.mx.aol.com (rly-yc03.mail.aol.com [172.18.149.35]) by air-yc05.mail.aol.com (v56.26) with SMTP; Thu, 25 Feb 1999 16:01:54 -0500
Received: from dfw-ix16.ix.netcom.com (dfw-ix16.ix.netcom.com [206.214.98.16])
by rly-yc03.mx.aol.com (8.8.8/8.8.5/AOL-4.0.0)
with ESMTP id QAA20059 for <alw1871@aol.com>;
Thu, 25 Feb 1999 16:01:49 -0500 (EST)
From: nrinker@ix.netcom.com
Received: (from smap@localhost)
by dfw-ix16.ix.netcom.com (8.8.4/8.8.4)
id PAA10426 for alw1871@aol.com; Thu, 25 Feb 1999 15:01:38 -0600 (CST)
Date: Thu, 25 Feb 1999 15:01:38 -0600 (CST)
Received: from sji-ca6-20.ix.netcom.com(205.186.213.20) by dfw-ix16.ix.netcom.com via smap (V1.3)
id rma010339; Thu Feb 25 15:01:16 1999
To: alw1871@aol.com
Message-Id: <1999225125044456334@ix.netcom.com>
Subject: Trip to PA

4 Extrema

SQUARE BASE PYRAMIDS

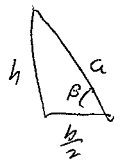
$$V = \frac{1}{3} b^2 h$$

$$S = b^2 + 4\frac{ab}{2} = b^2 + 2ab$$

$h = \frac{b}{2}\tan\beta$

$h = a\sin\beta$

$\frac{b}{2} = a\cos\beta$



$h = e\sin\gamma$

$\frac{b}{\sqrt{2}} = e\cos\gamma$

$a = \sqrt{e^2 - \left(\frac{b}{2}\right)^2}$

4 Cases: b = constant, h = constant, a = constant, e = constant

CASE B b = constant

$$V = \frac{1}{3}\frac{b^3}{2}\tan\beta = \frac{b^3}{6}\tan\beta$$

$$S = \cancel{4a^2\cos\beta}\ b^2 + 2b\frac{b}{2}\frac{1}{\cos\beta} = b^2\left(\frac{1}{\cos\beta} + 1\right)$$

$$\frac{V}{S} = \frac{b}{6}\frac{\tan\beta \cdot \cos\beta}{1+\cos\beta} = \frac{b}{6}\frac{\sin\beta}{1+\cos\beta}$$

$\beta \to 0, \quad \frac{V}{S} \to 0$ min

$\beta \to 90, \quad \frac{V}{S} \to \frac{b}{6}$ max

ALL SQUARE BASE PYRAMIDS BELONG TO A ~~ONE~~ TWO PARAMETER FAMILY. THE FIRST PARAMETER IS A SHAPE PARAMETER. THE SECOND IS A SCALE PARAMETER THE SHAPE PARAMETER MAY BE H:B, E:H A:B, ∠β

Units are immaterial unless comparisons are to be made to other objects th the scale parameter (unit) enters. But in comparison, the ratio is still the essence

---

CASE H h = constant

$b = 2h\cot\beta$

$$V = \frac{1}{3} 4h^3\cot^2\beta$$

$$S = 4h^2\cot^2\beta + 4h^2\frac{\cot\beta}{\sin\beta} = 4h^2\left[\cot^2\beta + \frac{\cot^2\beta}{\cos\beta}\right] = 4h^2\cot^2\beta\left[\frac{\cos\beta + 1}{\cos\beta}\right]$$

$$\frac{V}{S} = \frac{h}{3}\frac{\cos\beta}{1+\cos\beta}$$

$\beta \to 0 \quad \frac{V}{S} \to \frac{h}{3}$ max

$\beta \to 90° \quad \frac{V}{S} \to 0$ min

CASE A a = constant

$$V = \frac{1}{3} 4a^3\cos^2\beta\sin\beta$$

$$S = 4a^2\cos^2\beta + 2a^2\cos\beta = 4a^2\cos^2\beta\left(1 + \frac{1}{\cos\beta}\right) = 4a^2\cos^2\beta\left(\frac{1+\cos\beta}{\cos\beta}\right)$$

$$\frac{V}{S} = \frac{a}{3}\frac{\sin\beta\cos\beta}{1+\cos\beta}$$

$\beta \to 0 \quad \frac{V}{S} \to 0$

$\beta \to 90 \quad \frac{V}{S} \to 0$

∴ max or min is in between

$$\frac{d}{d\beta}\left(\frac{V}{S}\right) = \frac{(1+\cos\beta)\,d(\sin\beta\cos\beta) - \sin\beta\cos\beta\,d(1+\cos\beta)}{(1+\cos\beta)^2}$$

$$= \frac{\cos^3\beta + 2\cos^2\beta - 1}{1+\cos^2\beta} = 0$$

must solve $x^3 + 2x^2 - 1 = 0$

one root is $x = -1$ or $\beta = 180°$

$x^2 + x - 1 = 0$

$x = \frac{-1 \pm \sqrt{1+4}}{2} = \frac{-1 \pm \sqrt{5}}{2}$

~~This is another printer test~~

CASE $\overset{E}{e}$ = constant

$V = \frac{1}{3} b^2 h$ $\qquad h = e\sin\gamma$

$S = b^2 + 2ab$ $\qquad b = e\sqrt{2}\cos\gamma$

$a = \sqrt{e^2 - \left(\frac{b}{2}\right)^2} = \frac{e}{\sqrt{2}}\sqrt{2-\cos^2\gamma}$

$V = \frac{1}{3} 2e^3 \cos^2\gamma \sin\gamma$

$S = 2e^2\cos^2\gamma + 2\sqrt{2}e\cos\gamma\frac{e}{\sqrt{2}}\sqrt{2-\cos^2\gamma} = 2e^2\left[\cos^2\gamma + \cos^2\gamma\sqrt{\frac{2-\cos^2\gamma}{\cos^2\gamma}}\right]$

$= 2e^2\cos^2\gamma\left[1+\sqrt{\frac{2}{\cos^2\gamma}-1}\right]$

$\frac{V}{S} = \frac{e}{3}\frac{\sin\gamma}{\left[1+\sqrt{\frac{2}{\cos^2\gamma}-1}\right]} = \frac{e}{3}\frac{\sin\gamma\cos\gamma}{\cos\gamma+\sqrt{2-\cos^2\gamma}} = \frac{e}{3}\frac{\sin\gamma\cos\gamma}{\cos\gamma+\sqrt{1+\sin^2\gamma}}$

$\gamma \to 0 \quad \frac{V}{S} \to 0$

$\gamma \to 90 \quad \frac{V}{S} \to 0$ $\qquad$ ∴ in between

$\frac{d}{d\gamma}\left(\frac{V}{S}\right) = \frac{e}{3}\frac{d}{d\gamma}\left[\frac{\sin\gamma\cos\gamma}{\cos\gamma+\sqrt{1+\sin^2\gamma}}\right] = \frac{\left(\cos\gamma+\sqrt{1+\sin^2\gamma}\right)d(\sin\gamma\cos\gamma) - \sin\gamma\cos\gamma\, d\left(\cos\gamma+\sqrt{1+\sin^2\gamma}\right)}{\left(\cos\gamma+\sqrt{1+\sin^2\gamma}\right)^2} =$

$c+\sqrt{1+s^2}\left(-s^2+c^2\right) - sc\left(s+\frac{1}{2}\frac{2sc}{\sqrt{1+s^2}}\right) = 0$

$c + (c^2-s^2)\sqrt{\ } - s^2c - \frac{s^2c^2}{\sqrt{\ }} = 0$

$c + (1-2s^2)\sqrt{\ } - cs^2 - \frac{c^2s^2}{\sqrt{\ }}$

$c(1-s^2) + (1-2s^2)\sqrt{\ } - \frac{c^2s^2}{\sqrt{\ }}$

$c(1-s^2)\sqrt{\ } + (1-2s^2)(1+s^2) - c^2s^2$

$\sqrt{1-s^2}\,(1-s^2)\sqrt{\ } + 1 + \cancel{s^2} - 2s^2 - 2s^4 - \cancel{s^2} + s^4$

$(1-s^2)\sqrt{1-s^4} + 1 - s^4 - 2s^2$

$\frac{e}{6}\frac{\sin 2\gamma}{\cos\gamma+\sqrt{1+\sin^2\gamma}}$

$(c+\sqrt{\ })\,2\cos 2\gamma - \sin 2\gamma\left[-s+\frac{\cancel{1}}{\cancel{2}}\frac{\overset{\sin 2\gamma}{\cancel{2\sin\cos}}}{\sqrt{\ }}\right]$

$s^2 = x$ $\qquad s = \sin\gamma$

$(1-x)\sqrt{1-x^2} + 1 - x^2 - 2x = 0$

$(1-x)\sqrt{1-x^2} = x^2+2x-1$

$x^3 + x^2 + x - 1 = 0$

$(1-x)^2(1-x^2) = (x^2+2x-1)^2$

$(1-2x+x^2)(1-x^2) =$

$1 - x^2 - 2x + 2x^3 + x^2 - x^4 =$

$x^4 + 4x^3 + 2x^2 - 4x + 1$

$x^4 + 4x^3 + 2x^2 - 2x = 0$

$2x^4 + 2x^3 + 2x^2$

$x = 0,543621$

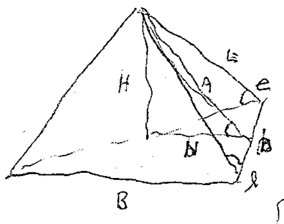
$\cos^{-1}x = 57{,}0695^\circ$
$= \beta$

$\sin^{-1}\sqrt{x} = 47{,}5025^\circ$
$= e$

EXTREMA

$\frac{S}{V}$ $\frac{V}{S}$

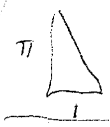
$d \tan x = \sec^2 x$
$d \cot x = -\csc^2 x$
$d \sec x = \sec x \tan x$
$d \csc x = -\csc x \cot x$



$B = 2N$

$V = \frac{B^2 H}{3}$, $S = B^2 + 2AB = B(B+2A)$

$V = \frac{4N^2 H}{3}$, $S = 4N^2 + 4AN = 4N(N+A)$



if $H = \pi$ same vol as sphere with radius N

$\tan^{-1}(\pi) = 72.^\circ 343213 = b$

Max $\frac{S}{V}$, $\boxed{H = \text{const} = 1}$

$K = \frac{S}{V} = \frac{3(N+A)}{HN} = 3\left(\frac{1}{H} + \frac{A}{N}\right) = 3(1 + \sec b)$ or $3(1 + \tan l)$

$\frac{dK}{db} = 3 \sec b \tan b = 0$ $\frac{dK}{dl} = 3 \sec^2 l$

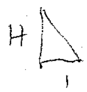
$3 \frac{\sin b}{\cos^2 b} = 0$ $b = 0$ $\frac{3}{\cos^2 l} = 0$ no sol Flat, no pyramid

$\frac{V}{S} = \frac{HN}{3(N+A)} = \frac{N}{3(N+A)} = \frac{1}{3(1+\frac{A}{N})} = \frac{1}{3(1+\sec b)} = \frac{1}{3(1+\tan l)}$ OK

$\frac{d}{db}\left(\frac{V}{S}\right) = -\frac{1}{3} \frac{\sec b \tan b}{(1+\sec b)^2} = 0$ $\tan b = 0$, $b = 0$ ...

Max $\frac{S}{V}$, B or $\boxed{N = \text{const} = 1}$

$K = \frac{S}{V} = \frac{3(1+A)}{H} = 3\left(\frac{1}{H} + \frac{A}{H}\right) = 3(\cot b + \csc b)$ OK



$\frac{dK}{db} = 3(-\csc^2 b - \csc b \cot b) = -3 \csc b (\cot b + \csc b) = 0$

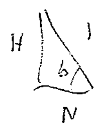
$\cot = -\csc$

$\frac{\cos}{\sin} = \frac{-1}{\sin}$ $\cos = -1$ $b = 180$ no pyramid flat

---

Max $\frac{S}{V}$, $\boxed{A = \text{const} = 1}$

$K = \frac{S}{V} = \frac{3(N+1)}{HN} = 3\left(\frac{1}{H} + \frac{1}{HN}\right) = 3(\csc b + \csc b \sec b)$



$3 \csc b (1 + \sec b)$

$\frac{dK}{db} = 3\, \csc b (\sec b \tan b) - (1 + \sec b) \csc b \cot b = 0$

$\sec^2 b - \frac{\cos b}{\sin^2 b}\left(1 + \frac{1}{\cos b}\right) = 0$

$\frac{1}{\cos^2 b} - \frac{\cos b}{\sin^2 b} - \frac{1}{\sin^2 b} = 0$ see sheet

$\sin^2 b - \cos^3 b - \cos^2 b = 0$

~~$1 + \cos^3 b = 0$~~

~~$\cos^3 b = -1$~~

~~$\cos b = -1$~~

~~$b = 180$~~ no pyr

$\cos^3 b + 2\cos^2 b - 1 = 0$
$x^3 + 2x^2 - 1 = 0$
$x = -1$
$x^2 + x - 1 = 0$

OK

Use other method

$N = A \cos b$ $A = 1$
$H = A \sin b$

$\frac{S}{V} = \frac{3(\cos b + 1)}{\cos b \sin b}$

↓

$\cos b = \varphi$

$x^3 + 2x^2 - 1 = 0$
$x = -1$
$x^2 + x - 1 = 0$
$x = \varphi$

99/03/01

extrema $\frac{V}{S}$, E fixed

$\cos e = \sqrt{2}\cos l$ $\quad$ $\sin l = \frac{1}{\sqrt{2}}\sqrt{2-\cos^2 e} = \frac{1}{\sqrt{2}}\sqrt{1+\sin^2 e}$

$A = E\sin l =$ $\quad$ $A = \frac{E}{\sqrt{2}}\sqrt{1+\sin^2 e} = \frac{E}{\sqrt{2}}\sqrt{2-\cos^2 e}$

$B = \sqrt{2}\,E\cos e$

$H = E\sin e$

$$S = 4\left(\frac{AB}{2}\right) + B^2, \quad V = \frac{1}{3}H B^2$$

$$S = \frac{4}{2}E\sin l\sqrt{2}\,E\cos e + 2E^2\cos^2 e$$

$$= 2E^2\sqrt{2-\cos^2 e}\,\cos e + 2E^2\cos^2 e = 2E^2\cos e\left[\sqrt{2-\cos^2 e} + \cos e\right]$$

$$V = \frac{1}{3}E\sin e\, 2E^2\cos^2 e = \frac{2}{3}E^3\sin e\cos^2 e$$

$$\frac{S}{V} = \frac{3}{E}\left(\frac{\sqrt{2-\cos^2 e} + \cos e}{\sin e\cos e}\right); \quad \cancel{\frac{SE}{3V} = \cot e + \sqrt{1+\cot^2 e}}$$

$$\cancel{\frac{SE}{3V} = \frac{1}{\sin e} + \frac{\sqrt{2-\cos^2 e}}{\sin e\cos e}} \qquad \frac{SE}{V3} = \frac{1}{\sin e} + \frac{\sqrt{2\sec^2 - 1}}{\sin e}$$

$$f(e) = \frac{1}{\sin e}\left[1 + \sqrt{2\sec^2 e - 1}\right] \checkmark \qquad \sqrt{2\sec^2 - 1} = \sqrt{1+2\tan^2}$$

$$f'(e) = 0 = \frac{1}{\sin e}\left[\frac{1}{2}\frac{4\sec^2 e\tan e}{\sqrt{2\sec^2 e - 1}}\right] + \left[1+\sqrt{2\sec^2 e - 1}\right]\left(-\cot e\csc\right)$$

$$\frac{2\sec^2\tan}{\sqrt{1+2\tan^2}} = \cot\left[1+\sqrt{1+2\tan^2}\right]$$

$$\frac{2\sin^2}{\cos^4} = 1+2\tan^2 + \sqrt{1+2\tan^2}$$

$$2\left(\frac{\sin^2}{\cos^4} - \frac{\sin^2}{\cos^2}\right) = 1+\sqrt{\quad} \qquad \sec^2 - 1 = \tan^2$$

$$2\left(\sec^2\tan^2 - \tan^2\right) = 2\tan^2(\sec^2 - 1) = 2\tan^4 = 1+\sqrt{\quad}$$

$$2\tan^4 - 1 = \sqrt{1+2\tan^2} \qquad u = 1.191 \quad x = 1.09 \quad e = 47.500$$

$$4\tan^8 - 4\tan^4 + 1 = 1 + 2\tan^2 \qquad u = x^2, \ x = \tan e$$

$$4x^8 - 4x^4 - 2x^2 = 0 \qquad \boxed{u^3 - u - \frac{1}{2} = 0}$$

$$x^2 = 0 \quad \tan = 0 \Rightarrow b = 0$$

$$x^6 - x^2 - \frac{1}{2} = 0$$

$u = \cancel{-}.595743941$ from calc ?

you keep track of where you've been! The streamlined Keyword/Web location-box also serves as a dropdown list that stores the last 25 AOL areas and Web sites you visited.

-- Personalize your toolbar by adding your own favorite places. Want one-click access to your sports scores, your personal finance news, or your favorite entertainment area? Adding an icon to your personalized toolbar is as easy as dragging and dropping the Favorite Places heart onto the toolbar.

WHERE DID IT GO? HOW TO FIND YOUR FAVORITE FEATURES ON AOL 4.0
Below is a list of some of the features that have changed or moved in AOL 4.0. For a complete listing of all the new features, new names and new locations of features on AOL 4.0, go to Keyword: Click & Go, then click "Where Is It. An A to Z Index."

-- Adding new AOL access phone numbers to connect to AOL. Easier than ever! Now you can add AOL access phone numbers in three easy steps. From the Signon screen, click the Setup button. This will open the Locations screen. Click Add Number, give us your area code, and then sit back while we do the rest.

-- Flashsessions. New name! Flash Sessions is now called Automatic AOL. This new feature goes online automatically to collect your new e-mail and newsgroup postings, and to download files you've collected in your Download Manager. Then you can tend to them all offline. To activate Automatic AOL, select Run Automatic AOL from the Mail Center menu on the toolbar.

-- File Search. New location! There's no longer a File Search icon on toolbar. To search for downloadable files, click the Find button on the toolbar, then select Software. Or go to Keyword: Files.

-- The Go To menu. The Go To menu is now called My Shortcuts. Click on Favorites on the toolbar, then click on My Shortcuts. You can edit shortcuts just as you created your own Go To menu.

-- Keywords. New feature! Now you don't have to open a separate keyword box to type in your keywords. The white input box in the middle of your toolbar is where you type, not only keywords, but Web addresses, too.

-- The Mail Menu. There's no longer a mail menu in the menu bar. Now, to get to all the mail features, click the Mail Center icon on the toolbar.

-- The Members Menu. There's no longer a Members menu on the menu bar. Now, to find AOL members, click the People icon on the toolbar.-- My AOL. New location! My AOL is now located on the new toolbar. Click its icon to open a menu of all of AOL's customizable features.

-- The News icon. New location! There's no longer a News icon on the toolbar. To go to the AOL News channel, click the Channel icon on the page 2 99/03/01

$\max \frac{S}{V}$, E fixed

$x \quad 1$

$f(x) = x^3 - x - .5$ has one real root

$y = \mathrm{root}(f(x), x)$

$y = 1.191500406 = \tan e$

$\delta = 0.000408$

$\tan^{-1} e = 47.^{\circ}5065$

$\cos e = \sqrt{2} \cos l$

$l = 61.46~~7~~649$

$\cot l = \cos b \qquad b = 57.065017$

$= 57^{\circ}\,3'\,54''$

Note this pyramid also has the property $b = f$

let $z = 0.543621$

$\sin^{-1}\sqrt{z} = e = 47.5025$

$\cos^{-1} z = b = 57.0695$

$$\left\{\begin{array}{l} \sin e = \sqrt{z} \\ \cos b = z \end{array}\right. \quad \text{and} \quad \left.\begin{array}{l} \cos e = \sqrt{2} \cos l \\ \cot l = \cos b \end{array}\right\} \Rightarrow z^3 + z^2 + z - 1 = 0$$

So the special property of this pyramid is.

$$\boxed{\sin^2 e = \cos b}$$

E - FIXED

$x := .7$

$g(x) := x^3 - x^2 + .5 \cdot x - .25$

$y := \mathrm{root}(g(x), x)$

$y = 0.771818681$

$z := \frac{180}{\pi} \cdot \mathrm{asin}\left(\sqrt{y}\right)$

$z = 61.465797388$

E - FIXED

Special property Found that $\boxed{\cos b = \sin^2 e}$

in general um

$\cos b = \cot l$

$\cos l = \frac{B}{2E}$

$\cos e = \frac{B}{\sqrt{2}E}$

This is a check of $\cos b = \sin^2 e$

$b = 57.0650$

$e = 47.5065$

$l = 61.4676$ $\sin l = 0.878547$

$\sin^2 l = 0.771845$

$\therefore \sqrt{2} \cos l = \cos e$

$\therefore 2\cos^2 l = \cos^2 e = 1 - \sin^2 e = 1 - \cos b = 1 - \cot l$

$\cot l = 1 - 2\cos^2 l = 2\sin^2 l - 1$

$\cos l = 2\sin^3 l - \sin l = \sqrt{1 - \sin^2 l}$

$4\sin^6 l - 4\sin^4 l + \sin^2 l = 1 - \sin^2 l$

$4\sin^6 l - 4\sin^4 l + 2\sin^2 l - 1 = 0$

$u^3 - u^2 + \frac{u}{2} - \frac{1}{4} = 0$

$u = 0.771818681$

Alternate Method

E - fixed

$$\frac{d}{d\beta}\left[\frac{\sin\beta\,\cos\beta}{(1+\cos\beta)\sqrt{1+\cos^2\beta}}\right]=0$$

$$(1+c)\sqrt{1+c^2}\,(c^2-s^2)-sc\left[(1+c)\,\frac{1}{2}\,\frac{(-2cs)}{\sqrt{1+c^2}}+\sqrt{1+c^2}\,(-s)\right]=0$$

$$s^2=1-c^2$$

$$(1+c)\sqrt{1+c^2}\,(2c^2-1)+c^2(1-c^2)\frac{(1+c)}{\sqrt{1+c^2}}+(1-c^2)c\sqrt{1+c^2}=0$$

$$(1+c)(1+c^2)(2c^2-1)+(1+c)\,c^2(1-c^2)+(1-c^2)(1+c^2)c=0$$

$$(1+c)(1+c^2)(2c^2-1)+(1-c^2)\left[c^2+c^3+c^3+c\right]=0$$

$$(c^2+1)(2c^2-1)+(1-c)(2c^3+c^2+c)=0$$

$$\cancel{2c^4}+c^2-1+2c^3+\cancel{c^2}+c-\cancel{2c^4}-c^3-\cancel{c^2}=0$$

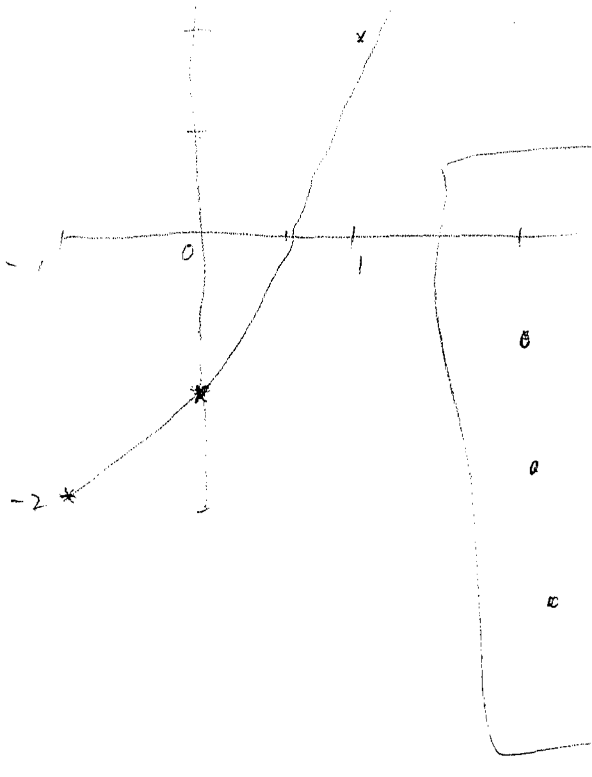
$$c^3+c^2+c-1=0 \quad \text{OK}$$

ONE ROOT IS $c = 0.54362094222\text{6}$ real

(13)

$\sim \beta = 57°.069526$ ([illegible] 17′ 4/ rad)

$c = \cos\beta$



E-FIXED

THREE CUBIC EQUATIONS

- $c^3+c^2+c-1=0$ $\cos\beta$, $\beta = 57°.0695$
  $c = 0.543621$
- $t^3-t-0.5=0$ $\tan e$ $e = 47°.5065$
  $t = 1.191500$
- $s^3-s^2+\frac{s}{2}-\frac{1}{4}=0$ $\sin l$ $l = 61°.4676$
  $s = 0.771818081$

800	BEGINNING OF VIKING INVASIONS
	JOHN SCOTTUS ERIGENA (810-877) PHILOSOPHER
1066	NORMAN INVASION

635	ST AIDEN (595-651) TO LINDISFARNE
657	ST HILDA (614-681) FOUNDS WHITBY
664	THE SYNOD OF WHITBY
669	ST WILFRID(634-709 BISHOP OF YORK
684	ST CUTHBERT (634-687) BISHOP OF LINDISFARNE

Fixed height
→ ∞ base
fixed base
→ ∞ height

we may maximize for fixed base, fixed height, fixed edge, fixed apothem.

vsratio2.wp6
12/15/94
95/03/08

VOLUME TO SURFACE RATIOS

This is for fixed Apothem

Three dimensional solids, such as spheres, cylinders, cones, pyramids, etc. may be characterized by their volume/surface ratio. For three dimensional figures, this ratio has the dimensionality of length. The ratio can be made dimensionless by multiplying the value of the surface by a <u>size parameter</u> which is some characteristic length, A, associated with the solid. The quantity V/(SA) then becomes a pure number, size independent, which characterizes the <u>shape</u> of the solid.

In the case of a square based pyramid, we have

$$V = \frac{B^2 H}{3} \quad and \quad S = 4\frac{AB}{2} + B^2$$

where V is the volume, S the surface area, H the height of the pyramid, B the length of a side of the base, and A is the apothem of a triangular face. If x is the angle between the apothem and the plane of the base, then

$$B = 2A\cos(x) \quad and \quad H = A\sin(x)$$

Substituting, we have

$$V = \frac{4}{3}A^3\cos^2(x)\sin(x) \quad and \quad S = 4A^2\cos(x) + 4A^2\cos^2(x)$$

For a fixed apothem
The Gt Pyr
has max $\frac{V}{S}$ @ 51°

But not for a fixed base

Giving

$$\frac{V}{SA} = \frac{\cos(x)\sin(x)}{3(\cos(x)+1)}$$

The left member is a dimensionless, size independent function which is seen to be equal to a "shape function" based on the independent parameter x. We shall designate the shape function, whose value depends on the apothem-base angle,x by f(x).

$$f(x) = \frac{\cos(x)\sin(x)}{\cos(x)+1}$$

To find the maximum value of the function f(x), we set its derivative equal to zero.

$$\frac{df(x)}{dx} = \frac{\cos^3(x) + 2\cos^2(x) - 1}{(\cos(x)+1)^2} = 0$$

To solve this equation we must first find the roots of the cubic equation

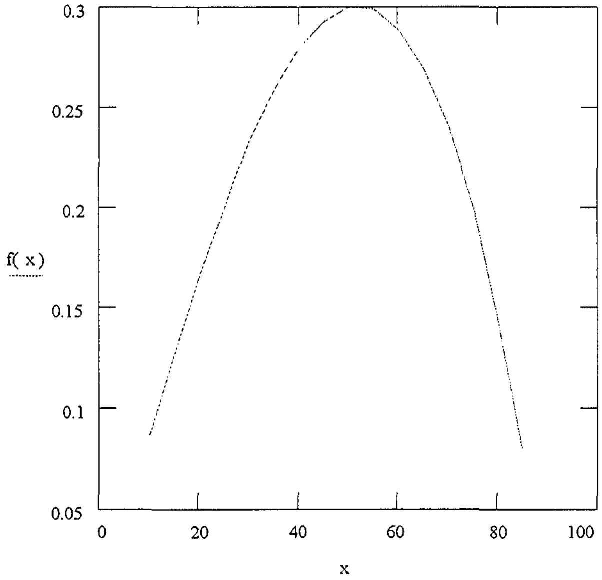
$$y^3+2y^2-1 = 0$$

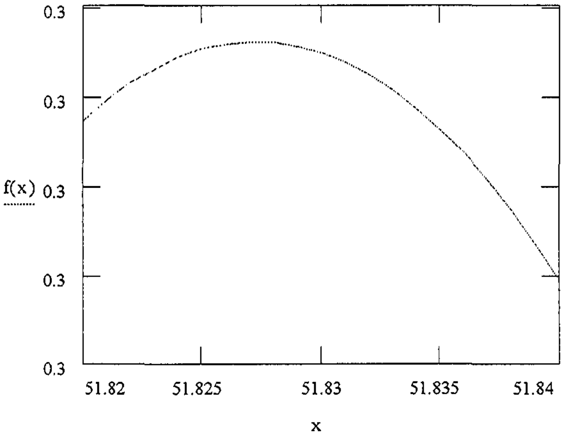
The roots are

$$y = -1.618034...$$
$$y = -1$$
$$y = 0.618034...$$

x = arccos(y) has no solution for y = -1.618034...
x = 180 degrees is the solution for y = -1
and
x = $51^{\circ}.827292$ is the solution for y = 0.618034...

For values of x in the meaningful range 0 to 90 degrees, the function f(x) is zero at both ends of the range and takes on its maximum value at $51^{\circ}.827292 = 51^{\circ}49'38.25''$.





There are two interesting results of this approach to solids in the case of square pyramids. The first is that the maximum value of the shape function occurs when the ratio of the apothem to the half-base is equal to the Golden Section (0.618034). The second result is that to within a minute or two of arc, the Great Pyramid at Gizeh has been measured to have this same base-apothem angle. [The best measurements give a value of 51.85 ± .01 degrees, off from the above value by about 1.2'± .6' arc. or off about .3 inch in a radius of 100ft.] We conclude that the Great Pyramid has the shape for a square based pyramid that very colosely gives the maximum volume for a given surface or the ~~the~~ minimum surface for a given volume.

apothem constant

Other Questions:

1) If the base is ignored, only the sides being involved, what is max $\frac{V}{S}$?

$$V = \frac{B^2 H}{3} \quad , \quad S = \frac{4AB}{2}$$

$$B = 2A\cos(x) \quad , \quad H = A\sin(x)$$

$$V = \frac{4A^3}{3}\cos^2(x)\sin(x) \quad , \quad S = 4A^2\cos(x)$$

$$\frac{V}{S} = \frac{A}{3}\cos(x)\sin(x) = \frac{A}{6}\sin(2x)$$

$$\frac{d}{dx}\left(\frac{V}{S}\right) = \frac{A}{6}\,2\cos(2x) = \frac{A}{3}\cos(2x) = 0$$

$$\cos\theta = 0 \quad , \quad \theta = 90°$$

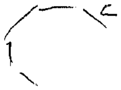
$$\therefore \boxed{x = 45^0}$$

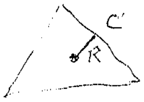
$$\frac{V}{S} = \frac{A}{3}\,\frac{\sin(x)\cos(x)}{1+\cos(x)}$$

Find x

2) $\frac{V}{S}$ for any regular pyramid or cone

3 sides to circle (∞) $\begin{matrix} n \to \infty \\ c \to 0 \end{matrix}$





$\mathcal{B}$ = area of base

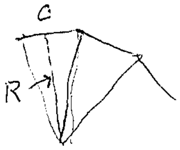
$$V = \frac{H}{3}\mathcal{B} \qquad S = n\frac{Ac}{2} + \mathcal{B}$$

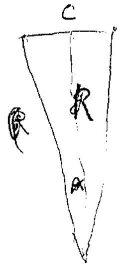
n sides

$n \to \infty$
$c \to 0$

$P = nc$
$nc \to 2\pi R$

$$\mathcal{B} = \mathcal{B}(n)$$





$$\mathcal{B} = n\frac{cR}{2}$$

Cone

$\mathcal{B} = \pi R^2$

$$\frac{V}{S} = \frac{\frac{H}{3}\pi R^2}{\frac{A \cdot 2\pi R}{2} + \pi R^2}$$

$$= \frac{1}{3}\frac{HR}{A+R}$$

$$V = \frac{H}{3}\,\frac{ncR}{2} \qquad S = n\frac{Ac}{2} + \frac{ncR}{2} = \frac{nc}{2}(A+R)$$

$$\frac{V}{S} = \frac{HR}{3(A+R)} = \frac{A^2\sin(x)\cos(x)}{3A(1+\cos x)}$$

~~R cos(α) = A cos(x) = g~~

~~tan(α) = $\frac{g}{2g}$~~

~~= sin(α)~~

$$H = A\sin(x) \quad , \quad R = A\cos(x)$$

$$\frac{V}{S} = \frac{A}{3}\,\frac{\sin(x)\cos(x)}{(1+\cos x)}$$

and integrate the essences of these many mythic traditions. The Journey of the Year provides such a framework. For its seasons not only give us common experiences but give us a framework to organize and integrate our many perceptions and interpretations of those experiences.

Its seasons and celebrations provide a multi-ocular perspective of our diversities which can be seen to be but facets of the great archetypal journey on which the Earth and we, its children, are embarked. As we discover the deeper meanings of this journey we discover that our differences enrich us rather than separate us. Although each of us will have a special affection for the tradition into which we were born, and will choose to emphasize its festivals in our lives, our efforts can turn from proselyting and homogenizing to appreciating and internalizing the full spectrum of perspectives afforded by the variety of cultural traditions. While we may learn much just by exploring our own heritage, we can gain deeper insights by juxtaposing many heritages and noting their contrapuntal contrasts and similarities.

The Journey of the Year is an affirmation. It is an affirmation of the truth of our own tradition and simultaneously an affirmation of the truth of other traditions. But we can also discover that each truth, when all are honored, leads to deeper truth subsuming all.

The Journey of the Year is a mediator. It mediates Sky and Earth. It bridges the cycles of the Heavens and the rhythms of the Earth, (as Man by intellect mediates the worlds of spirit and matter). The Journey of the Year also mediates the changeless and the changing. Paradoxically, the changing seasons through their repetitive cycle provide a changeless ground which enables all earthly change.

The Journey of the Year is a teacher. It teaches us to:

- Understand the basic physical and psychological cycles we all share.
- Become familiar with the timbre of time, to know the best of times and the worst of times for our activities.
- Learn to interact with our personal rhythmic patterns.
- Learn and participate in rituals useful for spiritual growth.
- Unlearn those dogmas which have inhibited our growth.

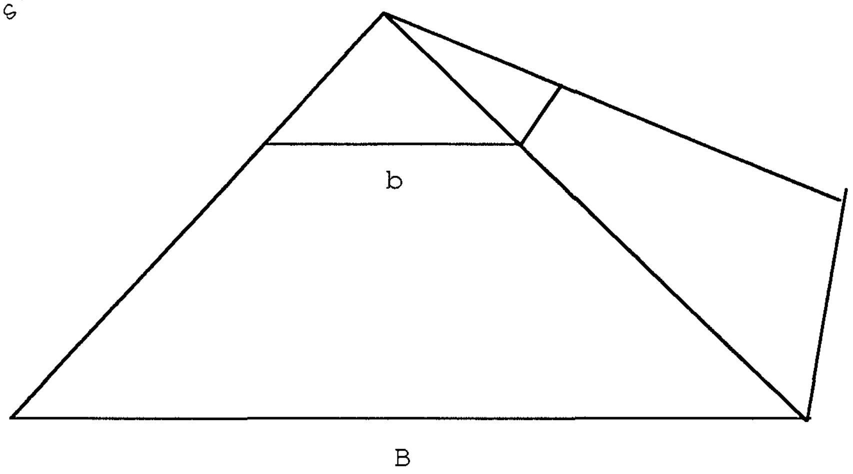
Finally, the Journey of the Year is preparation for a new theophany, a preparation to receive a revelation of deeper attributes of God. It is thus theosis, its practice sacrilizes the earth.

Redo this page

$\frac{dE}{dt} = P = \rho R^2 \propto \rho \frac{V^2}{S^2}$

$\frac{V}{S} \propto \frac{P}{\rho}$

$P \propto \rho \frac{V}{S}$



The Great Pyramid has the maximum volume for a given surface area (including the base), (or the minimum surface for a given volume)

i.e. for the pyramid $\frac{V}{S}$ is maximum

or $\frac{S}{V}$ is minimum

$E = \hbar \nu = \frac{\hbar}{t}$

$\frac{dE}{dt} = -\frac{\hbar}{t^2}$

An object with large $\frac{S}{V}$ is a good radiator/receiver
i.e. a good communicator

?

while a large $\frac{V}{S}$ indicated poor radiation/reception
∴ the pyramid is a poor communicator

$\frac{dE}{dt}$ = power

$P = \frac{MR^2}{T^3} = \rho R^2 = \rho\left(\frac{V}{S}\right)^2$

$\frac{S}{V} \propto \frac{dE}{dt}$ the rate of energy exchange

Pyramid has minimum energy exchange

yes

$\frac{S}{V} = \frac{1}{R}$

Plants have large $\frac{S}{V}$ ∴ high energy rates of exchange
cool fast, heat up fast

Animals have low $\frac{S}{V}$ ∴ retain heat better
Spheres cool & heat slowly

sphere

$\frac{S}{V} = \frac{4\pi R^2}{\frac{4}{3}\pi R^3} = \frac{3}{R}$

For fixed shape $\left[\frac{S}{V}\right] = \left[\frac{1}{R}\right]$ R measures scale

∴ the larger R the smaller $\frac{S}{V}$ and the smaller $\frac{dE}{dt}$

TRUNCATED PYRAMIDS

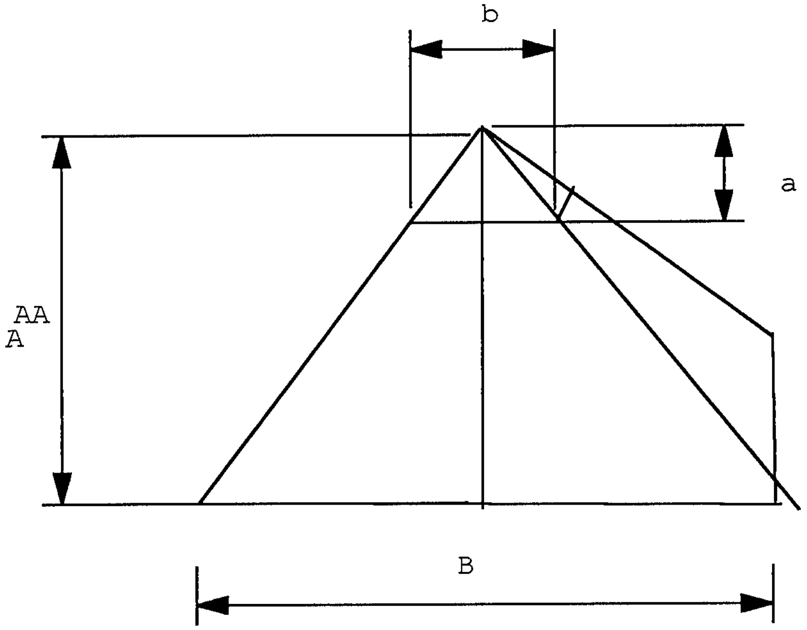


FIGURE T

GPFRVS.WP6
95/03/08

THE VOLUME TO SURFACE RATIO FOR THE FRUSTRUM OF A PYRAMID

In figure T) we designate the base, height and apothem of the total pyramid by B,H and A respectively, and the base, height, and apothem of the small or cap pyramid by b,h and a respectively. Let p stand for the ratios:

$$p=\frac{b}{B}=\frac{h}{H}=\frac{a}{A}$$

Then the volume of the frustrum, (Large pyramid minus the cap pyramid) will be:

$$V=\frac{B^2H}{3}-\frac{b^2h}{3}=\frac{B^2H}{3}(1-p^3)$$

And the surface of the frustrum will be:

$$S=B^2+b^2+\frac{4AB}{2}-\frac{4ab}{2}=B^2(1+p^2)+2AB(1-p^2)$$

If x is the base-face dihedral angle, then:

$$B=2A\cos(x) \quad and \quad H=A\sin(x)$$

Substituting these values gives:

$$\frac{V}{S}=\frac{\frac{4A^3}{3}\cos^2(x)\sin(x)(1-p^3)}{4A^2\cos^2(x)(1+p^2)+4A^2\cos(x)(1-p^2)}=\frac{A}{3}\frac{\sin(x)\cos^2(x)(1-p^3)}{\cos^2(x)(1+p^2)+\cos(x)(1-p^2)}$$

Or

$$\frac{V}{S}=\frac{A}{3}\frac{\sin(x)\cos(x)}{q_1\cos(x)+q_2}=\frac{A}{3}F(x,p)$$

where

$$q_1=\frac{1+p^2}{1-p^3} \quad and \quad q_2=\frac{1-p^2}{1-p^3}$$

Volume of a frustrum

$V = \frac{1}{3} h (a^2 + ab + b^2)$ ①

h = height

a + b lengths of

top + bottom squares

redo using equation ①

To find the maximum value of V/S for a fixed value of x, we set the partial derivative of F(x,p) with respect to p equal to zero:

$$\frac{\partial F(x,p)}{\partial p} = \frac{\partial}{\partial p}\left(\frac{\sin(x)\cos(x)}{q_1\cos(x)+q_2}\right) = 0$$

Differentiating:

$$\frac{\partial F}{\partial p} = \frac{-\sin(x)\cos(x)\left(\cos(x)\,\frac{dq_1}{dp}+\frac{dq_2}{dp}\right)}{[q_1\cos(x)+q_2]^2} = 0$$

The equation is satisfied for p=1, where the denominator becomes infinite. This is the case where the entire pyramid is truncated and the volume is zero and the surface = $2B^2$.

Other values of p that are solutions depend on the values of

$$\frac{dq_1}{dp}\, and\, \frac{dq_2}{dp}.$$

We have

$$\frac{dq_1}{dp} = \frac{d}{dp}\left(\frac{1+p^2}{1-p^3}\right) = \frac{P^4+3P^2+2P}{(1-P^3)^2}$$

and

$$\frac{dq_2}{dp} = \frac{d}{dp}\left(\frac{1-p^2}{1-p^3}\right) = \frac{-P^4+3P^2-2P}{(1-P^3)^2}$$

giving

$$\frac{p^4(\cos(x)-1)+3p^2(\cos(x)+1)+2p(\cos(x)-1)}{(1-p^3)^2} = 0$$

In addition to the solution p=1 there is p=0, the full pyramid, and values of p with 0<p<1 satisfying the cubic equation

$$p^3+3Kp+2=0$$

where K = [cos(x)+1]/[cos(x)-1]

To find the maximum value of V/S for a fixed value of p, we set the partial derivative of F(x,p) with respect to x equal to zero:

$$\frac{\partial F(x,p)}{\partial x}=\frac{\partial}{\partial x}\left(\frac{\sin(x)\cos(x)}{q_1\cos(x)+q_2}\right)=0$$

Differentiating:

$$\frac{\partial F}{\partial x}=\frac{(q_1\cos(x)+q_2)(\cos^2(x)-\sin^2(x))-\sin(x)\cos(x)(-q_1\sin(x))}{(q_1\cos(x)+q_2)^2}=0$$

The equation is satisfied for p=1, where the denominator becomes infinite. This is the case where the entire pyramid is truncated and the volume is zero and the surface = $2B^2$.

Values of x that are solutions depend on the values at which the numerator vanishes:

$$q_1\cos^3(x)+2q_2\cos^2(x)-q_2=0$$
$$or \quad qy^3+2y^2-1=0$$
$$where \quad y=\cos(x) \quad and \quad q=\frac{q_1}{q_2}=\frac{1+p^2}{1-p^2}$$

PYRRTABL.WP6
95/03/08

V/S for the frustrum of a pyramid

In part I it was shown that a square pyramid of any size with a maximum value of volume/surface will have a base-apothem angle of 51°49'38.25". In this part we shall consider what configurations of a truncated pyramid will have maximum V/S.

In the case of the full pyramid, shape was a function of one parameter, the value of the base-apothem angle. For the frustrum of a pyramid, shape depends on two parameters: the base-apothem angle, x, and the ratio of the height of the cut-off or cap pyramid to the full pyramid, p=h/H. The parameter p can take on values from zero (a full pyramid) to unity (no pyramid). In the following table values of p are assumed and the values of the base,b, and height,h, of the cap pyramid are found and the corresponding values of cos(x), and x are derived subject to the conditions for maximization of V/S. In addition the value of the parameter $q = (1+p^2)/(1-p^2)$ is given.

	p	b	h	H	q	cos(x)	x
1	0	0	0	146	1	.618034	51° 49'38"
2	0.011908	2.74	1.74	144.3	1.000284	.618016	51° 49'43"
3	0.054234	12.5	7.92	138.1	1.0059	.617650	51° 51'18"
4	0.061644	14.2	9.0	137	1.007629	.617538	51° 51'48"

← * see page Ⓐ $p = \alpha$

The following descriptions relate the table data to the Great Pyramid at Gizeh. Each of the angular entries are derived by the maximization of V/S. using $9y^3 + 2y^2 - 1 = 0$

1. A full untruncated pyramid. This pyramid would have a height H of 146 meters.
2. Frustrum with an upper base of 9 ft (2.74m), said to be the original design of the Great Pyramid by Agatharchides. (Tompkins p373)
3. Frustrum with a base-apothem angle of 51°51'18", the "best fit" to the measured angle.
4. The limiting frustrum. The present height of the Great Pyramid is 137 meters. If this was also the original height, then the value of x which maximizes V/S will be 51 51'48". No smaller value of H, and therefore no larger value of x, is permissible.

B = 230.363m
H = 146 m

work out the frustrum ~ 51°51'14", the rolling drum value
use the [illegible] result for a fixed x

$p^3 + 3Kp + 2 = 0$

$K = \frac{[\cos(x)+1]}{[\cos(x)-1]}$

b = 5.37m

for $\frac{b^2}{B^2} = 1836$

GPCALFR.WP6

These are the calculations for the entries in the V/S frustrum table.

$p := 0$

$q := \dfrac{1+p^2}{1-p^2}$ $\qquad q = 1$

$y := .618$

$f(y) := q \cdot y^3 + 2 \cdot y^2 - 1$

$u := \mathrm{root}(f(y), y)$

$u = 0.618033967614$

$x := \mathrm{acos}(u) \cdot \dfrac{180}{\pi}$

$x = 51.827293913379$

$p := 0.011908$

$q := \dfrac{1+p^2}{1-p^2}$ $\qquad q = 1.000283641148$

$y := .618$

$f(y) := q \cdot y^3 + 2 \cdot y^2 - 1$

$u := \mathrm{root}(f(y), y)$

$u = 0.618015473214$

$x := \mathrm{acos}(u) \cdot \dfrac{180}{\pi}$

$x = 51.828641797869$

$p := 0.054234$

$q := \dfrac{1+p^2}{1-p^2}$ $\qquad q = 1.005900007362$

$y := .618$

$f(y) := q \cdot y^3 + 2 \cdot y^2 - 1$

$u := \mathrm{root}(f(y), y)$

$u = 0.617649949631$

$x := \mathrm{acos}(u) \cdot \dfrac{180}{\pi}$

$x = 51.855276293924$

$p := 0.061644$

$q := \dfrac{1+p^2}{1-p^2}$ $\qquad q = 1.007628955371$

$y := .618$

$f(y) := q \cdot y^3 + 2 \cdot y^2 - 1$

$u := \mathrm{root}(f(y), y)$

$u = 0.617537687693$

$x := \mathrm{acos}(u) \cdot \dfrac{180}{\pi}$

$x = 51.863454498623$

51.827294 = 51° 49' 38"
51.828642 = 51° 49' 43"
51.855276 = 51° 51' 18"
51.863455 = 51° 51' 48"

This is ptox.mcd based on the partial derivative with respect to x. The parameter p is assigned and the value of x making F maximum is found.

$p := 0$

$q := \dfrac{1+p^2}{1-p^2} \qquad q = 1$

$y := .6 \qquad\qquad y = \cos(x)$

$f(y) := q \cdot y^3 + 2 \cdot y^2 - 1$

$u := \mathrm{root}(f(y), y)$

$u = 0.618027496539$

$x := \mathrm{acos}(u) \cdot \dfrac{180}{\pi}$

$x = 51.827765532605$

This is REVPTOX.MCD the reverse algorithm of PTOX.MCD

$x := 51.827765532605 \cdot deg$

$\cos(x) = 0.6180275$

$y := \cos(x)$

$$q := \frac{1 - 2 \cdot y^2}{y^3}$$

$q = 1.0000995$

$$p := \sqrt{\frac{q-1}{q+1}}$$

$p = 0.00705332$

$\alpha = ?$

$\frac{1}{p} = 141.7776$

If $\frac{1}{p} = E$, $p = \alpha = 0.00729735308$

$q = ? = \frac{1+p^2}{1-p^2} = 1.0001066$

$x = ?$

$qy^3 + 2y^2 - 1 = 0$

$y =$

This is xtop.mcd based on the partial derivative with respect to p. The parameter x is assigned and the value of p making F maximum is found.

$x := 51 \cdot deg$

$h := \cos(x)$

$h = 0.6293204$

$k := \frac{h+1}{h-1}$

$k = -4.3954951$

$p := .01$

$v(p) := p^3 + 3 \cdot k \cdot p + 2$

$g := root(v(p), p)$

$g = 0.1519355$

This is REVXTOP.MCD the reverse algorithm of XTOP.MCD

$p := .1519355$

$$k := \frac{p^3 - 2}{3 \cdot p}$$

$k = -4.38013205$

$$h := \frac{k + 1}{k - 1}$$

$h = 0.62826191$

$$x := \operatorname{acos}(h) \cdot \frac{180}{\pi}$$

$x = 51.07799431$

edge

This is ptox.mcd based on the partial derivative with respect to x. The parameter p is assigned and the value of x making F maximum is found.

EDGE FIXED

MAX $\frac{v}{s}$

$p := 0$

$q := \frac{1 + p^2}{1 - p^2}$ $\quad q = 1$

$y := .5$

$f(y) := q \cdot y^3 + y^2 + y - 1$

$u := \mathrm{root}(f(y), y)$

$u = 0.543620942226$

$x := \mathrm{acos}(u) \cdot \frac{180}{\pi}$

$x = 57.069526059095 = \beta$

$\beta = 57^\circ\, 4'\, 10''$

1 radian = 57.29578 = 57° 17' 45"

$$\begin{array}{r} 57.29578 \\ 57.06953 \\ \hline 0.22625 \end{array}$$

$\delta = 13'\, 35''$

Given x find p

$x := 51.853973 \cdot deg$

$\cos(x) = 0.6176678$

$k := \frac{\cos(x) + 1}{\cos(x) - 1}$

$k = -4.2310535$

$p := 2$

$f(p) := (p^3 + 3 \cdot k \cdot p + 2)$

$g := root(f(p), p)$

$p = g = +0.1572813$

taking $x = 51.85°$

The max $\frac{v}{s}$ is at $p = .158$

Taking $p = \ldots$

max $\frac{v}{s}$ is at $x =$

$p = .157874$ between 0 and 1

$b = .158$ $B = 230$ $b = 36m$

$h =$ $H = 146$ $h = 23m$

way off

$$u = f(x, y)$$

$$\frac{\partial u}{\partial x} = 0 \qquad \frac{\partial u}{\partial y} = 0$$

$$F(x, p)$$

$$\frac{\partial F}{\partial x} = 0, \qquad \frac{\partial F}{\partial p} = 0$$

$\cos(x) = 1$

$x = 0$

$\frac{\cos x + 1}{\cos(x) - 1} = k = \frac{2 - p^3}{3p}$

assume p

e.g. $p = 0$

$k = \infty$

We get 3 values for p at $x = 51.85$

$p = 0$ (full

$p = 1$ null

$p = 0.1572813$

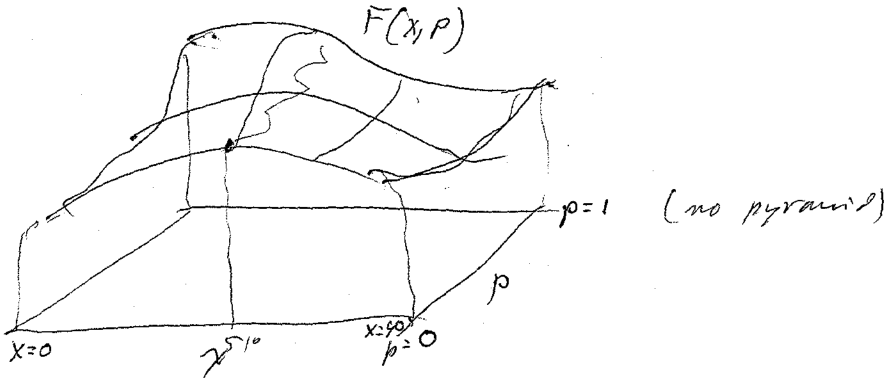
Can we assume p get x

We have a function $F(x, p)$ which gives the value of $\frac{V}{S}$ for the base-face angle x and the fraction of the cap pyramid p.

If we hold x constant, we can find how F varies with p

p F varies with x

Taking $\frac{\partial}{\partial p}$ and $\frac{\partial}{\partial x}$ we can find maxima + minima



$0 \leq X \leq 90$

$0 \leq p \leq 1$

We have taken $p=0$ (full pyramid)
and found that the max occurs at $x = 51°.827292$
But for other values of p, the max changes

$q = \frac{2-p^3}{3p}$

Select x, find the p for max ② $p^3 + 3qp + 2 = 0$ $q = \frac{\cos(x)+1}{\cos(x)-1}$

Select p, find the x for max e.g. the capstone assumption

$q = \frac{1-2y^2}{y^3}$, $q = \frac{1+p^2}{1-p^2}$

① $q'y^3 + 2y^2 - 1 = 0$

$y = \cos(X)$

$q = 1$ for $p=0$ full pyramid

When can we work backwards?

in ① select x, y find q, p

in ② select p find k, ~~y~~, x

JOYPRO1.wp6 JOURNYEAR00 JOURNEY OF THE YEAR WORK DISK
AUGUST 11,1986 DECEMBER 13,1986 January 12, 1995 January 20, 1995

JOURNEY OF THE YEAR
PROLOGUE

"To everything there is a season, and to every purpose under heaven there is a time."

We can properly respond to this timeless wisdom only when we accept the seasons of our hearts as we accept the seasons of our fields. But in the fast pace of urban civilization we have lost the seasons of the heart and are near also to loosing the seasons of the field. The extent of this loss cannot be measured, only its consequences in the deteriorration of the social order are visible to us. The homogenization of time has destroyed the vitality that once flowed between the hours.

We are children of the Earth. Our destiny is interwoven with the destiny of the Earth. Only with the help of the Earth can we fulfill our cosmic purpose and only with our help can the Earth fulfill its cosmic purpose. It is vital that we understand and appreciate the essence of this shared destiny. One path to such understanding lies in what is called the Journey of the Year-- A journey of awakening to the fullness of the sacred relationship that binds us with the Earth through living according to the injunctions of each season in each succesive cycle of the year. When the meaning and depth of the yearly cycle are understood, attunement to its seasons constitutes a continuing sacrament enabling the healing, guiding, empowering and transforming of ourselves and the Earth.

To become attuned to both the large and the subtle changes that occur in the cycle of the year has always been a purpose--conscious or tacit--in the religious life of man. It is consequently not surprising that in the Liturgical Years of many religious traditions we find the occurrence of the same motifs, observances, and even dates. Many assume that the times set aside for various festivals and remembrances are somewhat arbitbrary. But the temporal coincidences between celebrations in various eclesiastical calendars are neither accidental nor arbitrary, they are derived empirically from patterns in the timbre of time. These patterns manifest great opportunities to those who disciplinedly study and tune to them while they buffet the moods and frustrate the psyches of those who are ignorant and ignore them.

The Journey of the Year links the mythic heritages and symbolisms of all the peoples of the Earth. It is a great tapestry whose weft and warp are woven from the feasts and fasts of many traditions. Its seasons and celebrations provide a multi-ocular view that permits our diversities to be seen as but facets of the great archetypal journey on which the Earth and its children are embarked. As we discover the deeper meanings of this journey we discover that our differences enrich us rather than divide us and though we shall perhaps always prefer to emphasize the specific tradition into which we were born, focus will cease to be on proselytizing but will turn to internalizing the full spectrum of perspectives afforded us by the variety of cultural traditions in the Journey of the Year.

It is broadly experienced among humankind that anxiety and depression, euphoria and joy ebb and flow like tides. We customarily ascribe fluctuations in our moods to some specific local and

We have two cubic equations.

From $\frac{\partial F}{\partial x}$ we get   i.e. Given p or q, find y or x

① $gy^3+2y^2-1=0$ where $y=\cos(x)$
and $g=\frac{1+p^2}{1-p^2}$ $p=\sqrt{\frac{q-1}{q+1}}$

If $p=0$, $q=1$, have full pyramid

From $\frac{\partial F}{\partial p}$ we get   i.e. given x or y or g, find p

② $p^3+3gp+2=0$ where $g=\frac{y+1}{y-1}$
and $y=\cos(x)$

Can these be worked backwards?

i.e. in ① assign y find g?

$$g=\frac{1-2y^2}{y^3}$$

in ② assign p find g?

$$g=\frac{2-p^3}{3p}$$

Lets take a specific value of p, viz. 0.1572813 or $x=51.853973$
$y=\cos(x)=0.617668$

from ② $g=4.230442=\frac{y+1}{y-1}$, $y=\frac{g+1}{g-1}$

$y=1.6191103$

$\frac{1}{y}=.6176231$

---

from ①. $y=1.6191103$

$g=-1.0003514=\frac{1+p^2}{1-p^2}$

$p=\sqrt{\frac{g-1}{g+1}}=$

A Brief Summary of the Paths and Grounds

Last time we started the Grounds and the Paths. Before going much farther with that there's something else I really should make clear. There are, basically, two traditions in the Vajrayana of four schools and four sects. There are two of one and two of the other. Nyingma and Kagyu are one set of traditions. The Shakya and Gelug are another set. The Shakya and Gelug are of the tradition of scholarship and learning. The Nyingma and the Kagyu are the practice lineages. The difference is not so great as you might imagine, but great none the less. According to the Gelug tradition meditation follows from View. You study and you try to get some understanding of what meditation is all about, the nature and exactly what is meant by the idea of emptiness - Shunyata. Then, with this understanding you sit down and meditate. According to the Kagyu and Nyingma traditions View follows from meditation. In other words, first you sit down - you get your butt on the ground - and practice meditation, then View will arise all by itself. For this reason any of the information and teaching that's given should support this whole notion. It's possible to get side tracked away from the actual practice in developing a lot of information having to do with things that are useful later on, but are not so useful now.

Last week in discussing the first of the Five Paths - the Path of Accumulation, we talked about the nature of exactly what it is that's being accumulated. Namely, Merit and Wisdom. The accumulation of merit, basically, means straightening out your act and not doing stupid things that generate negative potentials in life that are going to create disturbances. For example, when you steal something all of a sudden you've got something to worry about. If you hold up a 7-11, all of a sudden there's a negative potential that simply was not there before. There's a very strong potential that bad stuff is going to come down on you and it preoccupies and absorbs a certain part of your life. We go through our lives doing some pretty dumb things so from one day to the next we're concerned about the~~o~~ur fallout. The accumulation of merit has to do with creating for ourselves a space in which to live and practice the Dharma without having to worry about bad shit coming down all the time. This is the accumulation of merit.

The accumulation of wisdom arises out of the practice of meditation. This was used last week as a vehicle for developing some notions about just exactly what wisdom is. That is the first path - the Path of Accumulation.

The second Path or stage of the path is called preparation or linking. The Tibetan word is Jyorlam, which means to bring together, also to mix or to prepare. This is, basically, the stage at which we begin to get some kind of intuitive notion of what the Four Truths are all about. The Truth of suffering, the Truth of where it comes from, the Truth that there might be some alternative way of doing things that doesn't wind us

Lets work from given p's re the capstone
and find x

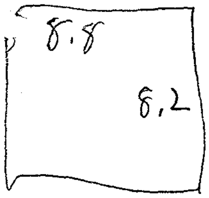
1. $b = 9'$ ft = meters

Peter Tompkins p372

Agatharchides of Cnidus c. 2nd century B.C.

Ja pyramidion or cap pyramid

p373 side of base of pyramidion = 9'
geographic feet



$H = 146.515$ m p367

8.8 ft = ? m 2.6822 m
8.2 = 2.499365 m
1 ft. = 30.48 cm 9' = 2.7432 m

9' $b = 2.7432$ m
$B =$ ~~320 m~~ 230.363

$p = 0.0119082$ $p^2 = .0001418$

$$q = \frac{1+p^2}{1-p^2} = 1.0002836$$

14600
$h = 1.74$
$H = 144.26$

$9y^3 + 2y^2 - 1 = 0$

$\rightarrow y = 0.6180155$

$\rightarrow x = 51.82864$
51° 49' 43"

essences of these many mythic traditions. The Journey of the Year provides such a framework. For its seasons not only give us common experiences but give us a framework to organize and integrate our many perceptions and interpretations of those experiences. Its seasons and celebrations provide a multi-ocular perspective of our diversities which can be seen to be but facets of the great archetypal journey on which the Earth and we, its children, are embarked. As we discover the deeper meanings of this journey we discover that our differences enrich us rather than separate us. Although each of us will have a special affection for the tradition into which we were born, and will choose to emphasize its festivals in our lives, our efforts can turn from proselyting and homogenizing to appreciating and internalizing the full spectrum of perspectives afforded by the variety of cultural traditions. While we may learn much just by exploring our own heritage, we can gain deeper insights by juxtaposing many heritages and noting their contrapuntal contrasts and similarities.

The Journey of the Year is an affirmation. It is an affirmation of the truth of our own tradition and simultaneously an affirmation of the truth of other traditions. But we can also discover that each truth, when all are honored, leads to deeper truth subsuming all.

The Journey of the Year is a mediator. It is a mediator between Sky and Earth. It bridges the cycles of the Heavens and the rhythms of the Earth, just as Man, by means of thought, mediates the world of spirit and the world of matter. The Journey of the Year is also a mediator between the changeless and the changing. Paradoxically, the changing seasons through their repetition provide the changeless ground against which all else is seen to change.

The Journey of the Year is a teacher. It teaches us

- Understand the basic physical and psychological cycles we all share.

- Understand timing, knowing the best and worst times for certain activities. Become familiar with the timbre of time.

- To learn how to interact with our personal rhythmic patterns.

- To learn and participate in rituals useful for spiritual growth.

- To help us unlearn those dogmas which have inhibited our growth.

Finally, the Journey of the Year is preparation for a new theophany –
a preparation to receive a ~~new~~ revelation of more of the attributes of ~~higher aspects of~~ God.
~~ever more majestic~~

- The Journey of the Year is a Theosis – its practice sacrilizes the Earth

SHAPE INDICES

SHAPINDX.WPD November 16, 1998

SHAPE INDICES

In flat space shape and size are independent permitting the creation of dimensionless indices that reference shape only. Two examples are given here. In two dimensions scale attributes of figures can be eliminated by taking the ratio P^2/A where P represents the perimeter of the figure and A its area. For three dimensional figures the dimensionless ratio S^3/V^2 removes scale factors, where S represents the surface area, and V the volume of the figure.

TWO DIMENSIONAL CASE

POLYGONS

Number of sides	Perimeter	Area	P^2/A	Value
∞	$2\pi r$	πr^2	4π	12.566371
6	6 e	$e^2 3\sqrt{(3)}/2$	$24/\sqrt{(3)}$	13.856407
5	5 e	e^2 1.720477		14.530854
4	4 e	e^2	16	16
3	3 e	$e^2\sqrt{(3)}/4$	$36/\sqrt{(3)}$	20.784610

The polygon shape parameters, all independent of size, have the value of 20.433 for an equilateral triangle and decrease toward $4\pi = 12.566371$ as the number of sides increases.

THREE DIMENSIONAL CASE

In the table E stands for the length of an edge; for pyramids a is an apothem and β is the base-face dihedral angle. Φ is the golden ratio 1.6180339...; φ = 1/Φ = 0.6180339...

POLYHEDRA

FIGURE	SURFACE	VOLUME	S^3/V^2	VALUE	
SPHERE	$4\pi R^2$	$4\pi/3 R^3$	$36 \cdot \pi$	113.097	÷○ = 9
ICOSAHEDRON	$5\sqrt{(3)} E^2$	$5 \Phi^2/6 E^3$	$36 \cdot 5 \cdot 3^{3/2}/\Phi^4$	136.458	
DODECAHEDRON	$3\sqrt{[5(5+2\sqrt{5})]} E^2$	$(15+7\sqrt{5})/4 E^3$		149.858	
OCTAHEDRON	$2\sqrt{(3)} E^2$	$\sqrt{(2)}/3 E^3$	$36 \cdot 3^{3/2}$	187.061	$\frac{2}{3}$△ = 9
CUBE	$6 E^2$	E^3	$36 \cdot 6$	216.000	÷□ = 13.5
TETRAHEDRON	$\sqrt{(3)} E^2$	$\sqrt{(2)}/12 E^3$	$36 \cdot 2 \cdot 3^{3/2}$	374.123	÷△ = 18

Note the ratio of triangle to circle = 1.65398 is one half the ratio of tetrahedron to sphere.

□ ○ $\frac{2}{3}$ cube

SHAPE INDICES OF SELECTED PYRAMIDS

$K = (S^3/V^2)/36$, $\Phi = (1+\sqrt{5})/2 = 1.618034...$, the golden section.

DEFINITION	b	S^3/V^2	K	S^3/V^2
$b = \arccos(\sqrt{3}/2)$	30°		30.0111	1080.3998
$b = \sin\varphi$	38.1727		18.9768	683.1665
Dahshur Bent upper	43.3667		15.0262	540.9424
$\arccos(1/\sqrt{2})$ ①	45.0	$36(1+\sqrt{2})^3$	14.0711	506.5596
$b = \arcsin(\pi/4)$ ②	51.7575		11.1140	400.1031
"400" ②	51.7654		11.1111	400
$b = \arccos(\varphi)$ ②	51.8273	$36\ \Phi^5$	11.0902	399.2472
$b = \arctan(4/\pi)$ ②	51.8540		11.0811	398.9193
Dahshur Bent lower	54.4622		10.2725	369.8089
$b = \arccos(1/\sqrt{3})$ ③	54.7356	$18(1+\sqrt{3})^3$	10.1962	367.0632
b = 1 radian	57.2958		9.5522	343.8787
$b = \arccos(1/2)$	60.0		9	324
$b = \arccos(1/\sqrt{5})$	63.4349		8.4721	304.9956
$b = \arccos(1/3)$ ④	70.5288		8	288
Inverse $\arccos(1/\sqrt{5})$	76.3453		8.4721	304.9956
$b = \arccos(1/5)$	78.4630		9	324
Inverse $\arccos(1/\sqrt{3})$	81.1006		10.1962	367.0632
Inverse $\arccos(\varphi)$	82.3090		11.0902	399.2472
Inverse $\arccos(1/\sqrt{2})$	84.6157		14.0711	506.5596

$k = \frac{100}{9}$

$\frac{4}{3} \times 216$

$= \frac{3}{2} \times 216$

① This pyramid results from dividing a cube into six congruent pyramids.

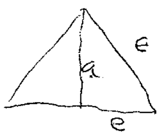
② These pyramids have been considered the best approximations to the Great Pyramid of Cheops.

③ This pyramid is half of an octahedron.

④ This is the minimum value of S^3/V^2 acquired by any square based pyramid.

SHAPE INDICES FOR ISOSCELES TRIANGLES

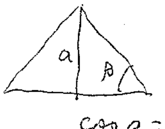
$\text{index} = \frac{P^2}{A}$ Circle 12.566371



equi $\frac{e}{2}$

$a = \frac{\sqrt{3}}{2} e$ $A = \frac{a e}{2} = \frac{\sqrt{3} e^2}{4}$ $I = \frac{P^2}{A} = \frac{36}{\sqrt{3}} = 20.784610$

$P = 3e$ $P^2 = 9e^2$



$\cos\beta = \varphi$

~~$a = \sin\beta$~~ ~~$A = e^2 \cos\beta$~~

~~$\frac{e}{2} = \cos\beta$~~

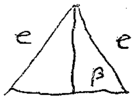
$P = 2e + e\sqrt{2}$ $P^2 = e^2 (2+\sqrt{2})^2$

$A = \frac{e}{\sqrt{2}} \cdot \frac{e}{\sqrt{2}}$ $A = \frac{e^2}{2}$ $I = 2(2+\sqrt{2})^2 = 23.313708$

$2(4 + 4\sqrt{2} + 2)$

$4(2 + 2\sqrt{2} + 1)$ ✓

IN General



$A = e \sin\beta \cdot e \cos\beta = e^2 \sin\beta \cos\beta$

$P = 2e + 2e\cos\beta = 2e(1+\cos\beta)$, $P^2 = 4e^2 (1+\cos\beta)^2$

$I = \frac{P^2}{A} = \frac{4(1+\cos\beta)^2}{\sin\beta\cos\beta}$

45° $\cos\beta = \sin\beta = \frac{1}{\sqrt{2}}$

$\underline{8\left(1+\frac{1}{\sqrt{2}}\right)^2} = 8\frac{(\sqrt{2}+1)^2}{2} = 4(1+\sqrt{2})^2$

$= 4(1 + 2\sqrt{2} + 2)$

$= 4(3 + 2\sqrt{2})$ ✓ $= 23.313708$

60° $\cos\beta = \frac{1}{2}$ $\sin\beta = \frac{\sqrt{3}}{2}$

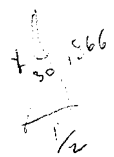
$\frac{4\left(1+\frac{1}{2}\right)^2}{\frac{\sqrt{3}}{4}} = \frac{4 \cdot \frac{9}{4}}{\frac{\sqrt{3}}{4}} = \frac{36}{\sqrt{3}}$

$S \text{ oct} = 8 \frac{\sqrt{3}}{4} = 2\sqrt{3}$

$V = \frac{\sqrt{2}}{3}$

$\frac{S^3}{V^2} = 8 \cdot 3^{3/2} \frac{9}{2} = 36 \cdot 3^{3/2}$

1 $\frac{\sqrt{3}}{2}$



$.866 = \cos 30$

How is S defined for a pyramid? $S = 1 + 4 \cdot \frac{\sqrt{3}}{4} = 1 + \sqrt{3}$

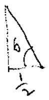
$S^3 = (1+\sqrt{3})^3$

$B = 1$

$\frac{1}{2}$ oct $H = \frac{1}{\sqrt{2}}$ $b = \cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$ 54

$A = \frac{\sqrt{3}}{2}$

$V = \frac{1}{3} \frac{1}{\sqrt{2}}$, $V^2 = \frac{1}{18}$



$\frac{S^3}{V^2} = 18$.

SHAPE INDICES OF SOME PYRAMIDS

sinφ 30 ~~30~~°.172708

Dashur 43.36 PYRAMIDS 15.026199 540.943158

DEFINITION	b	S^3/V^2	VALUE $\times 36$
$\frac{1}{6}$ cube tan = cot	45°	14.071068	506.558441
OCTAHEDRON /2	54.7356		
SIN b = π/4 ~~EQU - MID △~~	~~60°~~		
cos b = φ	~~6~~		
π pyramid			
1 rad → EQU - MID △ tan b = √3	60°	9	
tan l = 2	63.4349		
~~tan e = 2~~	~~8~~ 70	~~8~~	
tan e = 2	~~80°~~ 70.5288	8	minimum! 288
	80°	9.599324	
	~~85°~~		

⑮

85

ISOCELES
ISCOSOLES
SHAPE INDICES ISCOSOLES TRIANGLES
ISOSOLES

	⑯ DEF	b	S	V	S^3/V^2	VALUE
	—	30				
?	sin b = φ	38..				
	DASHUR	43+				
	Cube/6	45				
	Oct/2	54..				
GTPyr	b = sin $\frac{\pi}{4}$	51+				
GTPyr	cos b = φ	51+				
GTPyr	π PYR	51+				
	1 RAD	57+				
	EQU-MD	60				
	tan l = 2	63+				
		70				
	tan b = $2^{3/2}$ = tan e = 2	70+ -- 70.52878				
		75				
		85				

SPHERE PYRAMIDS

$S = b^2 + 2ab = (a+b)^2 - a^2$

$V = \frac{hb^2}{3}$, $h^2 = a^2 - \left(\frac{b}{2}\right)^2$, $4h^2 = (2a)^2 - b^2$

$9V^2 = h^2 b^4$; $36V^2 = 4h^2 b^4 = b^4[(2a)^2 - b^2]$

Take $b = 1$

$S = (a+1)^2 - a^2$

$36V^2 = 4a^2 - 1$

take $a = 1$

$S + 1 = (b+1)^2$

$4h^2 = 4 - b^2$

$36V^2 = b^4(4 - b^2)$

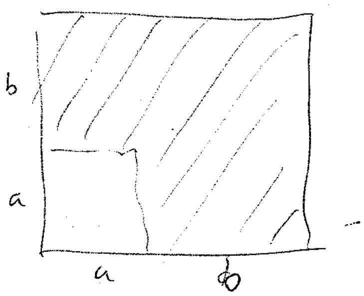
$\frac{36V^2}{b^4} = (4a)^2 - b^2 = 4h^2$

$b = 2e$

$h^2 = a^2 - e^2$

$\cancel{(a^2 - e^2)\cdot 4e^2} = 3V^2$

$3V = b^2\sqrt{a^2 - \left(\frac{b}{2}\right)^2}$



$S = (a+b)^2 - a^2$

Relating Sphere and pyramid

Vol's are equal when

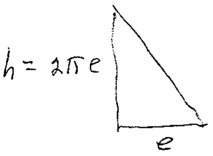
$= \frac{4}{3} h b^2 = \frac{4}{3}\pi r^3$

$b = 2e$

$h = \pi b = \pi 2e$

$\frac{4}{3}\pi b^3 \sim \frac{4}{3}\pi r^3$

$b \sim r$



$\tan\beta = 2\pi$

$\boxed{\beta = 80°.956939}$

i.e. the pyramid with $\beta = 80°.956939$ will have the same volume as a sphere when $b = r$ and $b = \frac{1}{2}$ length of base

Hemisphere and pyramid

$b = 2e$

$\frac{4}{3} h b^2 = \frac{4}{3}\frac{\pi}{2} r^3$

$h = \frac{\pi b}{2}$

$h = \pi e$

$\tan\beta = \pi$

$\boxed{\beta = 72°.343213}$

hemisphere vol = pyramid vol

Find shape indices for these pyramids

~~When we consider the success of mathematics as a symbolic domain representing the physical world, we naturally inquire, can mathematics serve as a model for the design of other symbolic domains? This does not mean that mathematics itself should be taken as the symbolic domain, but that there are certain aspects contained in the organization of mathematics that could prove useful in the design of other domains. Certainly the concepts of elements, types of elements, operations, and types of operations seem to be applicable to other domain of symbols. These concepts appear in language in the form of nouns, their modifiers, verbs and their modifiers. Where can we start in the design of a symbolic domain for the worlds of the psyche and spirit?~~

~~One of the most advanced symbolic domains, having many parallels to mathematics, for representing psychological and spiritual ontologies is that of Mahayana and Vajrayana Buddhism. The various buddhas, tathagatas, bodhisattvas, along with skandas, kayas, cittis, etc. provide a rich vocabulary and grammar for representing spiritual experiences. What is lacking that is found in mathematics is some form of overall organization. It is suggested that the structures contained in Vajrayana and Tantra be put in juxtaposition with not only the spiritual symbols of other heritages, but with the structures of mathematics and investigate whatever parallels that might appear.~~

ISOSTRIA

b=60 min $\frac{p^2}{A}$

$b := 25, 30 .. 85$

$$f(b) := 4\cdot\sqrt{3}\cdot\frac{(1+\cos(b\cdot deg))^2}{\sin(b\cdot deg)\cdot\cos(b\cdot deg)}$$

f(b)	b
65.73288	25
55.71281	30
48.79809	35
43.88362	40
40.38053	45
37.97187	50
36.51241	55
36	60
36.60778	65
38.82408	70
43.91443	75
55.80522	80
94.31134	85

$b := 59.5, 59.6 .. 60.5$

f(b)	b
36.00544	59.5
36.00349	59.6
36.00196	59.7
36.00087	59.8
36.00022	59.9
36	60
36.00022	60.1
36.00088	60.2
36.00198	60.3
36.00353	60.4
36.00553	60.5

$b := 51.8273$

$f(b) = 37.33166$

$b := 72$

$f(b) = 40.39452$

ISOS TRIA

$b := 25, 30 .. 85$

$$f(b) := 4 \cdot \frac{(1 + \cos(b \cdot deg))^2}{\sin(b \cdot deg) \cdot \cos(b \cdot deg)}$$

f(b)	b
37.9509	25
32.16581	30
28.17359	35
25.33622	40
23.31371	45
21.92307	50
21.08045	55
20.78461	60
21.13551	65
22.41509	70
25.35401	75
32.21916	80
54.45068	85

$b := 59.5, 59.6 .. 60.5$

f(b)	b
20.78775	59.5
20.78662	59.6
20.78574	59.7
20.78511	59.8
20.78474	59.9
20.78461	60
20.78474	60.1
20.78512	60.2
20.78576	60.3
20.78665	60.4
20.7878	60.5

$b := 51.8273$

$f(b) = 21.55345$

$b := 72$

$f(b) = 23.32179$

60° $\frac{36}{\sqrt{3}} = 20.78461$ minimum $\frac{P^2}{A}$

~~D~~Obverse about Fulcrum b: 70.5288

THREE PYRAMIDS

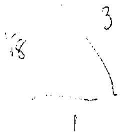
Shape Index

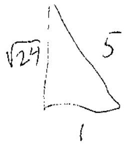
	V	S	V^2	S^3	S^3/V^2
B = 1	$\sqrt{3}/6 = \frac{1}{2\sqrt{3}}$	3	$1/12$	27	324
H = 1	$4/9 = 8/18$	4	$2^4/3^7$	64	324
A = 1	$\sqrt{3}/6$	3	$1/12$	27	324
E = 1					
B = 1	$\sqrt{2}/3$	4	$2/9$	64	288
H = 1	$3/18 = \frac{1}{6}$	2	$1/36$	8	288
A = 1	$2^3\sqrt{2}/3^4$	$(4/3)^2$	$2\cdot 2^6/3^8$	$(4/3)^6$	288
E = 1					
B = 1	$\sqrt{2/3}$	6	$2/3$	216	324
H = 1	$1/18$	1	$\frac{1}{2^3 3^4}$	1	324
A = 1	$(\frac{2}{5})^3\sqrt{\frac{2}{3}}$	$24/25$	$\frac{1}{3}\ \frac{2^7}{5^6}$	$\frac{3^3 2^9}{5^6}$	324
E = 1					

$\cos b = \frac{1}{2}$
60°
9
324

$\cos b = \frac{1}{3}$
70°.528779
8
288

$\cos b = \frac{1}{5}$
78°.4630
9
324





DIM2DIM

The $\frac{S^3}{V^2} = 400$ Pyramid

$x := 51.76588 = 51° 45' 57.''16836$ $y := \frac{1}{\sqrt{5}}$

$$f(x) := \frac{\left(\cos(x \cdot deg)^2 + \cos(x \cdot deg)\right)^3}{\cos(x \cdot deg)^4 - \cos(x \cdot deg)^6}$$

$$g(y) := \frac{\left(y^2 + y\right)^3}{y^4 - y^6}$$

$f(x) = 11.111111145$

$g(y) = 8.472135955$

$36 \cdot f(x) = 400.00000123$

FAMILIES

PYRAMIDOLOGY

FAMILIES

HAED RATIOS $B=1$

TRIGONOMETRIC FUNCTIONS = $N, \sqrt{N}, 1/N, 1/\sqrt{N}, \ldots$ etc.

Basic TRIGONOMETRIC FUNCTION = TRIGONOMETRIC FUNCTION

$\left\{ \begin{array}{l} \text{PYRAMIDS WITH 3 = ANGLES} \\ \text{PYRAMIDS WITH 2 = ANGLES} \end{array} \right.$

⑥ KEY ANGLES → $\boxed{6}$ positions

② Companion Pyramids

③ M F D

$a \quad -a \quad \sim E \leftrightarrow M$ or

$a \quad \frac{1}{a} \quad \sim m \leftrightarrow b$ or

$\sqrt{-1} = i \sim a \quad -\frac{1}{a} \quad \sim$?

$b=45$	$l=54$	$\frac{\text{cube}}{6}$
$b=54$	$l=60$	$\frac{1}{2}$ oct
$b=60$	$l=\omega$	Merid
$b=51$	$f=\omega$	GP

$2l+f=180$

Bridge Angle

$\omega = 63.4349°$

$\tan\omega = 2 = \sec 60$

$\tan\frac{\omega}{2} = \varphi = \cos 51.$

When used for computer purposes, the 64-possibilities build up from 6 "off" bit positions through a natural sequence to 6 "on" positions, thus encoding values ranging from 0 to 63. A simplistic first approximation to a pattern for the range of views would thus involve starting with a hexagram of six broken lines as representing primordial ignorance (samsara) and building up through the complete sequence to a hexagram of six unbroken lines as representing a final level of transcendental insight (corresponding to nirvana). By ignoring the first and last elements in the sequence, a correspondence could be obtained to the basic Buddhist pattern of views.

(d) Other possibilities for decoding

This binary coding pattern is the crudest solution to mapping the views onto a pattern. It ignores difficulties created by exceptions in the above text, notably the single 2-fold set, the 5-fold set and the 7-fold set. Relocating the first of these to complete the lasttwo, introducing there the two which were omitted, would lead to a second approximation.

Much more effort could however be devoted to thinking through the significance of the 4-fold logic and relating it to a representation using the 4 combinations of 2 lines (broken and unbroken). It is quite possible that insights from the Book of Changes might be helpful, especially in the case of the 4-fold Buddhist sets based on "material", "space", "perception" and "happiness" (see 2.1). Consider the following possible correspondences from that perspective:

- "Earth": material, finite, uniform perception, exclusively happy
- "Air": immaterial, infinite, diversified perception, exclusively miserable
- "Water": material and immaterial, finite and infinite, limited perception, happy and miserable
- "Fire": neither material nor immaterial, neither finite nor infinite, boundless perception, neither happy nor miserable.

Given the level of abstraction, it is appropriate to move beyond the particular instances, labels and metaphors, especially in order to capture meanings which are considered more active at this time. Consider the following:

- Space/Time: historical determinism ("past"), anticipation/vision ("future"), living in the present ("past and future"), proactive spontaneity ("neither past nor future")
- Subject/Object: objects without subjects, percipience without objects, subjects and objects, neither subjects nor objects.

Such an exploration could uncover ways of combining representations of the different views concerning the relationship between the three dualistic domains (materiality, objectivity, and space/time) as three pairs of two lines forming a single hexagram. These could be much more precisely linked to the views in the text. It would seem that the text contains sufficient indications to suggest that the final pattern might "lock" together in a totally unambiguous way, once the key was found. It might also provide a striking link to the insights and patterns of the Book of Changes such that each enhances the other.

As with any binary coding pattern, a finer pattern of distinctions can be obtained by adding further positions. Thus one extra would raise thepositions. Thus one extra would raise the number of d

7. Implications for sustainable human development

(a) Function of each view

COMPANION PYRAMIDS

$2b = P$
$p = 2B$
$2l = D$
$d = 2L$
$2e = M$
$m = 2E$

EXAMPLES

$\frac{1}{6}$ cube ($\cos b = \frac{1}{\sqrt{2}}$) and $\frac{1}{2}$ Octahedron ($\cos b = \frac{1}{\sqrt{3}}$)

$\frac{1}{\sqrt{2}} - \frac{1}{\sqrt{3}}$

Great Pyramid ($\cos b = \varphi$) and $\cos b = 5^{-1/4} = \frac{1}{\sqrt[4]{5}}$ ($\tan b = \sqrt{2\varphi}$)

$\cos b = \sqrt{\varphi}$ and $\cos b = \varphi^{3/2}$

$\cos b = \frac{1}{3}$ and $\tan b = \frac{1}{2}$ or $\cos^2 b = \frac{4}{5}$

$\frac{1}{3} - \frac{2}{\sqrt{5}}$

$\tan b = 2$ or $\cos b \frac{1}{\sqrt{5}}$ and $\cos^2 b = \frac{2}{3}$

$\frac{1}{\sqrt{5}} - \sqrt{\frac{2}{3}}$

Message-ID: <bf4d2ca5.24d8f9de@aol.com>
Date: Tue, 3 Aug 1999 22:05:18 EDT
Subject: Fwd: FW: Is Your Hut Burning?
To: SOONRBRN58@aol.com
MIME-Version: 1.0
Content-Type: multipart/mixed; boundary="part3_73e260c8.24d8f9de_boundary"
X-Mailer: AOL 4.0 for Windows 95 sub 21

–part3_73e260c8.24d8f9de_boundary
Content-Type: text/plain; charset="us-ascii"
Content-Transfer-Encoding: 7bit

–part3_73e260c8.24d8f9de_boundary
Content-Type: message/rfc822
Content-Disposition: inline

Return-path: Sreph612@aol.com
From: Sreph612@aol.com
Full-name: Sreph612
Message-ID: <8fdb0a76.24d7b327@aol.com>
Date: Mon, 2 Aug 1999 22:51:19 EDT
Subject: Fwd: FW: Is Your Hut Burning?
To: BLoden8269@aol.com, Jthibode@foxboro.com, Mourfiel@bellsouth.net,
L9442@aol.com, Daisey736@aol.com, DRozell22@aol.com,
Arborvilla@aol.com
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X-Mailer: AOL 4.0 for Windows 95 sub 21

–part4_73e260c8.24d7b327_boundary
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Content-Type: message/rfc822
Content-Disposition: inline

Return-path: SOUTHPA@aol.com
From: SOUTHPA@aol.com
Full-name: SOUTH PA
Message-ID: <85ad0e8e.24d77fab@aol.com>
Date: Mon, 2 Aug 1999 19:11:39 EDT
Subject: Fwd: FW: Is Your Hut Burning?
To: charo@dixie-net.com (Charlotte White), Rross722@aol.com,
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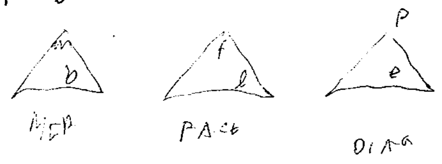
SPECIAL PYRAMIDS

		Meridian or Apothem △	Face △	Diag △				S^3/V^2		
NAME	b	T_M	T_F	T_D						Tan b
$\frac{1}{6}$ cube	45	45-90-45	54-70-54	35-109-35	$2b = m$	$2e = f$			$2H = B$	1
½ Octahedron FACE	54.7356	54-70-54	60-60-60	45-90-45	$2b = d$	$l = f$		$E = B$	$2H^2 = B^2$	$\sqrt{2}$
Meridian	60	60-60-60	63-53-63	50-78-50	$b = m$				$A = B$	$\sqrt{3}$
DIAGONAL	67.7923	67-44-67	69-41-69	60-60-60	$e = p$					$\sqrt{6}$
ABS	63.4349	63-53-63	65-48-65	54-70-54					$H = B$	2 $\sqrt{4}$
Min S^3/V^2	70.5288	70-38-70	71-36-71	63-53-63				288	$2A = 3B$	$\sqrt{8}$
	35.2644									$1/\sqrt{2}$
	53.1302									4/3
	57.0652				$b = f$					
	65.5302				$b = p$					
	58.72				$m = l$					
	54.1455				$m = e$					
	67.9103	64-50-64			$l = p$					
	60.9306	60-58-60	64-51-64	51-76-51	$f = e$	$2e = 2f = d$ $\sin b = \varphi\sqrt{2}$				
Great Pyramid	51.8283	51-76-51	58-63-58	41-96-41		$\sin x = \cot x$ $\cos b = \varphi$			$2H^2 = AB$	$\frac{1}{\sqrt{\varphi}}$
	38.1727	38-103-38	51-76-51	29-121-29	$2l = m$, $2b = f$ $2e + p = 180$	$\cos^2 b = \varphi$ $\cos x = \varphi \tan x$ $\sin b = \varphi$				$\sqrt{\varphi}$
SYM TO G.P.	48.0301	48-83-48	56-67-56	38-103-38						$\sqrt{2\varphi}$
	58.2825	58-63-58								$1/\varphi$
	76.3454	76-27-76								

Self symmetric

For all pyramids

$$\begin{cases} 2b + m = 180 \\ 2l + f = 180 \\ 2e + p = 180 \end{cases}$$



Check S^3/V^2 list for Specials

$x_c + x_s = 90$

	$\tan x$	x	$\tan x$	x	$\cos x$	x_c	$\sin x$	x_s	
	1	45 •			1	0	1	90	
	$\sqrt{2}$	54.7356 •	$1/\sqrt{2}$	35.2644 •	$1/\sqrt{2}$	45 •	$1/\sqrt{2}$	45	
	$\sqrt{3}$	60 •	$1/\sqrt{3}$	30	$1/\sqrt{3}$	54.7356 •	$1/\sqrt{3}$	35.2644 •	
	$\sqrt{4}$	63.4349 •	$1/\sqrt{4}$	26.5651	$1/\sqrt{4}$	60 •	$1/\sqrt{4}$	30	
	$\sqrt{5}$	65.9052			$1/\sqrt{5}$	63.4349 •	$1/\sqrt{5}$	26.5651	
	$\sqrt{6}$	67.7923 •							
	$\sqrt{7}$	69.2952	φ	31.7175	φ	51.8273 •	φ	38.1727 •	
	$\sqrt{8}$	70.5288 •	$\frac{1}{\varphi}$	58.2825 •	φ^2	67.5445	φ^2	22.4555	
	$\sqrt{9}$	71.5651	$\sqrt{2\varphi}$	48.0300 •	φ^3	76.3454 •			
	$\sqrt{10}$	72.4516			φ^4	81.6107			
	$\sqrt{11}$	73.2213							
	$\sqrt{12}$	73.8979			$\sqrt{\varphi}$	38.1727 •	$\sqrt{\varphi}$	51.8273 °	
	$\sqrt{13}$				$\sqrt[3]{\varphi}$	31.5920			
	$\sqrt{14}$				$\sqrt[4]{\varphi}$	27.5445	$\sqrt[4]{\varphi}$	62.4555	
	$\sqrt{15}$				$\varphi/2$	72	$\varphi/2$	18	
	$\sqrt{16}$	75.9638			$1/2\varphi$	36	$1/2\varphi$	54	
					[illegible]				

$2 \times 58.2825 + 63.4349 = 180$ $\qquad 2 \cos^{-1}\frac{1}{\varphi} + \cos^{-1}\frac{1}{\sqrt{5}} = 180$

$2 \times 51.8273 + 76.3454 = 180$ $\qquad 2 \cos^{-1}\varphi + \cos^{-1}\varphi^3 = 180$

$T_G = 51,8273 - 76,3454 - 51.8273$

$T_R = 38,1727 - 103.6546 - 38,1727$

$F = T_R$ does not exist, $l < 45°$

PYRAMIDS

$\varphi^{3/2}$

$\frac{1}{\sqrt[4]{5}}$

$M = T_G$ $\quad$ $M = T_R$, $F = T_G$ $\quad$ $D = T_G$ $\quad$ $D = T_R$

PYRAMID ===>		G. P.	$\cos b = \sqrt{\varphi}$	$\cos b = \varphi^{3/2}$	$\cos b = \frac{1}{\sqrt[4]{5}}$			
SYM	DEFINITION	$\cos b = \varphi$	$\cos^2 b = \varphi$	$\tan b = \sqrt{\frac{2}{\varphi}}$	$\tan b = \sqrt{2\varphi}$			
b	VALUE	51.8273	38.1727	60.9306	48.0301		64.0864	71.0393
m	m=180-2b	76.3454	103.6546	58.1387	83.9398		51.8273	37.9214
l	cot l = cos b	58.2825	51.8273	64.0864	56.2278		66.3939	72
f	f=180-2l	63.4349	76.3454	51.8273	67.5445		47.2121	36
e	√2tan e = tan b	41.9699	29.0694	51.8273	38.1727		55.5063	64.0864
p	p=180-2e	96.0602	121.8613	76.3454	103.6546		68.9875	51.8273
d	d=arccos(-cos²b)	112.4555	128.1727	103.6546	116.5650		101.0101	96.0602
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							

$b + m = d$

$2l = m$
$2b = f$
~~$2e = 180 - p$~~
$d - b = 90$
$l + b = 90$
$l + d = 180$
$m + f = 180$

$f = e$
$e + p = d$
$f + e = d$
$m = 2e$
$180 - m = p$
$p + d = 180$

Same set for Red + green

$2b = p$
$p = 2b$
$2l = d$
$d = 2l$
$2e = m$
$m = 2e$
$m + p = 180$
$p + m = 180$
$d + f = 180$
$f + d = 180$

$e + b = 90$
$b + e = 90$

Black + Orange are companions
Red + green are companions

The GP and Orange P contain many symmetries

Is this exceptional? or do other pyramids have such "companions?

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol φ represents the golden ratio = 0.618034...

T_5 = 51.8273 - 76.3454 - 51.8273
T_6 = 58.2825 - 63.4349 - 58.2825
T_7 = 38.1727 - 103.6546 - 38.1727

comp

PYRAMIDS

comp

PYRAMID ===>		G.P. $\cos b = \varphi$	$\cos^2 b = \varphi$	$\sin b = \varphi\sqrt{2}$	$\tan b = 1+\varphi$		no pyramid	SYM
SYM	DEFINITION	$M=T_5$ $F=T_6$	$F=T_5$ $M=T_7$	$D=T_5$	$M=T_6$	$D=T_6$	$F=T_7$	$D=T_7$
b	VALUE	51.8273	38.1727	60.9306	58.2825	66.3939		48.0301
m	m=180-2b	76.3454	103.6546	58.1387	63.4349	47.2122		83.9398
l	cot l = cos b	58.2825	51.8273	64.0864	62.2677	68.1765	38.1727	56.2278
f	f=180-2l	63.4349	76.3454	51.8273	55.4646	43.6469	103.6546	67.5445
e	√2tan e = tan b	41.9699	29.0694	51.8273	48.8455	58.2825		38.1727
p	p=180-2e	96.0602	121.8613	76.3454	82.3090	63.4349		103.6546
d	d=arccos(-cos²b)	112.4555	128.1727	103.6546	106.0451	113.6061		116.5650
W	W=4d-360 sph deg							
A	A = 1/(2cosb)	$\frac{1}{2\varphi}$	$\frac{1}{2\sqrt{\varphi}}$	1.0291 $\frac{1}{2\varphi\sqrt{\varphi}}$				
H	H = (tanb)/2	$1/2\sqrt{\varphi}$	$\frac{\sqrt{\varphi}}{2}$	0.8995 $\frac{1}{\sqrt{2\varphi}}$				
E	E=1/(2cosl)	$\frac{1}{2\varphi}\sqrt{1+\varphi^2}$	$\frac{1}{2\varphi}$	1.1441 $\frac{1}{\varphi\sqrt{2}}$				
		$2H^2 = AB$	$2A^2 = E$	A = AE				

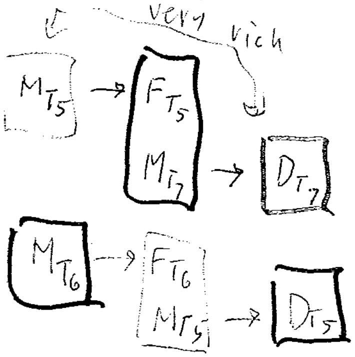
Obl

d=90+b
l+b=90
l+d=180
2l=m
2b=f
m+f=180
obl
2e=180-p

f=e
f+e=d
2e=2f=d
p+d=180

pro

m+b=d
b+d=180
~~m+2b=180~~
2d-m=180



orange black
b = ½ (GP) p
l = ½ (GP) d
e = ½ (GP) m
d = 2 (GP) l
p = 2 (GP) b
m = 2 (GP) e
f + (GP) d = 180
p + (GP) m = 180
~~2e+p~~ d + (GP) r = 180
m + (GP) p = 180

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

tan 45 = 1
tan 54.7356 = $\sqrt{2}$
tan 60 = $\sqrt{3}$
tan 63.4349 = 2
tan 70.5288 = $\sqrt{8}$
tan 53.1302 = 4/3

T_1 = 45-90-45
T_2 = 60-60-60
T_3 = 54.7356-70.5288-54.7356
T_4 = 63.4349-53.1302-63.4349

T_1, T_2, T_3, T_4 each appear 3 times

PYRAMIDS

comp

	PYRAMID ===>		FLAT	$\frac{1}{6}$ CUBE	$\frac{1}{2}$ Octahedron	Link to GP*		MIN S^3/V^2 = 288 $\cos b = \frac{1}{3}$	APS	
	SYM	DEFINITION	F = T_1	F = T_3, M = T_1	M = T_3 D = T_1 F = T_2	F = T_4 M = T_2	D = T_2	D = T_4	M = T_4, D = T_3	
M	b	VALUE	0	45	54.7356	60	67.7923	70.5288	63.4349	50.7685
	m	m=180-2b	180	90	70.5288	60	44.4154	38.9424	53.1302	
F	l	cot l = cos b	45	54.7356	60	63.4349	69.2952	71.5651	65.9051	
	f	f=180-2l	90	70.5288	60	53.1302	41.4097	36.8699	48.1898	
D	e	√2tan e = tan b	0	35.2644	45	50.7685	60	63.4349	54.7356	
	p	p=180-2e	180	109.4712	90	78.4630	60	53.1302	70.5288	
	d	d=arccos(-cos²b)	180	120	109.4712	104.4775	98.2132	96.3794	101.5370	
	W	W=4d-360 sph deg								
	A	A = 1/(2cosb)	1/2	$1/\sqrt{2}$	$\frac{1}{2}\sqrt{3}$	1	$\frac{1}{2}\sqrt{7}$	3/2	$\frac{1}{2}\sqrt{5}$	
	H	H = (tanb)/2	0	$\frac{1}{2}$	$1/\sqrt{2}$	$\frac{1}{2}\sqrt{3}$	$\sqrt{3/2}$	$\sqrt{2}$	1	
	E	E=1/(2cosl)	$1/\sqrt{2}$	$\frac{1}{2}\sqrt{3}$	1	$\frac{1}{2}\sqrt{5}$	$\sqrt{2}$	$\sqrt{5/2}$	$\sqrt{3/2}$	
			$E = \sqrt{A}$	$A = \sqrt{H}$	E = B	A = B	E = D	$A = \frac{3}{2}B$	H = B	
			f = 2l Obl	f = 2e m = 2b p = 2l Obl	~~p = 2e~~ l = f d = 2b Boundary	Pro	Pro	Pro	Pro	

f = m
l = b

Double Pyramids

Octahedron → OBLATE 2H < $\sqrt{2}$
PROLATE 2H > $\sqrt{2}$

H ~ 0.7071

$\frac{1}{6}$ cube and $\frac{1}{2}$ oct
~~are~~ companion

* In F, l → f gives G.P.

Oct → Cube

Cube → Oct

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

comp $\sqcap$ $\cos^2 b = 4/5$

PYRAMIDS

comp $\sqcap$

PYRAMID ===>		288	41	APS				
SYM	**DEFINITION**	$\cos b = \frac{1}{3}$	$\tan b = \frac{1}{2}$	$\tan b = 2$	$\cos^2 b = \frac{2}{3}$			
b	VALUE	70.5288	26.5651	63.4349	35.2644			
m	m=180-2b	38.9424	126.8698	53.1302	109.4712			
l	cot l = cos b	71.5651	48.1773	65.9051	50.7685			
f	f=180-2l	36.8699	83.6454	48.1898	78.4630			
e	$\sqrt{2}\tan e = \tan b$	63.4349	19.4713	54.7356	26.5651			
p	p=180-2e	53.1302	140.0575	70.5288	126.8698			
d	d=arccos(-cos²b)	96.3794	143.1301	101.5370	131.8103			
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							

b + b = 90

b — 2b

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol φ represents the golden ratio = 0.618034...

~~Oblate~~

$$\overset{\triangle}{M \longleftrightarrow D}$$

75.963752

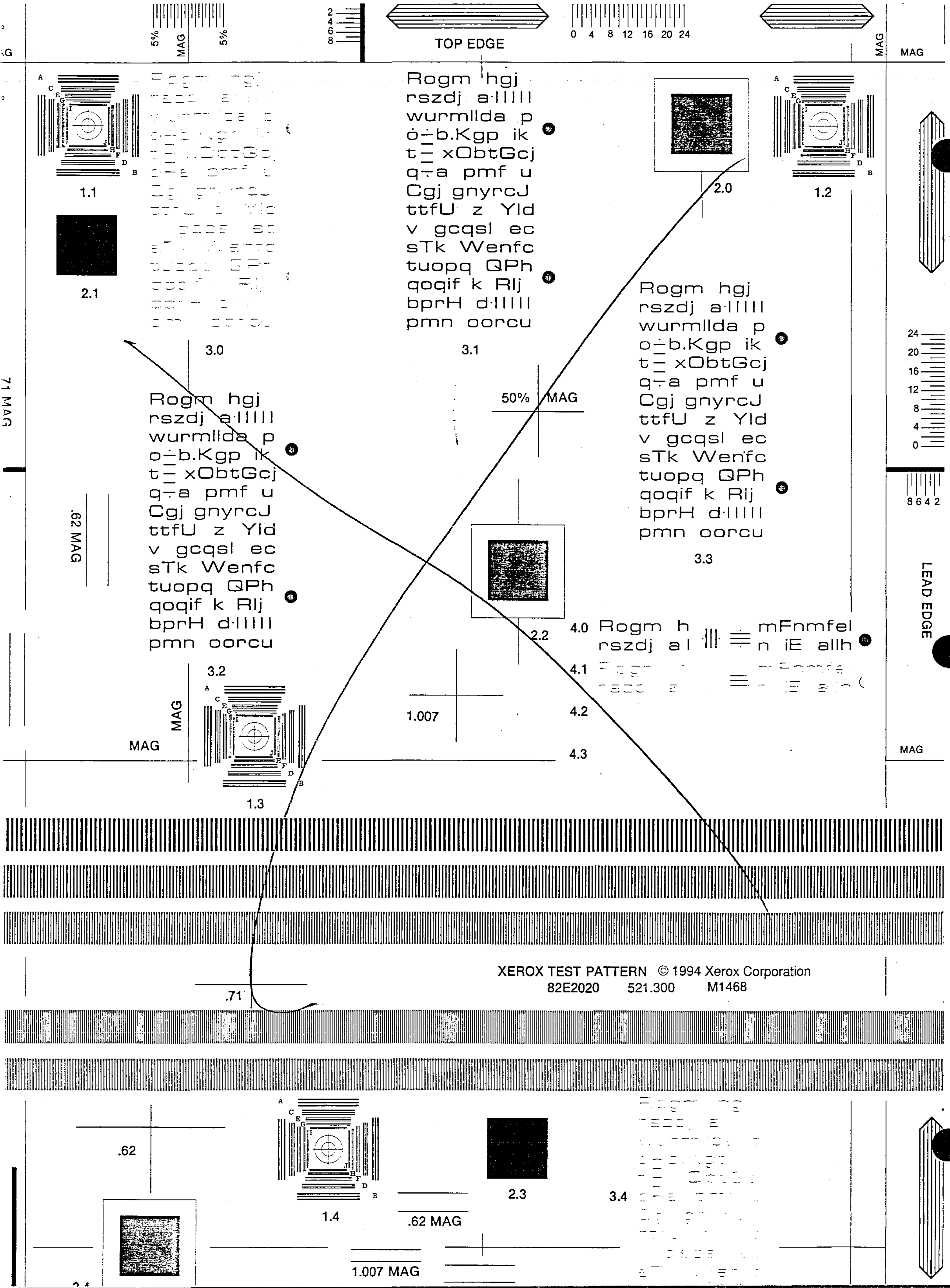
Prolate
d = face-face dihedral

	M △		D △		
	b - m - b ~~m - b - m~~		e - p - e ~~e - p - e~~		90° ↑
			75-78-75	M → D flatter ↑	
	75-28-75		70-38-70		~~[75.963752]~~ d = 93.3723
288 MIN	70-38-70		63-63-63		→ d = 966379369
APS	63-53-63		54-70-54		d = 101.53696
Tetrahedron M ≡ D	54-70-54	≡	54-70-54	Fulcrum	d = 70.52878
½ Octahedron	54-70-54		45-90-45	↓	d = 109.47122
$\frac{1}{6}$ cube	45-90-45		35-109-35		d = 120
	35-109-35			Flatter D → M	↓ 180°

also
M ⟷ F

oblate

D ⟷ F



Rogm hgj
rszdj a·lllll
wurmllda p
o÷b.Kgp ik
t= xObtGcj
q÷a pmf u
Cgj gnyrcJ
ttfU z Yld
v gcqsl ec
sTk Wenfc
tuopq QPh
qoqif k Rlj
bprH d·lllll
pmn oorcu

Rogm hgj
rszdj a·lllll
wurmllda p
o÷b.Kgp ik
t= xObtGcj
q÷a pmf u
Cgj gnyrcJ
ttfU z Yld
v gcqsl ec
sTk Wenfc
tuopq QPh
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pmn oorcu

Rogm h mFnmfel
rszdj a l n iE allh

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Every plane through the vertex of the pyramid, perpendicular to the base is a plane of symmetry. The Edge-Section, D, is the maximum section, the ^{M}meridian section is the minimum.

Ð → M flattens the pyramid, M → Ð sharpens it.

F → M

Flat →	$\frac{\text{cube}}{6}$ →	$\frac{\text{oct}}{2}$ →	Merid →	APS →		sharpens
b=0	75	54	60	63		

F → Ð

Flat →	$\frac{\text{OCT}}{2}$ →	cose=2 →	sharpens
b=0	b=54	b=67	

M → F extinction
Ð → F extincti[illegible] Flat

Note many pyramids are the same in
M → Ð
F → M
F → Ð

Family origin

H Extremas

Flat b=0 B fixed
$\cos b = \varphi$ A fixed
$\sin^2 e = \cos b$ E fixed
Spike b=90 H fixed

F → M
F → Ð

cannot emerge
NO F, NO Ð, NO M

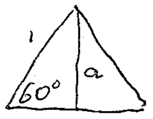
SYMBDOM..WPD October 30, 1998

SYMBOLIC DOMAINS

~~Humans attempt to understand their experiences by representing them symbolically. These symbols are the inhabitants of a mental world designed to behave in the same way that the worlds of experience behave. The most immediate world of our experience is the cultural world in which we interact with other humans, and the most immediate of our symbolic domains is that of language, a symbol set of words designed to perform coherently with our cultural operations and views. When we attempt to extend this cultural symbolic set in attempts to understand other worlds of our experience we find words are inadequate. We have found that a symbolic set we call mathematics is most useful for representing our trans-cultural experiences with the physical world, the world of nature. We have found useful representations of our experiences with spiritual and psychological worlds in sets of deities and sets of symbolic activities called rituals. For each world of experience we develop a domain of symbols, but for cultural purposes tie these domains together with language. To truly explore non-cultural worlds such as nature or spirit, we must thoroughly transcend dependence on those symbols fabricated for operating in our cultural world. Although mystics have long understood this, scientists have discovered it only in the present century, when the understanding of experiences in the physical world cannot be grasped by words but can be represented by equations.~~

~~Mathematics appears to be a symbolic domain isomorphic to the physical world. Language is a symbolic domain being continually updated in order to be isomorphic to our changing cultural world. The representations of the worlds of spiritual experience, however, have not been so successful. First of all, this may be because there are many worlds of spirit, not just one as we have so far found to be the case for nature. But be that as it may, religion repeatedly returns to cultural symbols for understanding. Not only has it not developed an adequate symbolic domain to sustain understanding of worlds of the spirit, but has instead substituted cultural scriptures for the spirit worlds whose exploration is its task to explore. For these reasons we can conclude that religion is not dedicated to its task of understanding the spirit, but has opted for being a cultural facade which in effect obstructs this task. The religions of the aborigines, the shamans, the pagans, were far more advanced in their approach to the spirit than the institutionalized religions of our times. This is not to say that within the heritages of our religions there are no useful symbols, for there are many. This is especially true of the complex structures of interacting deity symbols in those religions of Vedic lineage, especially Hinduism and Buddhism. In the West the rich spiritual and psychological symbols~~ represented by the gods and goddesses of the Mediterranean, of Egypt, Greece, Rome have been discarded in favor of a symbol for a single, (though important), spiritual fact: The unity of all things. [The desiccation created by this choice could not sustain itself. It had to be augmented with threefold aspects, with Satan, with the Virgin, with countless angels and saints. Monotheism is a lock on the gate to spiritual worlds.]

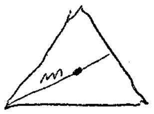
THE TETRAHEDRON



FACE

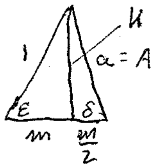
$a = \sqrt{1-(\frac{1}{2})^2} = \frac{\sqrt{3}}{2} = A$

re check this
? error



BASE

$m = \frac{2}{3} a = \frac{1}{\sqrt{3}}$



E-Section
≡ M-Section

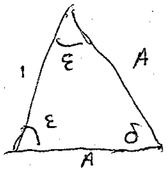
$H^2 = 1 - m^2 = 1 - \frac{1}{3} = \frac{2}{3}$

$H = \sqrt{\frac{2}{3}}$

$\cos \varepsilon = m = \frac{1}{\sqrt{3}}$; $\underline{\varepsilon = 54.7356^\circ}$

$\overset{\tan}{\cancel{\sin}}\, \delta = \frac{H}{\cancel{A}\frac{m}{2}} = \sqrt{\frac{2}{3}} \cdot 2\sqrt{3} = \sqrt{8}$ ~~8~~

$\underline{\delta = 70.52878^\circ}$ $\cos \delta = \frac{1}{3}$



E = M-section

$\frac{3}{2} m = m + \frac{m}{2} = A$

δ = dihedral angle

W = Solid angle at vertex = Sperical excess = $3\delta - 180 = 31.38634^\circ$ sp deg
= $0.1754797\,\pi$
= 0.5512856 steradians

Ω = Total interior solid angle = 4W = 126.34536 sph deg
= $0.701919\,\pi$
= 2.2051425 steradian

S^3/V^2	374,123	187,061	216	149.858	136.458
	Tetrahedron	Octahedron	Cube	Dodecahedron	Icosahedron
V	4	6	8		
T=?.	1	4	6		
W	0.1754797π	0.4326933π	0.5π		
Ω	$0.701919\,\pi$	1.7307733π	4π		
W		77.88488 sp deg			
Ω		311.53952			

re do
all solid angles

THE $\overset{54-70-54}{E \equiv M\,\Delta}$ of a tetrahedron ↔ M Δ of an Octahedron

THE $\overset{45-90-45}{E\,\Delta}$ of an octahedron ⟷ M Δ of a $\frac{1}{6}$ cube

Th $\overset{35-109-35}{E\,\Delta}$ of a $\frac{1}{6}$ cube ⟷ ?.

tetrahedron as fulcrum

Th E Δ of a $\underset{ABS}{\beta = 63.434949^\circ}$ ⟷ E≡M Δ of a tetrahedron 35.26439

E Δ of a $\underset{288\ \text{Min}}{\beta = 70.52878}$ ⟷ ~~M~~F Δ of an ~~ABS~~

2.1.7 Both finite and infinite

2.1.8 Neither finite nor infinite

2.1.9 Of uniform perception

2.1.10 Of diversified perception

2.5.4 Nibbana here and now in the third jhana

2.5.5 Nibbana here and now in the fourth jhana

6. Possible binary coding pattern

(a) Book of Changes

In the light of the above clues, the relationship to the 64-fold pattern of the Chinese *Book of Changes* calls for investigation, especially since the latter is similarly ambitious in scope. Of special interest is its early use in providing insights into the dilemmas of governance of Chinese society. The relevance of this pattern to understanding sustainable policy cycles is explored in Section TP (of the 1991 edition of this Encyclopedia). The concern here is with the symbol system used to encode that pattern, not with its popular uses by those indifferent to its overall structure. It should be noted that two of the 64 elements there (denoting creativity and receptivity) have a primordial significance distinguishing them from the remaining 62. It is these two which can be suggestively associated with nirvana and samsara in the Buddhist pattern.

The *Book of Changes* originated as a set of linear signs for oracular pronouncements. At its simplest this took the form of an unbroken line for "Yes" and a broken line for "No", thus capturing the essence of the Aristotelian view and the excluded middle. Greater subtlety was required and the pattern was extended to a double line representation by combining the two basic possibilities, thus forming a set of four possible responses. It is these four which can be used to encode the 4-fold logic noted above.

The pattern of the *Book of Changes* was then further extended by adding a single broken (or unbroken) line to each of the four above. This gives the 8 possibilities, namely the 8 basic trigrams of that system. It is possible that these might prove appropriate to encoding the 8-fold sub-sets noted above.

The final extension of the pattern was by combining each of the trigrams with each other into hexagrams of six lines (broken or unbroken). It is these that are used to represent the 64 conditions of the Book of Changes.

(b) Genetic code and physical particles

Although the Book of Changes is an extremely interesting example of the use of a binary coding pattern, especially given its focus on the complex subtleties of psycho-social systems, another striking use of this same pattern is to encode the set of 64 codons of the genetic code. The binary code is of course also basic to digital computer operations, even in giving importance to sets of 64 elements. Another fundamental application of a binary system is the standard model mapping the entire range of physical particles in terms of 6 quarks in 3 pairs of 2 -- a first pair of up and down quarks, a second of charm and strange quarks and a third of bottom and top quarks (with each being harder to make than the previous pair). Each quark has an anti-matter counterpart. Mesons are two-quark particles (requiring a quark and an anti-quark, which in the case of a K-meson are an anti-strange quark and a down quark). Baryons are three-quark particles.

(c) Computer machine code

PYRAMIDS

Defined by H, A, E, D relations

$D = B\sqrt{2}$

ATTRIBUTES

	b	Name				
$A = \frac{B}{2}$	0°	FLAT				
$A = B$	60°	Meridian	M = 60/60/60			
$H = B$	63°.4349	ABJ				
$E = B$	54°.7356	Half Octahedron	F = 60/60/60	MIN TOTAL Ω	$\sqrt{2}A = B$	$2A = \sqrt{3}B$
$H = \frac{B}{2}$	45°	$\frac{CUBE}{6}$	$EB = \sqrt{3}A^2$	$E^2 = 3H^2$	$A^2 = BH$	$2E = \sqrt{3}B$
$E = D$	67°.7923		D = 60/60/60			
$2H^2 = AB$	51°.8273	ϕ pyramid		$\frac{V}{S}$ max		
$2A = 3B$	70°.5288	Fulcrum	$\frac{S^3}{V^2} = 288$ a minimum			
$H = 2B$	75°.9638					
$A = 2B$	75°.5225					
$E = 2B$						
$2H = 3B$	71°.5651					
$2E = 3B$						
Name	b	A	H	E		
$\frac{CUBE}{6}$	45°	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$		
$2H = B$	$A^2 = BH$	$E^2 = 3H^2$	$EB = \sqrt{3}A^2$	$2E = \sqrt{3}B$		
$\cos b = \varphi$	51.8273					

LIMITS

$A > \frac{B}{2}$

$A > H$

$E > A$

$E > H$

$E > \frac{B}{\sqrt{2}}$

3 triangls

M = AAB

F = EEB

D = EED

H = Height

A = Apothem

E = Edge

D = Diagonal

B = Base

MORPHING

THE FUNDAMENTAL TRIANGLES

V	b	b
90	45	45
60	60	60
45	67.5	67.5

THESE ARE PLACED IN
M, F, D positions

M = AAB
F = EEB
D = EED   D = √2 B

H - Space

There are two basic operations in "morphing" from one pyramid to another

1) interchanging M, F, D
2) exchanging v with b

cf
translation
rotation
...
P-space

Example Half-Octahedron → Great Pyramid

F → M

in new F v ↔ b

gives GP

When used for computer purposes, the 64-possibilities build up from 6 "off" bit positions through a natural sequence to 6 "on" positions, thus encoding values ranging from 0 to 63. A simplistic first approximation to a pattern for the range of views would thus involve starting with a hexagram of six broken lines as representing primordial ignorance (samsara) and building up through the complete sequence to a hexagram of six unbroken lines as representing a final level of transcendental insight (corresponding to nirvana). By ignoring the first and last elements in the sequence, a correspondence could be obtained to the basic Buddhist pattern of views.

(d) Other possibilities for decoding

This binary coding pattern is the crudest solution to mapping the views onto a pattern. It ignores difficulties created by exceptions in the above text, notably the single 2-fold set, the 5-fold set and the 7-fold set. Relocating the first of these to complete the lasttwo, introducing there the two which were omitted, would lead to a second approximation.

Much more effort could however be devoted to thinking through the significance of the 4-fold logic and relating it to a representation using the 4 combinations of 2 lines (broken and unbroken). It is quite possible that insights from the Book of Changes might be helpful, especially in the case of the 4-fold Buddhist sets based on "material", "space", "perception" and "happiness" (see 2.1). Consider the following possible correspondences from that perspective:

- "Earth": material, finite, uniform perception, exclusively happy
- "Air": immaterial, infinite, diversified perception, exclusively miserable
- "Water": material and immaterial, finite and infinite, limited perception, happy and miserable
- "Fire": neither material nor immaterial, neither finite nor infinite, boundless perception, neither happy nor miserable.

Given the level of abstraction, it is appropriate to move beyond the particular instances, labels and metaphors, especially in order to capture meanings which are considered more active at this time. Consider the following:

- Space/Time: historical determinism ("past"), anticipation/vision ("future"), living in the present ("past and future"), proactive spontaneity ("neither past nor future")
- Subject/Object: objects without subjects, percipience without objects, subjects and objects, neither subjects nor objects.

Such an exploration could uncover ways of combining representations of the different views concerning the relationship between the three dualistic domains (materiality, objectivity, and space/time) as three pairs of two lines forming a single hexagram. These could be much more precisely linked to the views in the text. It would seem that the text contains sufficient indications to suggest that the final pattern might "lock" together in a totally unambiguous way, once the key was found. It might also provide a striking link to the insights and patterns of the Book of Changes such that each enhances the other.

As with any binary coding pattern, a finer pattern of distinctions can be obtained by adding further positions. Thus one extra would raise thepositions. Thus one extra would raise the number of d

7. Implications for sustainable human development

(a) Function of each view

[redacted]

VALUES RESULTING FROM EQUATING

THE SIX BASIC TRIG FUNCTIONS

	15 equation	x					
12:00	sinx = cosx	45°					
12:30	sinx = tanx	0°					
1:00	sinx = cotx	cosx=φ x=51.8273					
1:30	sinx = secx	no solution					
2:00	sinx = cscx	90°					
2:30	cosx = tanx	sinx=φ x=38.1727					
3:00	cosx = cotx	90°					
3:30	cosx = secx	0°					
4:00	cosx = cscx	no SOLUTION					
4:30	tanx = cotx	45°					
5:00	tanx = secx	90					
5:30	tanx = cscx	cosx=φ 51.8273					
6:00	cotx = secx	sinx=φ 38.1727					
6:30	cotx = cscx	0°					
7:00	secx = cscx	45°					
7:30							
8:00							
8:30							
9:00							
9:30							
10:00							
10:30							
11:00							
11:30							
12:00							
12:30							
1:00							
1:30				b			
2:00					# sol		
2:30				0	3		
3:00				38.1727	2	possible pyramids	
3:30				45	3		
4:00				51.8283	2		
4:30				90	3		
5:00							
5:30				no sol	2		
6:00							
6:30							
7:00							
7:30							
8:00							
8:30							
9:00							
9:30							
10:00							
10:30							
11:00							
11:30							

3 Pyramids from simple trig equation

38.1727 –
45 – $\frac{1}{6}$ cube
51.8283 – Great Pyramid

Equating the various trigonometric functions, we get

$\frac{6 \cdot 5}{2} = 15$ equations ✓ → with only 3 possible pyramids

tan = cot	tan = 1, 45°
tan = sin	cos = 1, 0°
tan = cos	sin = φ, 38°.172708
tan = cosec	cos = φ, 51.827291 (Gt. Pyr)
tan = sec	sin = 1, 90°
cot = sin	cos = φ, 51.82
cot = cos	sin = 1, 90°
cot = cosec	cos = 1, 0°
cot = sec	sin = φ, 38°.17
sin = cos	45°
sin = cosec	sin = 1, 90°
sin = sec	sin · cos = 1
cos = cosec	—
cos = sec	cos = 1, 0°
cosec = sec	45°

We get 5 different angles

③ 0° – nothing no pyrami

② 38°.17

③ 45° – $\frac{oct}{2}$ family

② 51°.83 → φ family

③ 90° – nothing no pyramid

+ 2 not possibles no solutions

15

The Pyramids emerging from simple equations involve:

38°.17

45° $\frac{cube}{6}$ $\frac{oct}{2}$ …

51°.83 Gt. Pyr

Pyramid with b = 45° is the $\frac{1}{6}$ cube

The OCT family from 45°

The Gt Pyr family from 51°.83 (φ)

only Common angle 63.434949 = x

~ tan x = 2

sin x = 0.894427

cos x = 0.447214

∴ a third family, the $\omega = 0$ or 63°.43 family

$\frac{6.5}{2} = 15$

Great Pyramid

$\tan x = \csc x$

$\frac{\sin}{\cos} = \frac{1}{\sin}$

$\sin^2 - \cos = 0$

$\cos^2 + \cos - 1 = 0$

$y^2 + y - 1 = 0$

$\frac{-1 \pm \sqrt{5}}{2} : y = \cancel{0}\varphi$

$y = \cos x = \varphi$

also $\cos x = \sqrt{2} \sin \frac{x}{2}$

$\cos 2y = \sqrt{2} \sin y$

$\cos^2 y - \sin^2 y = \sqrt{2} \sin y$

$1 - 2 \sin^2 y = \sqrt{2} \sin y$

$2 \sin^2 y + \sqrt{2} \sin y - 1 = 0$

$$\frac{-\sqrt{2} \pm \sqrt{2+8}}{4} = \frac{-\sqrt{2} \pm \sqrt{2}\sqrt{5}}{4} = \frac{\sqrt{2}}{2}\left(\frac{-1 \pm \sqrt{5}}{2}\right) = \frac{\varphi}{\sqrt{2}}$$

SPACES01.WP6 APRIL 1, 1998

THE FUNDAMENTAL SPACES

P-SPACE:
Position or physical space, the space in which our sensory apparatus operates. This space can be viewed either as a three dimensional geometric space or as four dimensional space-time. Its properties are the basis of Aristotelean two valued logic and the law of the excluded middle. It is characterized by here and not here and by there and not there. No two objects can occupy the same coordinates (place) at the same time and no single object can be at different places at the same time. These interconnections of space and time coordinates indicate that the space and time axes are not orthogonal contrary to their usual mathematical formulation. Distance in P-SPACE has two species: extension and separation.

H-SPACE:
Hamming or form space, an informational space.

B-SPACE:
Bonding or control space

C-SPACE
Communication or link space

BASIC TRIG FAMILIES

Inspeting the tables for 38°.1727, 45°, 51°.8273
We find.

For 38.1727

5 pyramids including

$b = 38.1727$ $2A^2 = EB$ $\cos b = \sqrt{\varphi}$ $l = 51.8273$ ∴ in 51 family
$e = 38.1727$ $HE = \frac{1}{2}$ $\cos e = \sqrt{\varphi}$
$l = 38.1727$ $l < 45$ ∴ no pyramid

For 45°

6 pyramids

$b = 45°$ $HB = A^2$ $\frac{1}{6}$ cube $2E = \sqrt{3}B$ $H = \frac{B}{2}$
$l = 45°$ FLAT
$e = 45°$ $\frac{1}{2}$ OCTAHEDRON $\sqrt{2}H = B$, $B = E$
2eq —— $f = 45$ $b = p = 65.5302$

For 51°.8273

6 pyramids

$b = 51.8273$ $2H^2 = AB$ $\cos b = \varphi$ Great Pyramid, $f = 63°.4349$
$l = 51.8273$, $b = 38.1727$ ∴ related to 38 family
2eq —— $b = 60.9309$, $e = f = 51.8272$

The 38 and 51 families overlap for $b = 38.1727$

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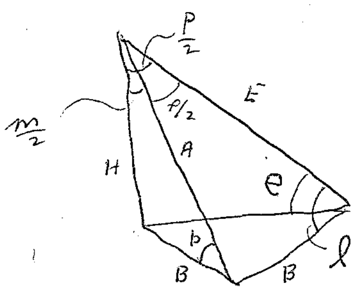
7. Implications for sustainable human development

(a) Function of each view

Pyramids with 2 angles equal

PAGE 1



$\boxed{b = m}$ $\rightarrow$ $3b = 180$ $b = 60$, $m = 60$

$m = 180 - 2b$ The Meridian Pyramid

$\boxed{b = l}$

$\cos b = \cot l$ $\rightarrow$ $x = 90°$ no pyramid

$\sin x = 1$

$\boxed{b = f}$

$\tan\frac{f}{2} = \frac{B}{A}$ $\tan\frac{x}{2} = \cos X$ $\rightarrow$ $x = 57°.06523$

$\cos b = \frac{B}{A}$

$\boxed{b = e}$

$\tan e = \frac{H}{\sqrt{2}B}$, $\tan b = \frac{H}{B}$

$\sqrt{2}\tan x = \tan \cancel{K}$

$\sqrt{2} = 1$ no pyramid

$\rightarrow$ FLAT $x = 0$

$\boxed{b = p}$

$\tan\frac{p}{2} = \frac{\sqrt{2}B}{H} = \frac{\sqrt{2}}{\tan b}$ $\rightarrow$ $65°.5302$

$\tan b = \frac{H}{B}$ $\tan\frac{x}{2}\tan x = \sqrt{2}$

$\boxed{m = l}$

$\tan l = \frac{A}{B}$ $\tan X = \frac{1}{\sin\frac{X}{2}}$

$\sin\frac{m}{2} = \frac{B}{A}$ $m \rightarrow 62°.56$ with $b = 58°.72$

$\boxed{m = f}$

$\tan\frac{f}{2} = \frac{B}{A}$ $\tan\frac{x}{2} = \sin\frac{x}{2}$

$\tan\frac{m}{2} = \frac{B}{A}$ $\cos\frac{x}{2} = 1$

$x = 0$ NO PYRAMID

$\boxed{m = e}$

$\tan e = \frac{H}{\sqrt{2}B}$, $\sqrt{2}\tan e = \cot\frac{m}{2}$ $\rightarrow$ $62°.93$

$\tan\frac{m}{2} = \frac{B}{H}$ $\sqrt{2}\tan x = \cot\frac{x}{2}$ $b = 54.14549$

$\boxed{m = p}$

$\tan\frac{p}{2} = \frac{\sqrt{2}B}{H}$ $\tan\frac{x}{2} = \sqrt{2}\tan\frac{x}{2}$

$\tan\frac{m}{2} = \frac{B}{H}$ $x = 0$

flat no pyramid

$\boxed{l = f}$ $f = 180 - 2l$ Half Octahedron

$x = 60°$

$b = 54.73561$

17 1990#4

19 Pythagoras 430

130 1992 Paternoz

193 1993 Dymatch

→226

276

364 EXPLCREA 1998

462 SHARQ

SEARCH01.WP6

September 3, 1998

SEARCHING FOR WHAT?

Our lives find their meaning in our search~~es~~ing for we know not what, but which we know we will recognize when we find it.

~~Can there be~~ Is it meaningful to search without knowing what one is searching for? Traditionally, there have been many searches, usually for something only partially defined. Only that which has been lost and is stored in personal or cultural memory has definiteness. All other searches are a mixture of the vague and partially envisioned. What is the Holy Grail? A definite chalice? How do you know it when you find it or would you recognize it? What is salvation? What is enlightenment? What are most of those states or conditions that we search for? Even what is happiness? Something glimpsed to which we wish to return. Indeed the clue for the object of our search is usually but a brief glimpse of what it is. However, we are confident that we possess something that will confirm our search. This is an inate possession we can call "recognition". Recognition goes beyond intuition and is independent of ~~what is stored in~~ memory.

While most are searching for the definite:--security, wealth, position, power, pleasure, success; the few are searching for the indefinite: --understanding, meaning, oneness, enlightenment. And in between the definite and indefinite there are those searching for: justice, peace, love, and happiness. But in addition to these three groups, there are a very few who are searching for something beyond all of this but which includes all of this. These "meta-searchers" are searching for a different **vantage point,** for a new and different way of viewing the world. And they quickly learn that to do this they must free themselves from the present vantage point, THE vantage point we have used for millenia. They must go from THE, assuming it to be only a special case, a view of but one facet of reality, and go to ALL, searching for as many alternative vantage points as possible. They must launch out into unknown spaces and dimensions, crafting new vehicles of perception and conception, gaining access to thought~~s~~ and mind never before ~~had~~ acquired by humankind.

Is this at all possible? Does our biological hardware permit this? Is our ingrained software alterable? Is this only an illusion that would reduce to just another episode for Star Trek? And why should we humans again and again seek to challenge the gods? Do we wish to join Prometheus chained to the rock being eaten by vultures? What is it in us that tells us we are more than we have ever become, that drives us to find this unrealized essence that we carry. If we end beside Prometheus, so be it, but we long ago made a commitment to this search and there is no turning back. We have played with digressions for too long. It is the time to return to our destiny. We are ~~the~~ Searchers, the part of the cosmos the cosmos has set aside to explore and know itself.

Pyramids with 2 angles Equal
PAGE 2.

$\cos l = \frac{B}{2E}$

$\cot l = \frac{B}{2A}$

don't use

~~$\boxed{l = e}$~~

~~$\tan l = \frac{A}{B} = \sec b$~~ ~~$\tan b = \sqrt{2} \tan e$~~

~~$\sec b = \tan l$~~

~~$\tan e = \frac{H}{\sqrt{2}B} = \frac{\tan b}{\sqrt{2}}$~~ ~~$b = \operatorname{atan}(\sqrt{2} \tan e)$~~

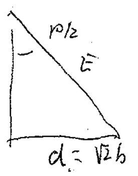
~~$b = \operatorname{asec}(\tan l)$~~

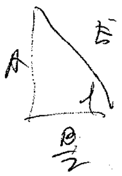
~~$\tan b = \frac{H}{B}$~~

~~$\operatorname{atan}[\sqrt{2} \tan x] = \operatorname{asec}[\tan x]$~~

~~$\tan x = y$~~

$\operatorname{atan}(\sqrt{2}y) - \operatorname{asec}(y) = 0$





$D = \sqrt{2}B$

$\frac{D}{2} = \frac{B}{\sqrt{2}}$ $\sin\frac{p}{2} =$ [illegible] $= \frac{B}{\sqrt{2}E}$

$\cos l = \frac{B}{2E}$, $\sqrt{2} \cos l = \frac{B}{\sqrt{2}E}$

$\boxed{l = p}$

$\cos l = \frac{B}{E}$ $\cos e = \sqrt{2} \cos l$

$\cos e = \frac{\sqrt{2}B}{E}$ $\cos x = \sqrt{2} \cos x$

No pyramid

$\boxed{l = p}$

$\sin\frac{p}{2} = \frac{\sqrt{2}B}{E} = \sqrt{2} \cos l$ $\sin\frac{x}{2} = \sqrt{2} \cos x$

$\cos l = \frac{B}{E}$ $\sin\frac{x}{2} = \sqrt{2} \cos x$ ✓

$x = l = p = 67.0213$

$b = 64.91033$

$\boxed{f = e}$

$\cos e = \frac{\sqrt{2}B}{E} = \sqrt{2} \sin\frac{f}{2}$

$\sin\frac{f}{2} = \frac{B}{E}$ $\cos x = \sqrt{2} \sin\frac{x}{2}$

→ 51,8273 = [illegible]

b = 60,9306

~~? → 64.08635~~

$\boxed{f - p}$

$\sin\frac{f}{2} = \frac{B}{E}$

$\sin\frac{p}{2} = \frac{\sqrt{2}B}{E} = \sqrt{2} \sin\frac{f}{2}$ no pyramid

$\boxed{e - p}$

$p = 180 - 2e$

$3x = 180$

$x = 60$

$b = 67.7923$

$[l = p]$ $\cos x = 1 - 2\sin^2\frac{x}{2}$

$\frac{1}{\sqrt{2}} \sin\frac{x}{2} = 1 - 2\sin^2\frac{x}{2}$

$\sin^2\frac{x}{2} + \frac{\sin\frac{x}{2}}{\sqrt{8}} - \frac{1}{2} = 0$

$u^2 + \frac{1}{\sqrt{8}}u - \frac{1}{2} = 0$

$u = \frac{-\frac{1}{\sqrt{8}} \pm \sqrt{\frac{1}{8} + 2}}{2}$

x = 67.021304

$u = +0.552092$ $\frac{x}{2} = 33.510652$

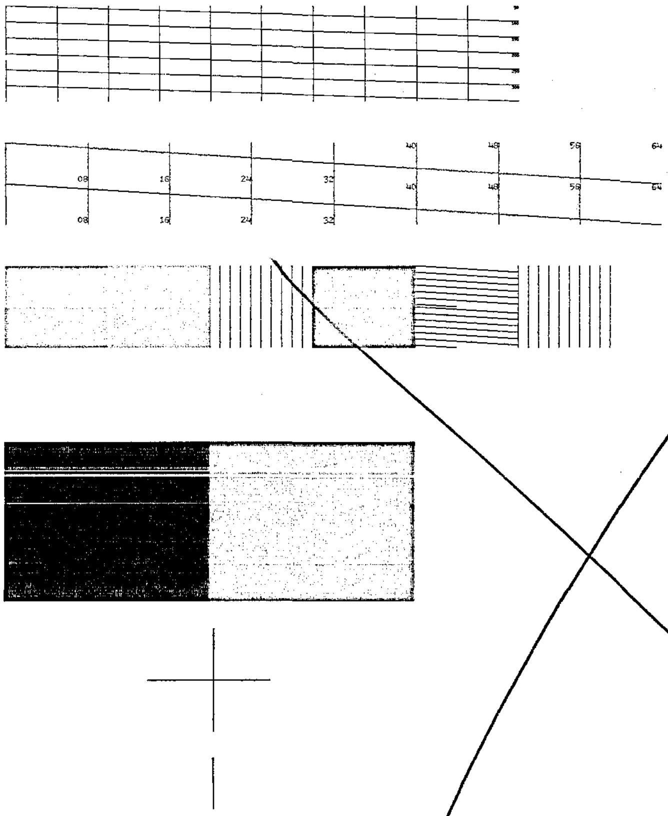
$u = -0.905646$ $\frac{x}{2} = -64.910429$

| = A B =

HP OfficeJet Pro 1150C Diagnostic Test

Model: OfficeJet Pro 1150C Cartridge Status: OK
ID: K 0x150001 CMY 0x8ec1

Print Cartridge



Built-in Scalable Fonts

Courier
Univers
CG Times
Letter Gothic

Courier Bld
Univers Bld
CG Times Bld
Letter Gth Bld

Courier It
Univers It
CG Times It
Letter Gth It

Courier Bld It
Univers Bld It
CG Times Bld It

Default Settings

DEFAULT PRINTING PARAMETERS:
Paper size: US Letter
VMI: 1200
Symbol set: PC-8
CR LF map: CR=CR

DEFAULT COPY PARAMETERS:
Quality: Normal
Lightness: 0 (Normal)
Paper Size: US Letter
Media Type: Plain
Color Intensity: 0 (Normal)
TE: ON
ELC: OFF
Red/Enlarge %: 100

|| = C D =

Summary

2 angles equal

$b = m$ $b = m = 60$ Merid

$b = l$ $\boxed{\text{no pyr}}$

5+4+3+2+1

(15)

• $b = f$ $b = 57°.06523$ — the E-fixed min $\frac{v}{s}$

$b = e$ $\boxed{\text{no pyr}}$

* • $b = p$ $b = 65°.5302$

• $m = l$ $m = l = 62°.56$, $b = 58°.72$

$m = f$ $\boxed{\text{n opyr}}$

• $m = e$ $m = e = 62.93$, $b = 54.14549$ Half Oct ?

$m = p$ $\boxed{\text{no pyr}}$

~~k~~ $l = f$ $l = f = 60$, $b = 54°.73561$ Half Oct ✓

$l = e$ $\boxed{\text{no pyr}}$

• $l = p$ $l = p = 67.0213$; $b = 64.9103$

* • $f = e$ $f = e = 51.8273$, $b = 60.9306$ → f = e is b of Gt-Pyr

$f = p$ $\boxed{\text{no pyr}}$

$e = p$ $e = p = 60$, $b = 67.7923$

9 pyramids with two equal angles

3 with 60-60-60

* Also in fundamental 45, or 51.8273 groups

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- ~~"Earth": material, finite, uniform perception, exclusively happy~~
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~~Such an exploration could uncover ways of combining representations of the different views concerning the relationship between the three dualistic domains (materiality, objectivity, and space/time) as three pairs of two lines forming a single hexagram. These could be much more precisely linked to the views in the text. It would seem that the text contains sufficient indications to suggest that the final pattern might "lock" together in a totally unambiguous way, once the key was found. It might also provide a striking link to the insights and patterns of the Book of Changes such that each enhances the other.~~

~~As with any binary coding pattern, a finer pattern of distinctions can be obtained by adding further positions. Thus one extra would raise thepositions. Thus one extra would raise the number of d~~

7. Implications for sustainable human development

(a) Function of each view

also the max $\frac{S}{V}$ for fixed E ↓

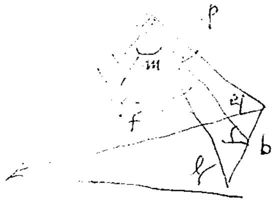
PYRAMIDS

with 2 angles the same

PYRAMID ===>		m = l	b = f	m = e	b = p	l = p	f = e	
SYM	**DEFINITION**							
b	**VALUE**	58.72	•57.0649	62.929	•65.5302	64.9104	60.9306	
m	**m=180-2b**	•62.56	65.8702	•54.142	48.9396	50.1792	58.1388	
l	**cot l = cos b**	•62.56	61.4676	65.53	67.5	•67.0214	64.0863	
f	**f=180-2l**	54.8786	•57.0649	48.94	45	45.9573	•51.8273°	
e	**√2tan e = tan b**	49.3315	47.5064	•54.141	57.2349	56.4893	•51.8273°	
p	**p=180-2e**	81.337	84.9872	71.7178	•65.5302	•67.0214	76.3455	
d	**d=arccos(-cos²b)**							
W	**W=4d-360 sph deg**							
A	**A = 1/(2cosb)**							
H	**H = (tanb)/2**							
E	**E=1/(2cosl)**							

} GP

= 2×38.1727



~~The doubles~~
~~51.8273~~
~~54.142~~
~~57.0649~~

double

double	b
51.8273 C GP	60.9306
54.143	62.929
57.0649 —	57.0649
62.56	58.72
65.5302 —	65.5302
67.0214	64.9104

+ 3 with equilateral triangles
3 angles the same

All angle values are given in degrees and decimal fractions of a degree.
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The symbol ϕ represents the golden ratio = 0.618034...

Additional Pyramids with 2 angles equal

g = the face - face dihedral angle [sometime called d]

$g = b$
$g = m$
$g = l$
$g = f$
$g = e$
$g = p$

$\cos g = -\cos^2 b$

[$g = b$] $x^2 + x = 0$ $x = 0$
$x = -1$
$b = g = 90$ no pyramid
$b = g = 180$ no pyramid

[$g = m$] $m = 180 - 2b$
$2b = 180 - m$
$b = 90 - \frac{m}{2}$
$\cos b =$ ~~$\cos\frac{m}{2}\cos 0$~~ $+ \sin\frac{m}{2}$
$-\sin^2\frac{x}{2} = \cos x = \cos^2\frac{x}{2} - \sin^2\frac{x}{2}$
$\cos^2\frac{x}{2} = 0$
$\frac{x}{2} = 90$, $x = 45$
$g = m = 45°$, $b = 67.5$

[$g = l$] $\cos b = \cot l$
$\cos g = -\cot^2 l$
$\cos x + \cot^2 x = 0$
$\cos x\left(1 + \frac{\cos x}{\sin^2 x}\right) = 0$
$\cos x = 0, \rightarrow x = 90$
$g = l = 90$, $b =$
no pyramid

$\frac{\sin^2 x + \cos x}{\sin^2 x} = 0$
$\cos^2 x - \cos x - 1 = 0$
$\frac{1 \pm \sqrt{1+4}}{2} = \varphi$
$\cos x = -\varphi$ no pyr
$x = 128°$

[$g = f$] $f = 180 - 2l$

[$g = e$] $\sqrt{2}\tan e = \tan b$

[$g - p$] $p = 180 - 2e$

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7. Implications for sustainable human development

(a) Function of each view

Angles → $\boxed{6}$

re do this page

Also do 67,5

PYRAMIDS

Putting key angles in positions

b, m, ~~l, f, e, p~~ stet

cos β = $\frac{1}{3}$ cos β = φ   E - FIXED MIN

PYRAMID ===>		45 in b	60 in b	54.73561 in b	63.4349 in b	70.5288 in b	51.8273 in b GP	cos b = sin² a
SYM	~~DEFINITION~~	$H = \frac{B}{2}$	A = B	E = B	H = B	$A = \frac{3}{2} B$	$H^2 = AB/2$	$H^2 = \frac{BE^2}{2A}$
b	~~VALUE~~	cube/6 ●	MERIDIAN ●	OCT/2 ●	APS ●	288 ●	GP	
m	~~m=180-2b~~	b = 67.5	MERIDIAN ●	b = 62.63245	b = 58.2825	OCT/2 ●	b = 64.0863	
l	~~cot l = cos b~~	FLAT	OCT/2 ●	CUBE/6 ●	MERIDIAN ●	b = 69.2952	b = 38.1727	
f	~~f=180-2l~~	b = 65.5302	OCT/2 ●	b = 58.8264	OT. PYR φ	CUBE/6 ●	b = 60.9306°	
e	~~√2tan e = tan b~~	OCT/2 ●	b = 67.7923	APS ●	288 ●	b = 75.9638	b = 60.9306°	
p	~~p=180-2e~~	b = 73.6751	b = 67.7923	b = 69.8963	b = 66.3939	APS ●	b = 71.0393	
d	~~d=arccos(-cos²b)~~							
W	~~W=4d-360 sph deg~~						• have f = e = 51.8273	
A	~~A = 1/(2cosb)~~							
H	~~H = (tanb)/2~~							
E	~~E=1/(2cosl)~~							
								b = f

	CUBE/6	3	
60 face	OCT/2	5	
60	MERIDIAN	3	
	APS	3	LINE OF APSIDES
	288	2	MIN S^3/V^2
	GT PYR	1	
	FLAT	1	
		= 7	need 10

~~$\overset{b}{\frac{cube}{6}} \rightarrow \overset{l}{\frac{cube}{6}} = \overset{b}{\frac{OCT}{2}} = \overset{e}{APS}$~~

$\frac{cube}{6} = \frac{OCT}{2}$

$\overset{b}{\frac{cube}{6}} \rightarrow \overset{l}{\frac{oct}{2}}$ $\frac{OCT}{2} \supset \overset{e}{\frac{cube}{6}}$

$\overset{e}{\frac{OCT}{2}} \rightarrow \overset{b}{APS}$ $\frac{OCT}{2} > APS$

$\overset{f}{APS} = GT\,PYR$ $\overset{e}{APS} \supset \overset{b}{GT\,PYR}$

$f = b$

$\left\{\frac{cube}{6} \atop e\right\} = \left\{\frac{OCT}{2} \atop b\right\} ; \left\{\frac{OCT}{2} \atop e\right\} = \left\{APS \atop b\right\} ; \left\{APS \atop f\right\} = \left\{GT\,PYR \atop b\right\}$

All angle values are given in degrees and decimal fractions of a degree.
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The symbol φ represents the golden ratio = 0.618034...

$\sec^2(38,17..) = \Phi$

$\boxed{S\sqrt{\Phi}}$ GROUP

ANGLE → $\boxed{6}$

38,172713

THE 38°~~,173139~~ Family

38,°172713

$\sin(\ ) = \varphi$

$\csc(\ ) = \Phi$

$\tan^2(\ ) = \varphi$

$\cos^2(\ ) = \varphi$

$\cos^2 = \sin$

$\cos^2 = \tan^2 \Rightarrow \varphi$

$\cos^4 = \sin^2$

PYRAMIDS

$S\sqrt{\Phi}\, b$ $S\sqrt{3}\, m$ $S\sqrt{3}\, l$ $S\sqrt{3} f \sec^2(\ ) = \Phi$

PYRAMID ===>				No Pyramid		$\sec\sqrt{3}\, e$	$\sec\sqrt{3}\, p$	No Pyramid
SYM	DEFINITION	$\cos^2 b = \varphi$	$\cos^2 m = \varphi$	$\cos^2 l = \varphi$	$\cos^2 f = \varphi$	$\cos^2 e = \varphi$	$\cos^2 p = \varphi$	$\cos^2 d = \varphi$
b	VALUE	38,172713	70.913644		69.756271	48.03009	76.251585	
m	m=180-2b	103.65457	38,172713		40.487458	83.93982	27,49683	
l	cot l = cos b	51,827294	71,892624	38,172713	70.913644	56,22776	76.631157	
f	f=180-2l	76,345404	36.214752		38.172713	67,54448	26.737686	
e	√2tan e = tan b	29.069380	63.925729		62.455477	38,172713	70.913644	
p	p=180-2e	121.86924	52,148542		55,089046	103,65457	38,172713	
d	d=arccos(-cos²b)	128.17270	96.188048		96.876286	116,56505	93.237892	38,172713
W	W=4d-360 sph deg	152.6908	24.552192		27,505144	106.2602	12,951568	
A	A = 1/(2cosb)	0.6360099	1.5290853		1,4450267	0.7476745	2.1038545	
H	H = (tanb)/2	0.3930758	1.4450266		1.3557663	0.5558931	2,0435763	
E	E=1/(2cosl)	0.809017	1.6087579		1,5290853	0.8994538	2.1624532	
		$2A^2 = EB$				$2H = 1/E$		

$A = \sqrt{\frac{E}{2}}$

$l \geq 45$
or not
pyramid

d must be > 90

$S = ?$

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ANGLE → $\boxed{6}$
45°

The 45° Family   tan(45°) = 1   2 equal angles

$\boxed{T1}$
$\boxed{S\sqrt{2}}$

PYRAMIDS

T1b   T1m   T1l   T1f   T1e   T1p

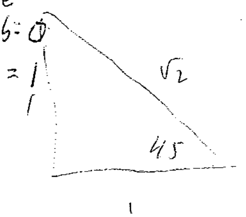
PYRAMID ===>		$\frac{\text{cube}}{6}$		FLAT	b = p	$\frac{\text{OCTAHEDRON}}{2}$		
SYM	DEFINITION	tan b = 1	tan m = 1	tan l = 1	tan f = 1	tan e = 1 cos l = $\frac{1}{2}$	tan p = 1	tan d = 1
b	VALUE	$\boxed{45°}$	67.5	0°	65.5302	54.73561	73.67505	
m	m=180-2b	90	$\boxed{45°}$	180°	48.9396	70.52878	32.6499	
l	cot l = cos b	54.73561	69.05898	$\boxed{45°}$	67.5	60	74.300143	
f	f=180-2l	70.52878	41.88204	90°	$\boxed{45°}$	60	31.399714	
e	√2tan e = tan b	35.26439	59.638807	0°	57.234901	$\boxed{45°}$	67.5	
p	p=180-2e	109.47122	60.722386	180°	65.530198	90°	$\boxed{45°}$	
d	d=arccos(-cos²b)	120	98.421058	180°	99.879281	109.47122	94.53158	45°
W	W=4d-360 sph deg	120	33.684232	360°	39.517124	77.88488	18.12632	
A	A = 1/(2cosb)	0.7071068	1.306563	0.5	1.2071068	0.8660254	1.7788236	
H	H = (tanb)/2	0.5	1.2071068	0	1.0986842	0.7071068	1.7071068	
E	E=1/(2cosl)	0.8660254	1.3989663	0.7071068	1.306563	1.000000	1.847759	
		BH = A²		A = E²		E = B		No Pyramid

one-four dihedral vertex solid

$.866 = \frac{\sqrt{3}}{2}$
$.707 = \frac{1}{\sqrt{2}}$

e = f/2
p = 2l
tan b = 1
sec b = √2
[illegible]

m = p = d
b = e
tan b = 0
sec b = 1



b = p

$H = \frac{B}{\sqrt{2}}$
tan b =
sec b =

d must be > 90

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The symbol ϕ represents the golden ratio = 0.618034...

2E = √3 B

redo this page

ANGLE → $\boxed{6}$
51.8273

THE 51.°83 FAMILY
51.°827298 = g

cos( ) = φ
sec( ) = Φ GROUP

$\boxed{S\Phi}$

PYRAMIDS

SΦb
GREAT PYRAMID
~~$2H^2 \doteq AB$~~

SΦm

SΦl

SΦf

SΦe close to one of Oct family

SΦp

	SYM	DEFINITION	1	2	3	4	5	6	7
	PYRAMID ===>		$2H^2=AB$		$2A^2=EB$		$HE=AB$	$E=\Phi B$	
	SYM	DEFINITION	cos b = φ	cos m = φ	~~cos l~~=φ	cos f = φ	~~cos e=φ~~	cos p = φ	cos d = φ
AHT	b	VALUE	51.827298	64.08657	38.1727	59.534535	60.9308	71.039288	
	m	m=180-2b	76.3454	51.827298	103.6545	60.930931	58.1387	37.921424	
FACE	l	cot l = cos b	58.2825	66.394064	51.827298	64.08657	64.0864	72.00000	72°
	f	f=180-2l	63.4349*	47.211872	76.3454	51.827298	51.8273	~~54.0000~~ ~~36.00000~~ ←	36°
HET	e	√2tan e = tan b	41.9699	55.506462	29.0694	50.243346	51.827298	64.08657	
	p	p=180-2e	96.0603	68.987076	121.8612	79.513308	76.3454	51.827298	–
	d	d=arccos(-cos²b)	112.4555	101.00998	128.1727	104.89617	103.6546	96.060171	51.827298
	W	W=4d-360 sph deg	89.8220	44.03992	152.6907	59.58468	54.6183	24.240684	
	A	A = 1/(2cosb)	0.8090	1.1441317	0.6360	0.9876263	1.0291	1.5388416	
	H	H = (tanb)/2	0.6360	1.0290954	0.3931	0.8500027	0.8995	1.4553465	
	E	E=1/(2cosl)	0.9511	1.2486141	0.8090	1.1441317	1.1441	1.6180339	
	δb	Difference in min sec			d - b = 90°	$m \doteq b$, $W \doteq b$	f = e	E = Φ	no pyramid ?

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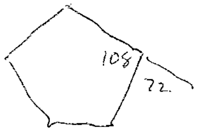
$m_1 \doteq f_3 = p_5$

51.827298
is also the angle
for which f = e
and for which = b

$\frac{v}{5}$ = [illegible]

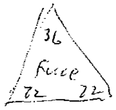
$f_3 \doteq p_5$

$d_3 = 2b_2$



tan b = 1.70000
$p - b \doteq 20°$
Can we make
a construction
to give 20°
∴ Nonagram ?

$p_5 = f_3$



⟹ p = 51.8273

$2\cos l = \varphi$
$d_6 = p_1$

d must be > 90

$$\boxed{\begin{gathered}\cos 72^\circ = \frac{\varphi}{2} \\ \frac{360}{5} = 72\end{gathered}}$$

~~$\cos 36 = \frac{\varphi}{2} = \cos 72$~~

$\cos 36 = \frac{\Phi}{2}$

$\cos 72 = \frac{\varphi}{2}$

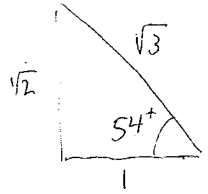
ANGLE → $\boxed{6}$
54°.73561

THE 54 GROUP
54.73561

Tan(54.735..) = $\sqrt{2}$ $\boxed{T\sqrt{2}}$
Sec(54.7..) = $\sqrt{3}$ $\boxed{S\sqrt{3}}$

PYRAMIDS

PYRAMID ===>		HALF OCTAHEDRON		CUBE 6		APS		
SYM	DEFINITION							
b	VALUE	54.73561	62.63245	45	58.826426	63.434949	69.896292	
m	m=180-2b	70.52878	54.73561	90	62.347148	53.130102	40.207416	
l	cot l = cos b	60	65.311905	54.73561	62.63245	65.905158	71.031105	
f	f=180-2l	60	49.37619	70.52878	54.73561	48.189684	37.93779	
e	√2tan e = tan b	45	53.794275	35.26439	49.450136	54.73561	62.63245	
p	p=180-2e	90	72.41145	109.47122	81.099728	70.52878	54.73561	
d	d=arccos(-cos²b)							
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)	tan b = $\sqrt{2}$		tan b = 1		tan b = 2		
		sec b = $\sqrt{3}$		sec b = $\sqrt{2}$		sec b = $\sqrt{5}$		



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Angle → $\boxed{6}$

57.0650

PYRAMIDS

The fixed 6

PYRAMID ===>		EXTREMA PYRAMID			" as first			
SYM	DEFINITION	$\sin^2 e = \cos b$						
b	VALUE	•57.0650	61.4675	49.6244	•57.0650	65.3893	68.9709	
m	m=180-2b	65.87	57.0650	80.7512	65.87	49.2214	42.0582	
l	cot l = cos b	61.4676	64.4669	57.0650	61.4676	67.3907	70.2599	
f	f=180-2l	•57.0650	51.0662	65.87	•57.0650	45.2186	39.4802	
e	√2tan e = tan b	47.5065	52.4414	39.7457	47.5065	57.0650	61.4675	
p	p=180-2e	84.987	75.1171	100.5086	84.987	65.8701	57.0650	
d	$d=\arccos(-\cos^2 b)$							
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							
		$H^2 = \frac{BE^2}{2A}$					"close" bridge	

b = 68.9709

~~W~~

δ 0°.0168 = 1' arc

p = 68.9887

with b = 64.0863 }

m = 51.8273 } ~ op

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

$$\frac{1+\sqrt{5}}{2} = 1.618033989$$

$\Phi := 1.618033989$

$\phi := 0.618033989$

$\frac{180}{\pi}\cdot \mathrm{acos}(\phi) = 51.827292355$

$b := 51.827292355$

$\frac{180 - b}{2} = 64.086353823$

$d := 64.086353823$

$g := \left[\frac{\tan\left(d\cdot\frac{\pi}{180}\right)}{\sqrt{2}}\right]$ $\frac{180}{\pi}\cdot \mathrm{atan}(g) = 55.506205727$

$h := 55.506205727$ $\boxed{180 - 2\cdot h = 68.987588546}$

$z := 61.465797388$ $\sqrt{2}\cdot\tan\left(\frac{\pi}{180}\cdot z\right) = 2.600953556$

not equal

$j := 2.600953556$

$k := \frac{180}{\pi}\cdot \mathrm{atan}(j)$ $\boxed{k = 68.969527284}$

$\delta = 1' \, 5''$

ANGLE → $\boxed{6}$

58.2825°

$\cot 58^\circ = \varphi \approx 0.618$

$\tan 58 = \Phi$ 1.618

GP

PYRAMIDS

PYRAMID ===>				GP				
SYM	DEFINITION	$\cot b = \varphi$		$\cos b = \varphi$				
b	VALUE	58.2825	60.8588	51.8273	56.1144	66.3939	68.4838	
m	m=180-2b	63.4350†	58.2825	76.3454	67.7712	47.2122	43.0324	
l	cot l = cos b	62.2677	64.0356	58.2825	60.8587	68.1756	69.8588	
f	f=180-2l	55.4646	51.9288	63.4349†	58.2825	43.6469	40.2825	
e	√2tan e = tan b	48.8455	51.7452	41.9699	46.4749	58.2825	60.8588	
p	p=180-2e	82.3091	76.5097	96.0602	87.0501	63.4349†	58.2825	
d	d=arccos(-cos²b)							
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

ANGLE → $\boxed{6}$
60° SEC(60°) = 2

The 60° Family
ONLY 3 PYRAMIDS

sec( ) = 2

$\boxed{S2}$
$\boxed{T\sqrt{3}}$

PYRAMIDS

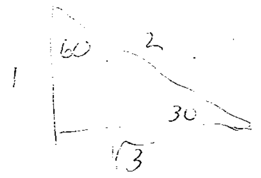
S2b = S2m S2l = S2f S2e = S2p

PYRAMID ===>		Ⓣ	Ⓣ	Octahedron 2		Diagonal 60		
SYM	DEFINITION	Meridian cos b = 0.5	cos m = 0.5	cos l = 0.5	cos f = 0.5	cos e = 0.5	cos p = 0.5	
b	VALUE	60	60	54.73561		67.792345		
m	m=180-2b	60	60	70.52878		44.41531		
l	cot l = cos b	63.434949		60	60	69.295189		
f	f=180-2l	53.130102		60	60	41.409622		
e	√2tan e = tan b	50.76848		45°		60	60	
p	p=180-2e	78.46304		90°		60	60	
d	d=arccos(-cos²b)	104.47751		109.47122		98.213211		60
W	W=4d-360 sph deg	57.91004		77.98488		32.852844		
A	A = 1/(2cosb)	1.00000		0.8660254		1.3228756		
H	H = (tanb)/2	0.8660254		0.7071068		1.2247449		
E	E=1/(2cosl)	1.118034		1.000000		1.4142136		
						$=\sqrt{2}$		No Pyramid

A = B

$\cos^2 b = \frac{1}{3}$
E = B

E = D



All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

ANGLE → $\boxed{6}$
60.9306

GP

PYRAMIDS

PYRAMID ===>								
SYM	DEFINITION							
b	VALUE	60.9306	59.5347°	56.2277	53.9685	68.5414	67.4156	
m	m=180-2b	58.1388^{+}	60.9306	67.5446	72.0630	42.9172	45.1688	
l	cot l = cos b	64.0863	63.1142	60.9306	59.5347°	69.9060	68.9910	
f	f=180-2l	51.8273°	53.7715	58.1388^{+}	60.9306	40.1880	42.0180	
e	√2tan e = tan b	51.8273°	50.2485	46.5973	44.1902	60.9306	59.5347°	
p	p=180-2e	76.3455	79.5129	86.8055	91.6196	58.1388^{+}	60.8305	
d	d=arccos(-cos^{2}b)							
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

ANGLE → $\boxed{G}$
$\tan(63.^\circ 434949) = 2$
$\omega = 63.434949$

The $63.^\circ 434949$ ~~Family~~ GROUP
$\overset{\shortparallel}{\omega}$

$\tan(\ ) = 2$

$\boxed{T2}$
$\boxed{S\sqrt{5}}$

PYRAMIDS

T2b T2m T2l T2f GT PYR T2e T2p

PYRAMID ===>		APS		[illegible]	$\tan l = \Phi$ $\cos b = \varphi$	288		NO PYRAMID
SYM	DEFINITION	$\tan b = 2$	$\tan m = 2$	$\tan l = 2$	$\tan f = 2$	$\tan e = 2$	$\tan p = 2$	$\tan d = 2$
b	VALUE	63.434949	58.282526	60	51.827292	70.52878	66.373902	
m	m=180-2b	53.130102	63.434949	60	76.345416	38.94244	47.212196	
l	cot l = cos b	65.905158	62.267698	63.434949	58.282526	71.565062	68.176537	
f	f=180-2l	48.189684	55.464604	53.130102	63.434949	36.869896	43.646926	
e	√2tan e = tan b	54.73561	48.845501	50.76848	41.969475	63.434949	58.282526	
p	p=180-2e	70.52878	82.308998	78.46304	96.06105	53.130102	63.434949	
d	d=arccos(-cos²b)	101.53696	106.04506	104.47751	112.45551	96.379369	99.227644	63.434949
W	W=4d-360 sph deg	46.14784	64.18024	57.91004	89.82204	25.517476	36.910576	
A	A = 1/(2cosb)	1.118034	0.9510565	~~1.00000~~ 1.0000	0.8090171	1.5	1.2486061	
H	H = (tanb)/2	1.0000000	0.8090171	0.8660254	0.63601	$\sqrt{2}$	1.1441229	
E	E=1/(2cosl)	1.2247449	1.0744805	1.118034	0.9510565	1.5811389	1.344997	
					$2H^2 = AB$	$\sqrt{8}A = 3H$		

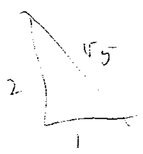
~~tan f = 2~~
~~tan l = Φ~~

$\tan f = 2$
$\tan l = \Phi = 1+\varphi$
$\cos b = \varphi$
$\cos\left(\frac{m}{2}\right) = \sqrt{\varphi}$
↑
THE GREAT PYRAMID

$EH = \sqrt{5},$
$\cos b = \frac{1}{3}$

$\tan e = \Phi$

d must be >90



$.860 = \frac{\sqrt{3}}{2}$

$2A = 3$
$H = \sqrt{2}$

$\frac{A}{H} = \frac{3}{\sqrt{8}}$

$AH^2 = 3$

$\sqrt{8}A = 3H$

$E = 1.5811 = \sqrt{\frac{5}{2}} = \frac{\sqrt{5}}{\sqrt{2}},$

$\frac{E}{\sqrt{5}} = \frac{1}{\sqrt{2}} = \frac{1}{H}$

$\sqrt{2}H$

$EH = \sqrt{5}$

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

Angl~~e~~ → $\boxed{6}$
64.0863

GP

PYRAMIDS

PYRAMID ===>								
SYM	DEFINITION							
b	VALUE	64.0863	57.9569	60.9306	51.2505	71.0392	66.1263	
m	m=180-2b	51.8273°	64.0863	58.1388	77.4990	37.0393	47.7474	
l	cot l = cos b	66.3939	62.0515	64.0863	57.9569°	72	67.9657	
f	f=180-2l	47.2123	55.8970	51.8273°	64.0863	36	44.0685	
e	$\sqrt{2}\tan e = \tan b$	55.5061	48.4854	51.8273°	41.3817	64.0863	57.9569°	
p	p=180-2e	68.9877	83.0291	76.3454	97.2365	51.8273°	64.0863	
d	$d=\arccos(-\cos^2 b)$							
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

Angles → $\boxed{6}$

re do this page

Also do 67.5

PYRAMIDS

Putting key angles in positions

b, m, ~~b, f, e, p~~ stet

$\cos\beta = \frac{1}{3}$ $\cos\beta = \varphi$ E - FIXED MIN

PYRAMID ===>		45 in b	60 in b	54.73561 in b	in b 63.4349	in b 70.5288	51.8273 in b GP	$\cos b = \sin^2 e$
SYM	DEFINITION	$H = \frac{B}{2}$	A = B	E = B	H = B	$A = \frac{3}{2}B$	$H^2 = AB/2$	$H^2 = \frac{BE^2}{2A}$
b	VALUE	cube/6 ●	MERIDIAN ●	OCT/2 ●	APS ●	288 ●	GP	
m	m=180-2b	b = 67.5	MERIDIAN ●	b = 62.63~~25~~	b = 58.2825	OCT/2 ●	b = 64.0863	
l	cot l = cos b	FLAT	OCT/2 ●	CUBE/6 ●	MERIDIAN ●	b = 69.2952	b = 38.1727	
f	f=180-2l	b = 65.5302	OCT/2 ●	b = 58.8264	GT. PYR φ	CUBE/6 ●	b = 60.9306 °	
e	$\sqrt{2}\tan e = \tan b$	OCT/2 ●	b = 67.7923	APS ●	288 ●	b = 75.9638	b = 60.9306 °	
p	p=180-2e	b = 73.6751	b = 67.7923	b = 69.8963	b = 66.3939	APS ●	b = 71.0393	
d	$d=\arccos(-\cos^2 b)$							
W	W=4d-360 sph deg						° have f = e = 51.8273	
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							
								b = f

	CUBE/6	3	
60 face	OCT/2	5	
60	MERIDIAN	3	
	APS	3	LINE OF APSIDES
	288	2	MIN S^3/V^2
	GT PYR	1	
	FLAT	1	
		= 7	need 10

~~$\overset{b}{\frac{cube}{6}} \rightarrow \overset{l}{\frac{cube}{6}} = \overset{b}{\frac{OCT}{2}} = \overset{e}{APS}$~~

$\overset{b}{\frac{cube}{6}} \rightarrow \overset{l}{\frac{oct}{2}}$ $\frac{cube}{6} = \frac{OCT}{2}$

$\frac{OCT}{2} \supset \overset{e}{\frac{cube}{6}}$

$\overset{e}{\frac{OCT}{2}} \rightarrow \overset{b}{APS}$ $\frac{OCT}{2} \supset APS$

$\overset{f}{APS} = GTPYR$ $\overset{e}{APS} \supset \overset{b}{GT\ PYR}$

f = b

$\begin{Bmatrix} \frac{cube}{6} \\ e \end{Bmatrix} = \begin{Bmatrix} \frac{OCT}{2} \\ l \end{Bmatrix}; \begin{Bmatrix} \frac{OCT}{2} \\ e \end{Bmatrix} = \begin{Bmatrix} APS \\ b \end{Bmatrix}; \begin{Bmatrix} APS \\ f \end{Bmatrix} = \begin{Bmatrix} GT\ PYR \\ b \end{Bmatrix}$

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol φ represents the golden ratio = 0.618034...

$\sec^2(38.17..) = \Phi$

$\boxed{S\sqrt{\Phi}}$

ANGLE → $\boxed{6}$

38,172713

THE 3~~8.173139~~ Family

38.°172713

$\sin(\ ) = \varphi$

$\csc(\ ) = \Phi$

GROUP

$\cos^2 = \sin$

PYRAMIDS

$\tan^2(\ ) = \varphi$

$\cos^2 = \tan^2 \Rightarrow \varphi$

$\cos^4 = \sin^2$

$S\sqrt{\Phi}\,b$ $S\sqrt{3}\,m$ $S\sqrt{3}\,l$ $S\sqrt{3}\,f\ \sec^2(\ ) = \Phi$ $\cos^2(\ ) = \varphi$

PYRAMID ===>				No Pyramid		Sec $\sqrt{3}$ e	Sec $\sqrt{3}$ p	No Pyramid
SYM	DEFINITION	$\cos^2 b = \varphi$	$\cos^2 m = \varphi$	$\cos^2 l = \varphi$	$\cos^2 f = \varphi$	$\cos^2 e = \varphi$	$\cos^2 p = \varphi$	$\cos^2 d = \varphi$
b	VALUE	38,172713	70.913644		69.756271	48.03009	76.251585	
m	m=180-2b	103.65457	38,172713		40.487458	83.93982	27,49683	
l	cot l = cos b	51,827294	71,892624	38,172713	70.913644	56,22776	76.631157	
f	f=180-2l	76,345404	36.214752		38,172713	67,54448	26.737686	
e	√2tan e = tan b	29.069380	63.725729		62.455477	38,172713	70.913644	
p	p=180-2e	121.86124	52,148542		55,089046	103,65457	38,172713	
d	d=arccos(-cos²b)	128.17270	96.188048		96.876286	116,56505	93.237892	38,172713
W	W=4d-360 sph deg	152.6908	24.552192		27,505144	106.2602	12,951568	
A	A = 1/(2cosb)	0.6360099	1.5290853		1,4450267	0.7476745	2.1038545	
H	H = (tanb)/2	0.3930758	1.4450266		1.3557663	0.5558931	2,0435763	
E	E=1/(2cosl)	0.809017	1.6087579		1,5290853	0.8994538	2.1624532	
		$2A^2 = EB$				$2H = 1/E$		

$A = \sqrt{\frac{E}{2}}$

$l \geq 45$
or not
pyramid

d must be > 90

S = ?

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

ANGLE → $\boxed{6}$
45°

The 45° Family   tan(45°) = 1   2 equal angles

$\boxed{T1}$
$\boxed{S\sqrt{2}}$

PYRAMIDS

T/b   T/m   T/l   T/f V   T/e   T/p

PYRAMID ===>		cube 6		FLAT	b = p	OCTAHEDRON 2		
SYM	DEFINITION	tan b = 1	tan m = 1	tan l = 1	tan f = 1	tan e = 1 cos l = $\frac{1}{2}$	tan p = 1	tan d = 1
b	VALUE	$\boxed{45^\circ}$	67.5°	0°	65.5302	54.73561	73.67505	
m	m=180-2b	90	$\boxed{45^\circ}$	180°	48.9396	70.52878	32.6499	
l	cot l = cos b	54.73561	69.05898	$\boxed{45^\circ}$	67.5	60	74.300143	
f	f=180-2l	70.52878	41.88204	90°	$\boxed{45^\circ}$	60	31.399714	
e	√2tan e = tan b	35.26439	59.638807	0°	57.234901	$\boxed{45^\circ}$	67.5	
p	p=180-2e	109.47122	60.722386	180°	65.530198	90°	$\boxed{45^\circ}$	
d	d=arccos(-cos²b)	120	98.421058	180°	99.879281	109.47122	94.53158	45°
W	W=4d-360 sph deg	120	33.684232	360°	39.517124	77.88488	18.12632	
A	A = 1/(2cosb)	0.7071068	1.306563	0.5	1.2071068	0.8660254	1.7788236	
H	H = (tanb)/2	0.5	1.2071068	0	1.0986842	0.7071068	1.7071068	
E	E=1/(2cosl)	0,8660254	1.3989663	0.7071068	1.306563	1.000000	1.847759	
		$BH = A^2$		$A = E^2$		$E = B$		No Pyramid

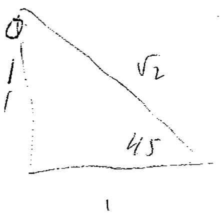
one-fine dihedral vertex solid

$.866 = \frac{\sqrt{3}}{2}$

$.707 = \frac{1}{\sqrt{2}}$

$e = f/2$
$p = 2l$
$\tan b = 1$
$\sec b = \sqrt{2}$
[illegible]

$m = p = d$
$b = e$
$\tan b = 0$
$\sec b = 1$



$b = p$

$H = \frac{B}{\sqrt{2}}$

$\tan b =$
$\sec b =$

d must be > 90

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

$2E = \sqrt{3}B$

edo this page

ANGLE → $\boxed{6}$

51.8273

THE 51.°83 FAMILY

51.°827298 = 2

$\cos(\ ) = \varphi$

$\sec(\ ) = \Phi$ GROUP

$\boxed{S\Phi}$

PYRAMIDS

SΦb GREAT PYRAMID ~~2H² = AB~~ 1

SΦm 2

SΦl 3

SΦf 4

SΦe close to one of Oct family 5

SΦp 6

7

	PYRAMID ===>		$2H^2 = AB$		$2A^2 = EB$		$HE = AB$	$E = \Phi B$	
	SYM	DEFINITION	$\cos b = \varphi$	$\cos m = \varphi$	$\cos l = \varphi$	$\cos f = \varphi$	$\cos e = \varphi$	$\cos p = \varphi$	$\cos d = \varphi$
AHT	b	VALUE	51.827298	64.08657	38.1727	59.534535	60.9308	71.039288	
	m	m=180-2b	76.3454	51.827298	103.6545	60.930931	58.1387	37.921424	
FACE	l	cot l = cos b	58.2825	66.394064	51.827298	64.08657	64.0864	72.00000	=72°
	f	f=180-2l	63.4349*	47.211872	76.3454	51.827298	51.8273	~~54.0000~~ ~~36.00000~~	36°
HET	e	√2tan e = tan b	41.9699	55.506462	29.0694	50.243346	51.827298	64.08657	
	p	p=180-2e	96.0603	68.987076	121.8612	79.513308	76.3454	51.827298	–
	d	d=arccos(-cos²b)	112.4555	101.00998	128.1727	104.89617	103.6546	96.060171	51.827298
	W	W=4d-360 sph deg	89.8220	44.03992	152.6907	59.58468	54.6183	24.240684	
	A	A = 1/(2cosb)	0.8090	1.1441317	0.6360	0.9876263	1.0291	1.5388416	
	H	H = (tanb)/2	0.6360	1.0290954	0.3931	0.8500027	0.8995	1.4553465	
	E	E=1/(2cosl)	0.9511	1.2486141	0.8090	1.1441317	1.1441	1.6180339	
	δb	Difference in min sec			d - b = 90°	m ≐ b, W ≐ b	f = e	E = Φ	no pyramid ?

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

$2\cos l = \varphi$
$d_6 = p_1$

d must be > 90

$m_1 \doteq f_3 = p_5$

$f_3 = p_5$

$d_3 = 2b_2$

$\tan b = 1.70000$

$p - b \doteq 20°$

Can we map a construction to give 20°

∴ Nonagram ?

$p_5 = f_3$

$\cos 72° = \frac{\varphi}{2}$

$\frac{360}{5} = 72$

~~$\cos 36 = \frac{\varphi}{2} = \cos 72$~~

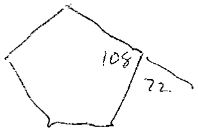
$\cos 36 = \frac{\Phi}{2}$

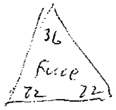
$\cos 72 = \frac{\varphi}{2}$

51.827298 is also the angle for which f = e

and for which = b

$\frac{V}{5}$ = angle





⟹ p = 51.8273

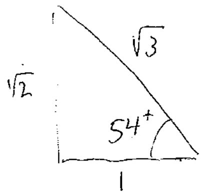
ANGLE → $\boxed{6}$
54°.73561

THE 54 GROUP
54.73561

Tan(54.735..) = $\sqrt{2}$ $\boxed{T \sqrt{2}}$
Sec(54.7..) = $\sqrt{3}$ $\boxed{S \sqrt{3}}$

PYRAMIDS

PYRAMID ===>		HALF OCTAHEDRON		CUBE 6		APS		
SYM	DEFINITION							
b	VALUE	54.73561	62.63245	45	58.826426	63.434949	69.896292	
m	m=180-2b	70.52878	54.73561	90	62.347148	53.130102	40.207416	
l	cot l = cos b	60	65.311905	54.73561	62.63245	65.905158	71.031105	
f	f=180-2l	60	49.37619	70.52878	54.73561	48.189684	37.93779	
e	√2tan e = tan b	45	53.794275	35.26439	49.450136	54.73561	62.63245	
p	p=180-2e	90	72.41145	109.47122	81.099728	70.52878	54.73561	
d	d=arccos(-cos²b)							
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)	tan b = $\sqrt{2}$		tan b = 1		tan b = 2		
		sec b = $\sqrt{3}$		sec b = $\sqrt{2}$		sec b = $\sqrt{5}$		



All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

Angle → $\boxed{6}$

57.0650

PYRAMIDS

The fixed 5

PYRAMID ===>		EXTREMA PYRAMID			" as first			
SYM	DEFINITION	$\sin^2 e = \cos b$						
b	VALUE	•57.0650	61.4675	49.6244	•57.0650	65.3893	68.9709	
m	m=180-2b	65.87	57.0650	80.7512	65.87	49.2214	42.0582	
l	cot l = cos b	61.4676	64.4669	57.0650	61.4676	67.3907	70.2599	
f	f=180-2l	•57.0650	51.0662	65.87	•57.0650	45.2186	39.4802	
e	$\sqrt{2}\tan e = \tan b$	47.5065	52.4414	39.7457	47.5065	57.0650	61.4675	
p	p=180-2e	84.987	75.1171	100.5086	84.987	65.8701	57.0650	
d	$d=\arccos(-\cos^2 b)$							
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							
		$H^2 = \frac{BE^2}{2A}$					"close" bridge	

b = 68.9709

~~H~~

δ 0°.0168 = 1′ arc

p = 68.9877

with b = 64.0863 }

m = 51.8273 } ~ op

All angle values are given in degrees and decimal fractions of a degree.
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The symbol ϕ represents the golden ratio = 0.618034...

ANGLE → $\boxed{6}$
58.2825°

cot 58° = φ ≈ 0.618
tan 58 = Φ 1.618

GP

PYRAMIDS

PYRAMID ===>				GP				
SYM	DEFINITION	cot b = φ		cos b = φ				
b	VALUE	58.2825	60.8588	51.8273	56.1144	66.3939	68.4838	
m	m=180-2b	63.4350†	58.2825	76.3454	67.7712	47.2122	43.0324	
l	cot l = cos b	62.2677	64.0356	58.2825	60.8587	68.1756	69.8588	
f	f=180-2l	55.4646	51.9288	63.4349†	58.2825	43.6469	40.2825	
e	√2tan e = tan b	48.8455	51.7452	41.9699	46.4749	58.2825	60.8588	
p	p=180-2e	82.3091	76.5097	96.0602	87.0501	63.4349†	58.2825	
d	d=arccos(-cos²b)							
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol φ represents the golden ratio = 0.618034...

ANGLE → $\boxed{6}$
60° SEC(60°) = 2

The 60° Family
ONLY 3 PYRAMIDS

sec( ) = 2

$\boxed{S2}$
$\boxed{T\sqrt{3}}$

PYRAMIDS

S2b = S2m S2l = S2f S2e = S2p

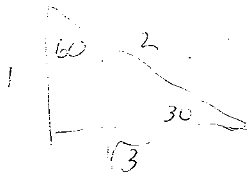
PYRAMID ===>		T ~~V-IV~~	T	Octahedron 2		Diagonal 60		
SYM	DEFINITION	Meridian cos b = 0.5	cos m = 0.5	cos l = 0.5	cos f = 0.5	cos e = 0.5	cos p = 0.5	
b	VALUE	60	60	54.73561		67.792345		
m	m=180-2b	60	60	70.52878		44.41531		
l	cot l = cos b	63.434949		60	60	69.295189		
f	f=180-2l	53.130102		60	60	41.409622		
e	√2tan e = tan b	50.76848		45°		60	60	
p	p=180-2e	78.46304		90°		60	60	
d	d=arccos(-cos²b)	104.47751		109.47122		98.213211		60
W	W=4d-360 sph deg	57.91004		77.88488		32.852844		
A	A = 1/(2cosb)	1.00000		0.8660254		1.3228756		
H	H = (tanb)/2	0.8660254		0.7071068		1.2247449		
E	E=1/(2cosl)	1.118034		1.000000		1.4142136		
						$=\sqrt{2}$		No Pyramid

A = B

$\cos^2 b = \frac{1}{3}$

E = B

E = D



All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

ANGLE → $\boxed{6}$
60.9306

GP

PYRAMIDS

PYRAMID ===>								
SYM	DEFINITION							
b	VALUE	60.9306	59.5347°	56.2277	53.9685	68.5414	67.4156	
m	m=180-2b	58.1388+	60.9306	67.5446	72.0630	42.9172	45.1688	
l	cot l = cos b	64.0863	63.1142	60.9306	59.5347°	69.9060	68.9910	
f	f=180-2l	51.8273°	53.7715	58.1388+	60.9306	40.1880	42.0180	
e	√2tan e = tan b	51.8273°	50.2435	46.5973	44.1902	60.9306	59.5347°	
p	p=180-2e	76.3455	79.5129	86.8055	91.6196	58.1388+	60.8305	
d	d=arccos(-cos²b)							
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

Angle → $\boxed{6}$
64.0863

GP

PYRAMIDS

PYRAMID ===>								
SYM	DEFINITION							
b	VALUE	64.0863	57.9569	60.9306	51.2505	71.0392	66.1263	
m	m=180-2b	51.8273°	64.0863	58.1388	77.4990	37.0393	47.7474	
l	cot l = cos b	66.3939	62.0515	64.0863	57.9569°	72	67.9657	
f	f=180-2l	47.2123	55.8970	51.8273°	64.0863	36	44.0685	
e	$\sqrt{2}\tan e = \tan b$	55.5061	48.4854	51.8273°	41.3817	64.0863	57.9569°	
p	p=180-2e	68.9877	83.0291	76.3454	97.2365	51.8273°	64.0863	
d	$d=\arccos(-\cos^2 b)$							
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

ANGLE → $\boxed{6}$
70°.52878

THE 288 FAMILY
70°.52878

SEC(70°.52878) = 3

$\boxed{S3}$

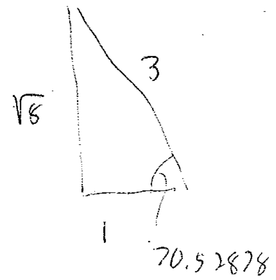
$\boxed{T\sqrt{8}}$

PYRAMIDS

	288	HALF OCT		1/6 cube		APS H₂B	
PYRAMID ===>		$\tan b = \sqrt{8}$	$\tan b = \sqrt{2}$	$\tan b = \sqrt{7}$	$\tan b = 1$	$\tan b = 4$	$\tan b = 2$	

SYM	DEFINITION	288 $\tan b = \sqrt{8}$	HALF OCT $\tan b = \sqrt{2}$	$\tan b = \sqrt{7}$	1/6 cube $\tan b = 1$	$\tan b = 4$	APS H₂B $\tan b = 2$	
		$\cos b = \frac{1}{3}$	$\cos b = \frac{1}{\sqrt{3}}$	$\cos b = \frac{1}{\sqrt{8}}$	$\cos b = \frac{1}{\sqrt{2}}$	$\cos b = 1/\sqrt{17}$	$\cos b = \frac{1}{\sqrt{5}}$	
b	VALUE	70.52878	54.73561	69.295189	45	75.963757	63.434949	
m	m=180-2b	38.94244	70.52878	41.409622	90	28.072486	53.130102	
l	cot l = cos b	71.565052	60	70.52878	54.73561	76.366978	65.905158	
f	f=180-2l	36.869896	60	38.94244	70.52878	27.266044	48.189684	
e	√2tan e = tan b	63.434949	45	61.874494	35.26439	70.52878	54.73561	
p	p=180-2e	53.130102	90	56.251012	109.47122	38.94244	70.52878	
d	d=arccos(-cos²b)					93.3723		
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							
		MIN S^3/V^2						

tan l = 3
tan e = 2
sec b = 3



tanb	~~sec~~ b
1	√2
√2	√3
2	√5
√7	√8
√8	3
4	√17
√n	√n+1

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

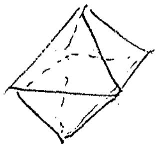
PYRAMIDS

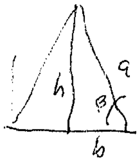
PYRAMID ===>								
SYM	DEFINITION							
b	VALUE							
m	$m=180-2b$							
l	$\cot l = \cos b$							
f	$f=180-2l$							
e	$\sqrt{2}\tan e = \tan b$							
p	$p=180-2e$							
d	$d=\arccos(-\cos^2 b)$							
W	$W=4d-360$ sph deg							
A	$A = 1/(2\cos b)$							
H	$H = (\tan b)/2$							
E	$E=1/(2\cos l)$							

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base $B = 1$.
The symbol ϕ represents the golden ratio = 0.618034...

Find name

Di - Pyramids



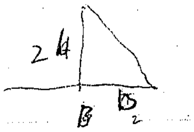


$V = \frac{8hb^2}{3}$

$S = 8ab$

$\frac{V}{S} = \frac{hb}{3a} = \frac{1}{3} b \sin\beta$

Dimension less $J = \frac{V^2}{S^3} = \left(\frac{8}{3}\right)^2 \frac{h^2 b^4}{8^3 a^3 b^3} = \frac{1}{72} \frac{h^2 b}{a^3} = \frac{1}{72} \sin^2\beta \cos\beta$



$72 J = \sin^2\beta \cos\beta = \cos\beta - \cos^3\beta = \dot{J}$

$144 J = \sin(2\beta)\sin\beta = \ddot{J}$

		β	$\dot{J}$	$\ddot{J}$	sin 2β
		0	0	0	0
	cube / 6	45	$1/\sqrt{2}$ .7071	[illegible] $2\sqrt{2}$	1
	MMM	60	3/4 0.75		0.866
$\tan^{-1}2$	~~MMM~~ H = B	63.4349	0.7155424		0.8
F=E+F	halfoct	54.7356	0.7698		0.9428
sin x = cot x	φ Pyr	51.8273	0.76393		0.9717
max	Fulcrum	70.5288	0.5926		0.6285
	DDD	64.7923	0.6973		0.7707
	cos x = tan x	38.1727	0.6		0.9717

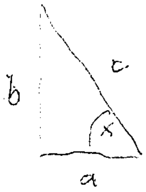
from $\sin x = \cot x \rightarrow 51.8273$

2 x 38.1727 = 76.3454 sin =

2 x 51.8273 = 103.6546 sin = 0.9717

180.0000

90



$\frac{b}{c} = \frac{a}{b}$

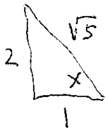
FAMILIES

or ω family   TRIG FN = N, $\sqrt{N}$ etc

The $\tan x = 2$ family $\rightarrow \dot{\omega} = 63.^\circ 434949$
$= 63^\circ 26' 5.''8164$

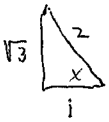
$\cos x = \frac{1}{\sqrt{5}}$ $\cos^2 x = 0.2 = \frac{\tan x}{10}$

$\sin x = \frac{2}{\sqrt{5}}$ $\sin^2 x = 0.8 = 4 \cos^2 x$



⊛ $\tan b = 2$ AHT $H = 1$
⊕ $\tan l = 2$ FACE $A = 1$
$\tan e = 2$ HET $A = 1.5$, $H = \sqrt{2}$

The $\frac{1}{2}$ octahedron family



$\cos x = 0.5$

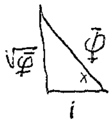
$\frac{1}{2}$ OCTH
$\tan b = \sqrt{2}$
$\cos l = $ ~~0.5~~ $\frac{1}{2}$, $\tan l = \sqrt{3}$
$\tan e = 1$ or $\sqrt{1}$

AHT $\tan b = \sqrt{2}$ $E = 1$ $\frac{1}{2}$ octh
FACE $\tan l = \sqrt{2}$ $H = 0.5$ $\frac{1}{6}$ cube
HET $\tan e = \sqrt{2}$ $H = 1$ $\tan b = 2$ ⊛

AHT $\tan b = \sqrt{3}$ $A = 1$ $\tan l = 2$ ⊕
FACE $\tan l = \sqrt{3}$ $E = 1$ $\frac{1}{2}$ octh
HET $\tan e = \sqrt{3}$ $E = \sqrt{2}$ β

AHT $\tan b = 1$ $H = \frac{1}{2}$ cube/6
FACE $\tan l = 1$ $A = \frac{1}{2}$ Flat
HET $\tan e = 1$ $E = 1$ $\frac{1}{2}$ octh

The φ family $\varphi = 0.6180339887499$



$\sin^2 x = \cos x$

$\cos x = \frac{1}{\Phi} = \varphi = 0.618034$ AHT $\cos b = \varphi$

$\sin x = \frac{1}{\sqrt{\Phi}} = 0.7861514$ FACE $\cos l = \varphi$

$\tan x = \sqrt{\Phi} = 1.2720196$ HET $\cos e = \varphi$

$$\frac{1}{\Phi^2} + \frac{1}{\Phi} = 1, \quad \Phi^2 - \Phi - 1 = 0, \quad \frac{1 \pm \sqrt{5}}{2} = \Phi$$

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HPOJTPRO       <DIR>        10-15-97  1:13p
CPQREG         <DIR>        07-11-97 11:28a
PROGRA~1       <DIR>        07-11-97 11:28a
HIBERNAT       <DIR>        07-11-97 11:28a
MYFILES        <DIR>        09-24-97 11:17a
CPQDRV         <DIR>        07-11-97 11:44a
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~QF020D8 TMP     1,471,213  08-24-97  8:55p
HPFONTS        <DIR>        10-15-97  1:13p
OPLIMIT        <DIR>        10-15-97  1:16p
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TOOLS_95       <DIR>        11-03-97  1:12p
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PAPRFIX  PIF           967  11-13-97  2:28p
ACROBAT3       <DIR>        11-19-97  1:55p
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KINKADE        <DIR>        12-16-97  3:13p
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        21 dir(s)     678,637,568 bytes free
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PYRAMIDS

PYRAMID ===>		FLAT	cube 6	cube 6	Half Octahedron	Half Octahedron	Half Octahedron	Half Octahedra
SYM	DEFINITION	$\tan l = 1$	$\tan b = 1$	$\sec f = 3$ $\tan b = 1$	$\tan b = \sqrt{2}$ $\tan e = 1$	$\sec m = 3$ $\tan b = \sqrt{2}$	$\sec f = 2$ $\tan b = \sqrt{2}$	$\sec l = 2$ $\tan b = \sqrt{2}$
b	VALUE	0°	45°	45	54.73561	54.73561	54.73561	54.73561
m	m=180-2b	180°	90°	90	70.52878	70.52878	70.52878	70.52878
l	cot l = cos b	45°	54.73561	54.73561	60	60	60	60
f	f=180-2l	90°	70.52878	70.52878	60	60	60	60.
e	√2tan e = tan b	0°	35.26439	35.26439	45	45	45	45
p	p=180-2e	180°	109.47122	109.47122	90	90	90	90
d	d=arccos(-cos²b)							
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							
		T1l	T1b	S3f	T1e	S3m	S2f	S2l

T√2 b

45 at l

45 at b

$e = \frac{f}{2}$

$l = \frac{p}{2}$

$b = \frac{m}{2}$

70.52878 at f

$\tan e = 1$
$\tan b = \sqrt{2}$
$\tan m = \sqrt{8}$
$\sec b = \sqrt{3}$

$\tan e = 1$
$\tan m = \sqrt{8}$
$\tan b = \sqrt{2}$

$\tan e = 1$

$\tan e = 1$

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

Two Pyramids

1) face-base = 45° b = 45° — cube/6
Apothems form square
2) edge-base = 45° e = 45° - Half Octahedron
Edges form square

Dividing a circle

36
30
18
15 } → 3°
or 120 parts

Construct a pentagon → 72°
Construct a hexagon → 60° } → 12° bisect → 6°
∴ can divide circle into 60 parts of 6° each
16 parts = 96°

12°

From 90, 72, 60 and bisection what can we derive?
18 12
6

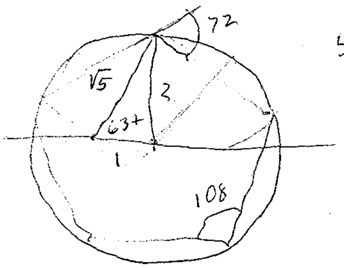
54
30
14 7 1

How to get 1°
90 − 72 = 18 72 − 60 = 12
72 − 18 = 54 12/2 = 6
54 − 30 = 14
14/2 = 7

54 − 14 = 40
↓
ENNEAD

7 − 6 = 1

CONSTRUCTION TO GET 72°



5)360
72

180
−72
108
54

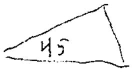
tan e = 0.9 best fit to Gt. Pyr

$\frac{18}{25} \rightarrow \frac{9}{10}$ or $\frac{10}{9}$ edge seked = $\frac{10}{9}$

$\frac{5}{3} \rightarrow \frac{6}{5}$

$\frac{4}{3} \rightarrow \frac{24}{25}$

$1 + \frac{1}{4}$



Rad = 2	1
Square ~ √8	√2
Pent ~ √5	√5/2
Hex ~ √4 = 2	1
Oct ~	

A: \

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Difculty.per	3,965	PER File	3/31/98 2:00 PM
fourdial	5,136	Corel WordPerfect 8 Document	9/18/98 6:26 PM
Fractdim	12KB	WP6 File	9/29/98 3:29 PM
geoages1	13KB	Corel WordPerfect 8 Document	9/17/98 7:43 AM
Gup1	4,725	Corel WordPerfect 8 Document	8/25/98 8:30 AM
Gupgep98	5,133	WP6 File	2/7/98 3:12 PM
hrdsft	3,002	Corel WordPerfect 8 Document	11/27/98 8:53 AM
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LIBFRE2	7,580	Corel WordPerfect 8 Document	10/24/98 9:20 AM
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pythchem	11KB	Corel WordPerfect 8 Document	10/20/98 2:06 PM
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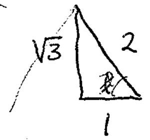
Symblev1	6,515	Corel WordPerfect 8 Document	10/20/98 8:33 PM
Thirdper.per	4,534	PER File	3/31/98 1:29 PM
Tulkushp	7,329	WP6 File	5/5/98 10:55 AM
Westlang	8,456	WP6 File	4/16/98 4:38 PM

SOME PYRAMIDOLOGY

TWO FAMILIES

HEDRON
FAMILY



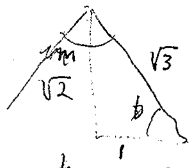
$\cos l = \frac{1}{2}$

~~x~~ = 60°

THE $\overset{l}{60}$-$\overset{l}{60}$-$\overset{f}{60}$ Triangle is the FACE triangle of the Octahedron

½ octahedron

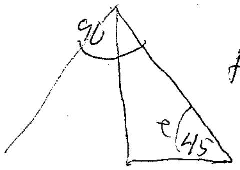
THE CORRESPONDING AHT TRIANGLE IS



b = 54.7356 $\tan b = \sqrt{2}$

m = 70.5288

THE CORRESPONDING HET TRIANGLE IS



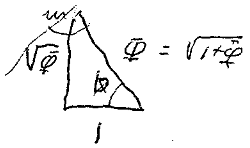
$\tan e = 1$

$\cos e = \frac{1}{\sqrt{2}}$

e = 45°

p = 90

Φ (= 1.6180399...)
FAMILY



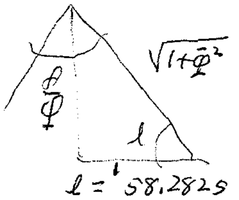
$\Phi = \sqrt{1+\Phi}$

$\cos b = \frac{1}{\Phi} = 0.61803...$

x = 51.8273..

THE b, b, $\overset{m}{76.3454}$ is THE AHT TRIANGLE OF THE GREAT PYRAMID

THE CORRESPONDING FACE TRIANGE IS



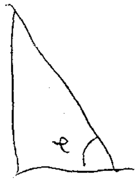
$\tan l = \Phi$

l = 58.2825 $\tan f = 2$

f = 63.4349

GT PYR

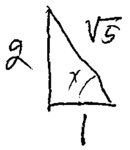
THE CORRESPONDING HET TRIANGLE IS



e = 41.9699

p = 96.0603

Another Pyr ☆



$\tan x = 2$

x = 63.4349

126.8698

180

53.1302

PYRAMIDS

PYRAMID ===>		8	9	10	11	12	13	14
SYM	FORMULA	W=90 sp deg	b=arcsin(π/4)	e=arcsin(2/3)	Vesica Piscis	2π/7	b=arctan(3/π)	OCTAGON/2
b	VALUE	51.7850	51.7575	51.6712	51.6106	51.4286	43.6793	54.7356
m	m=180-2b	76.4300	76.4850	76.6576	76.7788	77.1428	92.6414	70.5288
l	l=arccot(cosb)	58.2585	58.2429	58.1939	58.1596	58.0569	54.1249	60.0000
f	f=180-2l	63.4830	63.5143	63.6122	63.6808	63.8862	71.7502	60.0000
e	e=arccos(√2cosl)	41.9267	41.8986	41.8103	41.7485	41.5629	34.0287	45.0000
p	p=180-2e	96.1466	96.2028	96.3794	96.5031	96.8742	111.9426	90.0000
A	A=1/(2cosb)	**0.8083**	**0.8078**	**0.8062**	**0.8051**	**0.8019**	**0.6941**	**0.8660**
H	H=(tanb)/2	**0.6350**	**0.6344**	**0.6325**	**0.6311**	**0.6270**	**0.4775**	**0.7071**
E	E=1/(2cosl)	**0.9504**	**0.9500**	**0.9487**	**0.9478**	**0.9450**	**0.8523**	**1.0000**
d	d=arccos(-cos²b)	112.5000	112.5289	112.6199	112.6838	112.8761	121.5366	109.4712
W	W=4d-360 sph deg	90.0000	90.1158	90.4794	90.7350	91.5042	126.1464	77.8936
δb'	Difference in min arc	3.384'	5.634'	10.212'	13.848'	24.768'	---	---

For each pryamid the shaded cells represent the initial values from which the others are derived.
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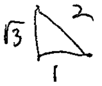
For each pyramid the bottom line gives the difference between the value of the angle b and its value in the measured pyramid in minutes of arc.
The values for A, H, and E (shown in bold face) are derived assuming the length of the base B to be unity.

☆

The Pyramid
with AHT
= 60 60 60

$\frac{1}{2}$ oct, Face  60-60-60

☆ FACE 

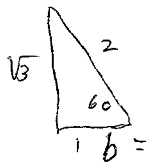
AHT  60-60-60

AHT  $\frac{1}{6}$ cube

cot l = cos b

√2 cos l = cos e

√2 tan e = tan b



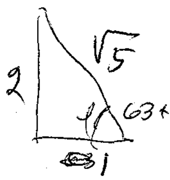
b = 60

m = 60

FACE =

l = 63.4349

f = 53.1301

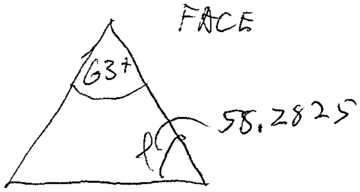


tan l = 2

tan f = $\frac{4}{3}$

→

FACE



The Face △ of the Gt. Pyr

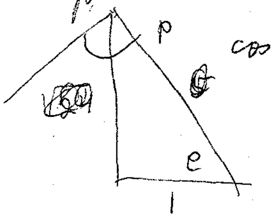
tan f = 2

tan l = Φ

HET

e = 50.7685

p = 78.4630



cos p = 0,2 = $\frac{1}{5}$

what is d
w

what pyramid has
HET 60-60-60?

PYRAMIDS

PYRAMID ===>		1	2	3	4	5	6	7
SYM	FORMULA	MEASURED	b=arctan(4/π)	b=arccos(ϕ)	p=π/3+π/5	VOL RATIO	b=π/2-2/3	b=π-ϕ-1/ϕ
b	VALUE	51.8414	51.8540	51.8273	51.8568	51.8796	51.8028	51.8827
m	m=180-2b	76.3172	76.2920	76.3454	76.2865	76.2408	76.3944	76.2345
l	l=arccot(cosb)	58.2906	58.2977	58.2825	58.2993	58.3123	58.2686	58.3141
f	f=180-2l	63.4189	63.4046	63.4349	63.4015	63.3754	63.4628	63.3718
e	e=arccos(√2cosl)	41.9844	41.9972	41.9699	42.0000	42.0234	41.9449	42.0267
p	p=180-2e	96.0311	96.0056	96.0603	96.0000	95.9532	96.1103	95.9466
A	A=1/(2cosb)	**0.8093**	**0.8095**	**0.8090**	**0.8095**	**0.8100**	**0.8086**	**0.8100**
H	H=(tanb)/2	**0.6363**	**0.6366**	**0.6360** ✓	**0.6367**	**0.6372**	**0.6355**	**0.6373**
E	E=1/(2cosl)	**0.9513**	**0.9515**	**0.9511**	**0.9515**	**0.9519**	**0.9507**	**0.9519**
d	d=arccos(-cos^{2}b)	112.4407	112.4274	112.4550	112.4245	112.4005	112.4813	112.3973
W	W=4d-360 sph deg	89.7627	89.7096	89.8226	89.6981	89.6022	89.9251	89.5891
δb'	Difference in min arc	0'	0.756'	0.846'	0.924'	2.292'	2.316'	2.478'

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The symbol ϕ represents the golden ratio = 0.618034...

$\cos 60 = \frac{1}{2} = \cot\omega$

$\tan\frac{\omega}{2} = \varphi = \cos b$

$\varphi \sin\omega = 1 - \cos\omega$

$\cos b \sin\omega = 1 - \cos\omega$

$\cos b + \cos b \cos\omega = \sin\omega$

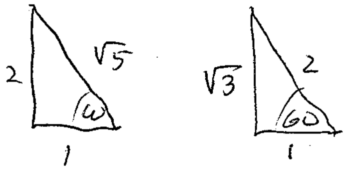
$$\left.\begin{aligned}\sin\omega - \cos b &= \cos b \cos\omega \\ 1 - \cos\omega &= \cos b \sin\omega\end{aligned}\right\}$$

$\tan(\omega) = \frac{1-\cos\omega}{\sin\omega - \varphi}$ 0 ✓

$\tan^2\left(\frac{\omega}{2}\right) = \frac{1-\cos\omega}{1+\cos\omega}$ ✓

$$\frac{\tan^2\left(\frac{\omega}{2}\right)}{\tan\omega} = \frac{\varphi^2}{2}$$

$\tan\frac{\theta}{2} = \frac{1-\cos\theta}{\sin\theta} = \frac{\sin\theta}{1+\cos\theta}$



$\cot\omega = \cos 60$

$\varphi = -\frac{1}{2} + \frac{\sqrt{5}}{2}$

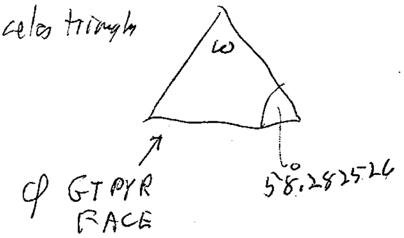
$\cos b = -\cos 60 + \operatorname{cosec}\omega$

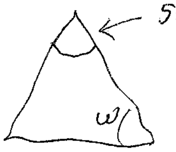
$\cos b \cancel{\theta} = \operatorname{cosec}\omega - \cot\omega$

$\varphi = \frac{1}{\sin\omega} - \frac{1}{\tan\omega}$

∃ also the exchange

isosceles triangle





$\omega = 63°434949$

AHT (δ) $H=1$ $b=\omega$

FACE (α) $A=1$ $b=60$ $l=\omega$

HET (ε) $H=\sqrt{2}$ $e=\omega$ $b=70.5288$

as well as the $\tan\frac{\omega}{2} = \varphi$

~~No e=ω~~

PYRAMIDS

~~b → e~~ ~~p → d~~ tane=0.9

PYRAMID ===>		φ b → m	φ d → ∡ l	φ e → ~~b → p~~ m/2	b ~~cd~~	e d → p	~ DASHUR	1/6 Cube
SYM	FORMULA							
b	VALUE	64.0864	48.0296	48.0301	51.8441		43.5251	45°
m	m=180-2b	51.8273	83.9408	83.9398	76.3118		92.9498	90°
l	l=arccot(cosb)	66.3939	56.2275		58.2921		54.0551	54.7356
f	f=180-2l	47.2121	67.545		63.4157	72°	71.8897	70.5288
e	e=arccos(√2cosl)	55.5062	38.1722		41.9872		33.8855	35.2644
p	p=180-2e	68.9876	103.6556	~~51.8273~~	96.0256		112.2290	109.4712
A	A=1/(2cosb)	1.1441	0.7477				0.6896	0.7071
H	H=(tanb)/2	1.0290	0.5559				0.4749	0.5
E	E=1/(2cosl)	1.2486	0.8994				0.8518	0.8660
d	d=arccos(-cos²b)	101.0109	116.5656		~~51.8273~~	~~126.8698~~	121.7175	120
W	W=4d-360 sph deg	44.0487	106.2624			~~147.4792~~	126.8698	120
δb'	Difference in min arc				d > 90°	d= 2×63.4349	Ω = 2×63.4349	

2×58.2828 ≈ φl

43°31'30"

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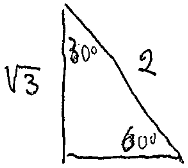
The symbol ϕ represents the golden ratio = 0.618034...

Two basic families of Pyramids:

HEDRON



1 cos f = ½

= apex face angle f

60° = 1.0471976 rad

cos = .5

THE HEDRON
FAMILY

⇓

½ Octahedron

minimization
of total solid angle → b = 54.°7356

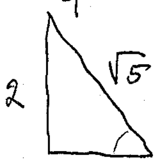
$\overset{d}{\text{face-face}} \overset{\to r}{\to}$

If face-face → apex diag

b = 45°

The $\frac{1}{6}$ cube
pyramid

φ

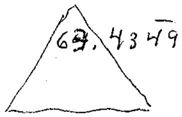


63.434949 = 1.1071487 rad = σ

1 cot f = ½ = apex face angle f

cos = $\frac{1}{\sqrt{5}}$, tan = 2

THE φ
FAMILY



⇓

THE GREAT
PYRAMID
(φ)

b = 51.° 8273

2 kinds of
transformation

1) mer-face-diag

2) and p ⟷ d

If the value of the face-face dihedral of the Great Pyramid
is taken as the apex angle of the diagonal
then b = 43.°4027 = the Dashur Pyramids
(Upper Bent & Red)

d → p

$$\frac{\frac{1}{2}\text{ octahedron}}{\frac{1}{6}\text{ cube}} = \frac{\text{Giza}}{\text{Dashur}}$$

i.e. Same transformation

54.7356 → 45 ; 51.8273 → 43.4027

1.2163467

1.194103

~~The regular is semi-homogenized. and the irregular is partially homogenized~~
~~6 close packs, semi-regular~~

~~5 does not close pack, phi, ==> growth, complexity => odd is less homogenized than even.~~

~~The highly homogenized resorts to complexity rather than extinction, but in the example of the musical scale being built of odd harmonics, complexity comes from the less homogenized.~~

	45 54 70	45	54 70 60 45	60 63 53 50.77	63 53 54 70 65.9	70 63		63	78.46

	1/6 cube	Flat	½ octahedron	Mid	APS	MIN $8^3/v^2$		GT. P4R$^{\varphi}$	
b	45	0	54.7356°	60	63.4349°	70.5288	~~53.1301~~	57.8273	78.4630°
m	90	180	70.5288°	60	53.1302	38.9424	~~73.7398~~	76.3754	23.074
l	54.7356	45	60	63.4349	65.9051	71.5651	~~59.0362~~	58.2825	78.69
f	70.5288	90	60	53.1301	48.1898	36.8699	~~61.9275~~	63.4349°	22.6199
e	35.2644°	0	45	50.7685°	54.7356	63.4350	~~43.3139~~	41.9699	73.8978
p	109.4712	180	90	78.4630°	70.5289	53.1301	~~93.3723~~	96.0602	32.2043
	p = 2l f = 2e								
					dup				
		dup			half 70.5288				
b	50.7685°	64.6230°	~~65.9051~~	65.9051°	35.2644°			58.2825	
m	78.4630°	50.7540°	~~64.6230~~	48.1898	109.4712			63.4349°	
l	57.6885°	66.8014	~~50.7754~~	67.7923	50.7685°			62.2677	
f	64.6230°	46.3973	~~66.8014~~	44.4154	78.4630°			55.4646	
e	40.8934	56.1454	~~46.3973~~	57.6884°	26.5651°			48.8455	
p	98.2132	67.7092		64.6232°	126.8699			82.3090	

	50.77 78.46 64.62	64.62		64.6 65.9	50.77 78.4630	50.7685

SEKEDS

Seked = cot [base-face angle] = cot(b) or cot(β)

Pyramid	b	cot b seked	tan b	cos b					
Half Octahedron	54.7356	$1/\sqrt{2}$	$\sqrt{2}$	$1/\sqrt{3}$					
$\frac{1}{6}$ Cube	45	1	1	$1/\sqrt{2}$					
Φ Pyramid	51.8273	0.786151 $\sqrt{\varphi}$	1.272020 $1/\sqrt{\varphi}$	φ = .618...					
* 6 EGYPTAN PYRAMITS	53.1301	3/4	4/3	$0.6 = \frac{3}{5}$					
Menkaure	51.3[illegible]8	4/5	5/4	5/8					
fulcrum V^2/s^3 min	70.5288	$\sqrt{2}/4 = \frac{1}{\sqrt{8}}$	$2\sqrt{2} = \sqrt{8}$	1/3					
	38.9424	$7/4\sqrt{2}$	$4\sqrt{[illegible]}/7$	7/9					
ω	63.4349^{ω}	1/2	2	$1/\sqrt{5}$					
inverse ω	76.3453								
inverse $\frac{1}{2}$ oct	81.1006								
inverse Φ	82.3090								
inverse $\frac{1}{6}$ cube	84.6157								
A = B	60°	$1/\sqrt{3}$	$\sqrt{3}$	1/2					

* includes Khafre

relable α, β, ...

δ →
α → B
β → C
ε → D

3 60-60-60
mw 3 45-45-90
mu 3 54-54-70

PYRAMIDS

d↔p
THE HEDRON / FAMILY

	PYRAMID ===>		α ①	FLAT	SHAFT	HALF ② OCTAHEDRON	$\frac{\text{CUBE}}{6}$ ③	γ	β ④	δ ⑤
	SYM	DEFINITION	l=ω A=1			tan b=√2	tan l=√2	$(\cos b)^2 = \frac{3}{5}$ d=2ω	E=√2	b=ω, H=1
AHT	b	VALUE	60	0	90	54.7356	45	39.2315	67.7923	63.4349
	m	m=180-2b	60	180	0	70.5288	90	101.5370	44.4153	53.1301
FACE	l	cot l = cos b	63.4349	45	90	60	54.7356	52.2387	69.2952	65.9052
	f	f=180-2l	53.1302 ~~46.8694~~	90	0	60	70.5288	75.5225	41.4096	48.1897
HET	e	√2tan e = tan b	50.7685	0	90	45	35.2644	30	60	54.7356 tan e $= \frac{1}{\sqrt{2}}$
	p	p=180-2e	78.4630	180	0	90	109.4712	120	60	70.5288
	d	$d=\arccos(-\cos^2 b)$	104.4775	180	90	109.4712	120	= 2X63.4349 126.8699	98.2132	101.5370
	W	W=4d-360 sph deg	57.9100	360	0	77.8936	120	147.4796	32.8528	46.1478
	A	A = 1/(2cosb)	1.0000	0.5	∞	0.8660	0.7071	0.6455	1.3229	1.1180
	H	H = (tanb)/2	0.8660	0	∞	0.7071	0.5	0.4082	1.2247	1.0000
	E	E=1/(2cosl)	1.1180	0.7071	∞	1.000	0.8660	0.8165	1.4142	1.2247
	δb	Difference in min sec								

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

d → p sequence

shaft → $\frac{\text{Oct}}{2}$ → $\frac{\text{cube}}{6}$ → γ

60-60-60 FACE = Oct/2
HET = β
AHT = α

45-45-90 HET = Oct/2
AHT = cube/6
FACE = FLAT

54-54-70 AHT = $\frac{\text{OCT}}{2}$
HET = δ
FACE = $\frac{\text{cube}}{6}$

tan 54.7356 = √2

d → p   d → p

HET → AHT
AHT → FACE
2XFACE → 2d ~~[illegible]~~ = W
A → E
H → A
E → E/2

FIND AN e = ω

PYRAMIDS

THE φ FAMILY

PYRAMID ===>				tan b = Φ	Φ PYRAMID	DASHUR RED-BENT	X	Y
SYM	DEFINITION			tan 58, 2825 = Φ	cos b = φ		$\cos^2 b = \phi$	$H \times E = \frac{1}{2}$
b	VALUE	41.9699	66.3939	58.2825	51.8273	43.4027	38.1727	60.9306
m	m=180-2b	96.0603	47.2122	63.4349	76.3454	93.1946	103.6545	58.1387
l	cot l = cos b	53.3693	68.1765	62.2677	58.2825	54.0000	51.8273	25.9136
f	f=180-2l	73.2613	43.6469	55.4646	63.4349	72.0000	76.3454	128.1727
e	√2tan e = tan b	32.4567	58.2825	48.8455	41.9699	33.7723	29.0694	51.8273
p	p=180-2e	115.0865	63.4349	82.3091	96.0603	112.4555	121.8613	76.3454
d	d=arccos(-cos²b)	123.5564	99.2276	106.0451?	112.4555	121.8612	90+b 128.1727	103.6546
W	W=4d-360 sph deg	134.2336	36.9106	64.1803?	89.8220	127.4450	=2f 152.6909	54.6184
A	A = 1/(2cosb)	0.6725	1.2486	0.9511	φ/2 0.8090	0.6882	0.6360	1.0291
H	H = (tanb)/2	0.4497	1.1441	0.8090 φ/2	0.6360	0.4729	0.3931	0.8994 a
E	E=1/(2cosl)	0.8380	1.3450	1.0745	0.9511	0.8507	0.8090 φ/2	0.5559 b
δb	Difference in min sec							$b = \frac{1}{2a}$

not a possible pyramid 41.9699

96.0602

$= \frac{d}{2}$ Dashur

$f_Y - b_X = 90$

$= 2 \times 51.8273$

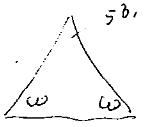
(close to ½ oct)

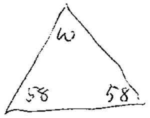
All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

$H \times E = \frac{1}{2}$

$b = \frac{1}{2a}$

cos x = 0.4





ω = 63,434949

tan 58+ = Φ
58.282526

a family of ώ

THE φ FAMILY

PYRAMIDS

51 50 40 d→p   d→p   To P HEDRON Page

PYRAMID ===>			GIZA	DASHUR		GIZA	DASHUR	e = ώ ε
SYM	DEFINITION		MEASURED	RED		φ Pyramid	~~43~~ RED	5: 70.5288 ~~54.7356~~
b	VALUE		51.84	43.4124		51.8273	43.4027	70.5288 ~~38.9424~~
m	m=180-2b		76.3111	93.1752		76.3454	93.1946	38.9424
l	cot l = cos b		58.2923	54.0044		58.2825	54.0000	71.5651
f	f=180-2l		63.4154	71.9912		63.4349	72.0000	36.8699
e	√2tan e = tan b		41.9875	33.7813		41.9699	33.7723	63.4349
p	p=180-2e		96.0251	112.4375		96.0603	112.4555	53.1301
d	d=arccos(-cos²b)		112.4375	127.8498		112.4555	127.8612	96.3794
W	W=4d-360 sph deg		89.7499	127.3992		89.8220	127.4450	25.5175
A	A = 1/(2cosb)		0.8093	0.6883		0.8090	0.6882	1.5000
H	H = (tanb)/2		0.6364	0.4730		0.6360	0.4729	√2 = 1.4142
E	E=1/(2cosl)		0.9513	0.8507		0.9511	0.8507	1.5811
δb	Difference in min sec		—	+ 2' 45"		- 1' 2"	+ 2' 10"	

e = ώ

MEASURED
43° 22'

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

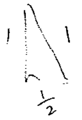
43.4124
= 43° 24' 44".64

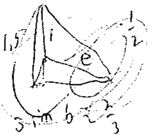
43.4027
= 43° 24' 9",68

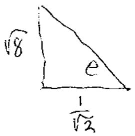
cos e = √2 cos l

The 3 ώ   B=1
FACE   A=1   ~~tan b = 2~~
AHT   H=1   tan b=2
HET   A=1.5   tan e =2

$\frac{2}{\sqrt{2}} = \sqrt{2} = x^2$







The d=p pyramid ? is flat
d = p = 180

GTP NEIGHBORS

GP TABLE A. WPG

8 - 14

GP TABLE B. WPG

PYRAMIDS

PYRAMID ===>		1	2	3= Π Pyr.	4	5 = φ Pyr.	6	7
SYM	DEFINITION	tan e = 0.9	b = π/(4φ+1)	tan b = 4/π	p = π/3+π/5	cos b = φ	b = π-φ-1/φ	b = π/2-2/3
b	VALUE	51.8442	51.8413	51.8540	51.8568	51.8273	51.8827	51.8028
m	m=180-2b	76.3116	76.3174	76.2920	76.2865	76.3454	76.2345	76.3944
l	cot l = cos b	58.2921	58.2905	58.2977	58.2993	58.2825	58.3141	58.2686
f	f=180-2l	63.4157	63.4190	63.4046	63.4015	63.4349	63.3718	63.4628
e	$\sqrt{2}$tan e = tan b	41.9872	41.9843	41.9972	42.0000	41.9699	42.0267	41.9449
p	p=180-2e	96.0256	96.0315	96.0056	96.0000	96.0603	95.9466	96.1103
d	d=arccos(-$\cos^2$b)	112.4377	112.4408	112.4274	112.4246	112.4555	112.3973	112.4813
W	W=4d-360 sph deg	89.7510	89.7632	89.7096	89.6984	89.8220	89.5891	89.9251
A	A = 1/(2cosb)	0.8093	0.8093	0.8095	0.8095	0.8090	0.8100	0.8086
H	H = (tanb)/2	0.6364	0.6363	0.6366	0.6367	0.6360	0.6373	0.6355
E	E=1/(2cosl)	0.9513	0.9513	0.9515	0.9515	0.9511	0.9519	0.9507
δb	Difference in min sec	- 0'1"	- 0' 11"	+0' 34".	+0' 44"	- 1' 2"	+2' 18"	- 2' 30"

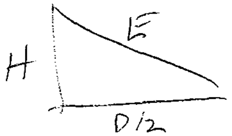
All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol φ represents the golden ratio = 0.618034...

$\cos^{-1}\frac{1}{\sqrt{5}} = \tan^{-1}2 = 63.4349 \sim \dot{\omega}=0$

orbit angle

THE GREAT PYRAMID--A META DESIGN

The most accurate and useful dimensionless measurement among the Great Pyramid parameters is the base-face dihedral angle. Its value is taken to lie between 51°51' and 51°52'. Let us assume its best value is near 51°51'30" or 51°.8583, which we shall designate by a_m. There are many simple ratios that give a good approximation to a_m. It is just this fact that creates the intriguing puzzle: Which (if any) of these ratios was used in the design? In the following table some of these ratios are listed. The first column gives the value of a, the base-face dihedral angle, which results from the ratio (or other definition). The second column gives the "error" in minutes of arc which is taken to be $|a_m - a|$. The third column gives a brief description of the ratio or definition leading to the value of a. More detailed derivations of each approach are given in §2.2 to be given later. In the following $\pi = 3.14159$, $\phi = 0.61803$ (the Golden Ratio), and $\Phi = 1 + \phi$, the inverse ratio.



No	a	δ	DEFINITION
1	51°.8540	0'.258 ✓	a = arctan(~~π/4~~ 4/π) or B:H :: π:2
2	51°.8442	0'.846 ✓	H:~~E~~ :: ~~9~~:10 H : $\frac{D}{2}$ :: 9:10
3	51°.8795	1'.272 ✓	volume of apex centered circumscribed sphere : volume of apex centered inscribed sphere :: 10:3
4	51°.8827	1'.464 ✓	$a = \pi - (\phi + \Phi) = \pi - \sqrt{5}$
5	51°.8273	1'.860 ✓	$a = \arccos(\phi)$, the Fibonacci limit, or area of face = H^2
	51°.8283 —		based on the fine structure constant - a truncated pyramid
6	51°.8028 * 51.7993	3'.330 ✓	a = (π/2 - 2/3) radians αμ
7	51°.7850	4'.398 ✓	Ω = solid angle at apex = 1 octant (= π/2 steradians)
8	51°.7782	4'.806 ✓	a = arcsin(Ω/2)
9	51°.7575	6'.048 ✓	a = arcsin(π/4) or H:A :: π:4
10	51°.7533	6'.300 —	a = arccos(13/21), a Fibonacci ratio
11	51°.7038	9'.270 —	a = (9/5 - 2π/7) radians
12	52°.0201	9'.708 —	a = arccos(8/13), a Fibonacci ratio
13	51°.6839	10'.464 —	cos(apex face angle) = e^(1/e) - 1
14	51°.6711	11'.232 ✓	E:H :: 3:2
15	51°.6565	12'.108 —	√(Ω/2) = 8/9
16	51°.6106	14'.862 ✓	from the Vesica Piscis construction

* $51°.7993 = a$

$\tan a = 10[\log_{10}(\alpha\mu) - 1]$

$\log_{10} \alpha\mu = 1.127074$

$\tan a = 1.27074$

17	52°.1148	15'.390	-	$a = F - (\pi + \phi)$ where F = Feigenbaum's constant = 4.6692
18	51°.5665	17'.508	-	$a = \arccos(9/10)$
19	51°.5662	17'.526	-	$a = (9/10)$ radian
20	51°.4979	21'.624	-	H:E :: 8:9
21	51°.4286	25'.782	✓	$a = 2\pi/7$
22	51°.3931	27'.912	-	$2(\Sigma$ five vertices solid angles$)^3 = 137.03598$
23	51°.3178	32'.430	-	$a =$ arccos(5/8), a Fibonacci ratio
24	51.°2781	34'.812	-	D:E :: 3:2
25	51°.0576	48'.042	-	H:E :: 7:8

New Triangles emerge
by this process

PYRAMIDOLOGY

PYRAMID b		M-Triangle	F-TRIANGLE	E-triangle	NOTES
A	0°	—	1n	—	FLAT
B	54.7356	3n	2n	1n	HALF OCTOHEDRON $\ell = 60$
C	45	1n	3n	4n	$\frac{1}{6}$ cube
D	60	2n	5d	6n	A = B b = 60
E	67.7923	7n	8n	2n	e = 60
F	63.4349	5d	9n	3n	tan b = 2
G	70.5288	3d	10n	5d	The V^2/S^3 min pyramid cos b = $\frac{1}{3}$
H	69.2952	8n	3d	11n	cos b = $\frac{1}{\sqrt{8}}$ tan b = $\sqrt{7}$
I	75.9638	12n	13n	3d	tan b = 4
J	65.0368	14n	15n	8n	
K	62.6322	3x			
L	51.8273	16n	5n		Φ Pyramid [THE GREAT PYRAMID] cos b = φ
M		5n			
N				5n	
P	51.8165	13x			~ Φ Pyramid close 51° 49'
O	~~70.5288~~				

TRIANGLES
Per EMF

m
↓
x

d
↑
n

	n	n	m	x	x	x	d	d	d
DESIGNATION	VERTEX	BASE	BASE	VERTEX	BASE	BASE	VERTEX	BASE	BASE
1	90	45	45	45	67.5	67.5	~~0~~	~~90~~	~~90~~
2	60	60	60	60	60	60	60	60	60
3	70.5288	54.7356	54.7356	54.7356	62.6322	62.6322	38.9424	70.5288	70.5288
4	109.4712	35.2644	35.2644	35.2644	72.3678	72.3678	~~—~~	~~109.4712~~	~~109.4712~~
~~5~~	~~63.4349~~	~~53.1302~~	~~53.1302~~	~~53.1302~~	~~63.4349~~	~~63.4349~~	~~53.1302~~	~~63.4349~~	~~63.4349~~
5	63.4349	58.2826	58.2826	58.2826	60.8587	60.8587	53.1302	63.4349	63.4349
6	78.4630	50.7685	50.7685	50.7685	64.6158	64.6158	23.0740	78.4630	78.4630
7	44.4153	67.79.23	67.7923	67.7923	56.1039	56.1039	91.1694	44.4153	44.4153
8	41.4096	69.2952	69.2952	69.2952	55.3524	55.3524	97.1808	41.4096	41.4096
9	48.1897	65.9052	65.9052	65.9052	57.0474	57.0474	83.6206	48.1897	48.1897
10	36.8700	71.5650	71.5650	71.5650	54.2175	54.2175	106.2600	36.8700	36.8700
11	56.2510	61.8745	61.8745	61.8745	59.0628	59.0628	67.4980	56.2510	56.2510
12	28.0725	75.9638	79.9638	+ay = 4 75.9638	52.0181	52.0181	123.8550	28.0725	28.0729
→ 13	27.2660	76.3670	76.3670	76.3670	51.8165	51.8165	125.4680	27.2660	27.2660 ← nφ
14	29.9264	75.0368	75.0368	75.0368	52.4816	52.4816	120.1472	29.9264	29.9264
15	28.9550	75.5225	75.5225	75.5228	52.2388	52.2388	122.0900	28.9550	28.9550
16	76.3454 ~~51.8273~~	51.8273	51.8273	51.8273	64.0864	64.0864	27.3092	76.3454	76.3454
	~~41.9699~~	~~96.0603~~							
17	96.0603	41.9699	41.9699	41.9699	69.0151	69.0151	~~X~~	96.0603	96.0603
	30	75	75	75	52.5	52.5	120	30	30

51° 48′ 59.4″
51° 49′

52.5 63.75 63.75

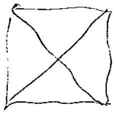
58.125

60.93

TRIA[illegible]ES
Per xnd

n x d
abb bcc daa

	62.6322	58.6839	58.6839	58.6839	60.6581	60.6581	54.7356	62.6322	62.6322
	73.7396	53.1302	53.1302	53.1302	63.4349	63.4349	32.5208	73.7396	73.7396



PYRAMIDS

Min Ω

PYRAMID ===>		~~#~~ 1	2	3	4	5	6	7	8
SYM	DEFINITION	FLAT	Half Octahedron	$\frac{1}{6}$ cube		$b = \omega$	$l = \omega$	$b = \cos^{-1}\sqrt{2}$	$\tan b = \frac{1}{\sqrt{2}}$
b	VALUE	0	54.7356	45	67.7923	63.4349	60	no pyramid	35.2644
m	m=180-2b	180	70.5288	90	44.4153	53.1301	60	possible	109.4712*
l	cot l = cos b	45	60	54.7357	69.2952	65.9052	63.4349	35.2644	50.7685
f	f=180-2l	90	60	70.5288	41.4096	48.1897	53.1301	109.4712	78.4630
e	√2tan e = tan b	0	45	35.2644*	60	54.7356	50.7685		26.5651 ~~78.4630~~
p	p=180-2e	180	90	109.4712*	60	70.5288	78.4630		~~26.5651~~ 126.8699
d	$d=\arccos(-\cos^2 b)$	180	109.4712	120	98.2132	101.5370	104.4775		
W	W=4d-360 sph deg	2π steradians	77.8936	120	32.8528	46.1478	57.9100		
A	A = 1/(2cosb)	½	0.8660	0.7071	1.3229	1.1180	1.000		
H	H = (tanb)/2	0	0.7071	0.5	1.2247	1.000	0.8660		
E	E=1/(2cosl)	$1/\sqrt{2}$ 0.7071	1.000	0.8660	1.4142	1.2247	1.1180		
δb	Difference in min sec		$\tan b = \sqrt{2}$	$\tan l = \sqrt{2}$	$E = \sqrt{2}$	H = 1 = B	A = 1 = B		~~f = e~~

E = 1 = B

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

$180 - (2 \times \omega) = 53.1301 = 2 \times 26.5651$
$26.5651 + \omega = 90$

PYRAMIDS

Fulcrum
V²/S³ min.

PYRAMID ===>		7	8	9	10	11	12	13	14
SYM	DEFINITION		tan b = $\frac{1}{\sqrt{2}}$					cos b = $\frac{1}{3}$	
b	VALUE	~~54.1825~~	35.2644 *	73.8979	65.9051	75.0368	69.2952	70.5288*	72.4516
m	m=180-2b	~~71.6351~~	109.4712 *	32.2043	48.1898	29.9264	41.4096	38.9424	35.0967
l	cot l = cos b		50.7685	74.4986	67.7923	75.5225	70.5288*	71.5650	73.2214
f	f=180-2l		78.4630	31.0028	44.4153	28.9550	38.9424	36.8700	33.5573
e	√2tan e = tan b	~~44.4153~~	26.5651	67.7923	57.6884	69.2952	61.8745	63.43496	65.9052
p	p=180-2e	~~67.7923~~	126.8699	44.4153	64.6232	41.4096	56.2510	53.1301	48.1897
d	d=arccos(-cos²b)								
W	W=4d-360 sph deg								
A	A = 1/(2cosb)								
H	H = (tanb)/2								
E	E=1/(2cosl)								

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

PYRAMIDS

		15	16	17				
PYRAMID ===>		$\tan e = \frac{4}{\sqrt{2}}$	$\tan b = \sqrt{7}$	Inverse ω				
SYM	DEFINITION	$\tan b = 4$	$\cos b = \frac{1}{2\sqrt{2}}$					
b	VALUE	75.9638	69.2952	76.3453				
m	m=180-2b	28.0725	41.4096	27.3094				
l	cot l = cos b	76.3670	70.5288	76.7174				
f	f=180-2l	27.2660	38.9424	26.5653				
e	√2tan e = tan b	70.5288	61.8745	70.0399				
p	p=180-2e	38.9424	56.2509	37.9217				
d	d=arccos(-cos²b)							
W	W=4d-360 sph deg							
A	A = 1/(2cosb)							
H	H = (tanb)/2							
E	E=1/(2cosl)							

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

SEQUENCE RESONANCES (IDENTICALS)

NOTATIO SEQ - ANGLE - N
e.g. II - α - 3

	VALUE											
	54°.73561	I-γ-1	I-ζ-4									
I-III	60°	I-γ-2	I-α-2	I-ζ-6	III-2β-1							
	45°	I-β-1	I-ζ-2									
	109°47112	I-e-2	I-2β-2	I-2γ-1								
	120°	I-e-1	I-2β-3		ØT.PYR							
I-II	63°.434944	I-γ-3	I-ζ-8	II-α-^{L}2	~~[illegible]~~	THIS IS	THE IMPORTANT		RESONANCE			
	70°.52878	I-α-1	I-γ-7									
I-III	138°.59038	I-2β-7	III-e-1									
	76°345416	II-α-1	II-2β-1									
	103°.65459	II-α-0	II-2β-2									
	51°.827292	II-γ-1	II-2δ-1									
I-III	98°.21321	I-e-6	III-2β-2									
I-III	39°.231522	I-δ-4	III-ζ-2									

63.43 ω=0

54 Min Σ solid angle

[redacted]5 Rows
9 + broad columns

OCTAHEDRON SEQUENCE

Evo[redacted]nary

SEQUENCE I PYRAMIDS

~~This~~ This sequence is generated by having each succeeding pyramid have its base-face dihedral (β) equal to its antecedant's edge-base angle (γ)

97/02/24
$\gamma(n) = \beta(n+1)$
$\gamma \to \beta$
Ex Nihilo
i.e. start $\beta = 0$

Metaphors [redacted] 2 Species of Parthe[redacted]eris
cf. Maxwell's Equation
$\gamma(3)\text{I} = \beta(4)\text{I} = \alpha(2)\text{II}$

PLANE (0) — HALF OCTAHEDRON (2)

	# : n		0	1	2	3	4	5	6	7	8
	b β = b		0°	45°	54°.73561	60°	63°.434949	65°.905158	67°.792346	69°.295189	70°.528779
	cos β b	$\frac{1}{\sqrt{n+1}}$	1	$1/\sqrt{2}$	$1/\sqrt{3}$	$1/2$	$1/\sqrt{5}$	$1/\sqrt{6}$	$1/\sqrt{7}$	$1/\sqrt{8}$	$1/3$
	tan β b	$\sqrt{n}$	0	1	$\sqrt{2}$	$\sqrt{3}$	2	$\sqrt{5}$	$\sqrt{6}$	$\sqrt{7}$	$\sqrt{8}$
$\frac{\tan\beta}{\sqrt{2}}$	= tan ζ e	$\sqrt{\frac{n}{2}}$	0	$1/\sqrt{2}$	1	$\sqrt{3/2}$	$\sqrt{2}$	$\sqrt{5/2}$	$\sqrt{3}$	$\sqrt{7/2}$	2
$\frac{1}{\cos\beta}$	= tan γ l	$\sqrt{n+1}$	1	$\sqrt{2}$	$\sqrt{3}$	2	$\sqrt{5}$	$\sqrt{6}$	$\sqrt{7}$	$\sqrt{8}$	3
	sin γ l	$\frac{\sqrt{n+1}}{\sqrt{n+2}}$	$1/\sqrt{2}$	$\sqrt{2}/\sqrt{3}$	$\sqrt{3}/2$	$2/\sqrt{5}$	$\sqrt{5}/\sqrt{6}$	$\sqrt{6}/\sqrt{7}$	$\sqrt{7}/\sqrt{8}$	$\sqrt{8}/3$	$3/\sqrt{10}$
$\frac{1}{\sqrt{2}\sin\gamma}$	= cos δ	$\frac{1}{\sqrt{2}}\sqrt{\frac{n+2}{n+1}}$	1	$\sqrt{3}/2$	$\sqrt{2}/\sqrt{3}$	$\sqrt{5}/2\sqrt{2}$	$\sqrt{3}/\sqrt{5}$	$\sqrt{7}/2\sqrt{3}$	$2/\sqrt{7}$	$3/4$	$\sqrt{5}/3$
l	γ	= l	45°	54°.73561	60°	63°.434949	65°.905158	67°.792346	69°.295189	70°528779	71°.565051
180−2γ	f = α	= f	90°	70°.52878	60°	53°.130102	48°.189684	44°.415308	41°.409622	38°.942442	36°.869898
	e = ζ	-	0°	32°.26439	45°	50°.76848	54°.73561	57°.688467	60°	61°.874494	63°.434949
	δ =	$\frac{180-d}{2}$	0°	30°	35°.26439	37°.761245	39°.231522	40°.202966	40°.893395	41°.409623	41°.810316
2(90−δ)	e d		180°	120°	109°.47112	104°.47751	101°.53696	99°.594068	98°.21321	97°.180754	96°.379368 ~~141°.17558~~
	2β		0°	90°	109°.47112	120°	126°.86998	131°.81032	135°.58469	138°.69038	141°.17558
					CODE:	REG b	l f e	d m			
$4B^2\left(\frac{1+\cos\beta}{\cos\beta}\right) =$	Surface	$4B(A+B)$	$8B^2$			SEQUENCE β	γ α ζ	e			
$\frac{1}{3}B^3\tan\beta$	Volume	$\frac{4}{3}HB^2$	0								
	S/V	$3\frac{(A+B)}{BH}$	$=\frac{3}{B}\left[\frac{1+\cos\beta}{\sin\beta}\right]$	$1+\sqrt{2}$	$\frac{1+\sqrt{3}}{\sqrt{2}}$	$\sqrt{3}$	$\frac{1+\sqrt{5}}{2} = \Phi$	$\frac{1+\sqrt{6}}{\sqrt{5}}$	$\frac{1+\sqrt{7}}{\sqrt{6}}$	$\frac{1+\sqrt{8}}{\sqrt{7}}$	$\sqrt{2}$
Fixed	B	–	∞	2.41421	1.93185	1.73205	1.618034	1.542659	1.488372	1.44701	1.41421

Base
H B tan β
D $B\sqrt{2}$
A $B/\cos\beta$
E $B\sqrt{2}/\cos\zeta$

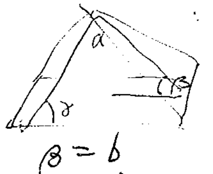
$$S = 4B^2\left[1+\sqrt{n+1}\right]$$
$$V = \frac{4}{3}B^3\sqrt{n}$$
$$\frac{S}{V} = \frac{3}{B}\left[\frac{1+\sqrt{n+1}}{\sqrt{n}}\right]$$

CHECK THIS SERIES
~~W~~ MAX AT β=51°
for fixed A

cf Periodic Table

fixed B $\frac{1+\cos\beta}{\cos\beta\sin\beta}$

∃ a difference in max with fixed A and with fixed B !!



β = b
γ = l
α = f

Fixed ~~Base~~ B

$$\frac{V}{S} = \frac{B}{3} \frac{\sin\beta}{(1+\cos\beta)}$$

fixed height H

$$\frac{V}{S} = \frac{H}{3} \frac{\cos\beta}{(1+\cos\beta)}$$

fixed apothem A

$$\frac{V}{S} = \frac{A}{3} \frac{\sin\beta \cos\beta}{(1+\cos\beta)}$$

fixed edge E

$$\frac{V}{S} = \frac{E}{3} \frac{\sin\beta \cos\beta}{(1+\cos\beta)\sqrt{1+\cos^2\beta}}$$

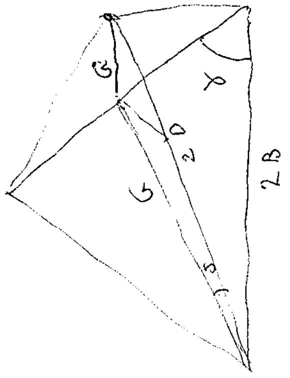
check

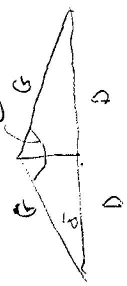
$$A^2 + B^2 = E^2$$

$$A^2(1+\cos^2\beta) = E^2$$

$$A = \frac{E}{\sqrt{1+\cos^2\beta}}$$

Face-Face dihedral angle e





$2B \sin\gamma = G$

$D = \sqrt{2} B$

$G \cos\delta = D$

$2B \sin\gamma \cos\delta = \sqrt{2} B$

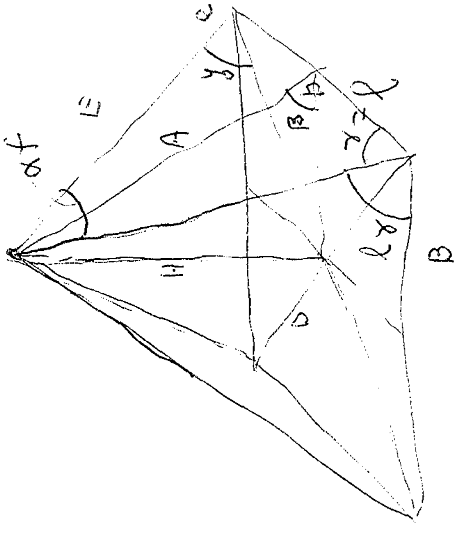
$\cos\delta = \frac{1}{\sqrt{2}\sin\gamma}$

$e = 2(90-\delta)$

face face = d

given e

$\delta = \frac{180-d}{2}$



	45	60	54.73561	70.52878	63.434949				51.827292	
tan	1	$\sqrt{3}$	$\sqrt{2}$	$\sqrt{8}$	2				$\sqrt{\Phi}$	
sec	$\sqrt{2}$	2	$\sqrt{3}$	3	$\sqrt{5}$				$\Phi = 1.618034$	
			Associated	angle						
	54	63		35.26439	51.8273					
	70	45		54	58.282526					
	35	70		45	53.130102					
	60			90	70.52878					
				60	54.73561					
				63				CODE		
				38.94244				45		C/6
								54.73561		HO
								0		FL
								51.827292		GP
								60		EM
								63.434949		LA
								70.52878		288

Special Pyramids: Flat; Cube/6; ½ octahedron, 288; zero line of apsides; Great Pyramid
APS GP

VALUES

$1/\varphi$	1.618034										
φ	0.618034										
$\sqrt{\varphi}$	0.7861514										
$1/\sqrt{\varphi}$	1.2720196										
$1+\varphi$	1.618034	$= \frac{1}{\varphi}$									
$\sqrt{1+\varphi}$	1.2720196	$= 1/\sqrt{\varphi}$									
$1/\sqrt{1+\varphi}$	0.7861514	$= \sqrt{\varphi}$									
$2+\varphi$	2.618034	$= (1+\varphi)^2$	$= \frac{1}{\varphi^2}$								
$\sqrt{2+\varphi}$	1.618034	$= 1/\varphi$									
$1/\sqrt{2+\varphi}$	0.618034	$= \varphi$									
$3+\varphi$	3.618034										
$\sqrt{3+\varphi}$	1.902113										
$1/\sqrt{3+\varphi}$	0.5257311										
$4+\varphi$	4.618034										
$\sqrt{4+\varphi}$	2.1489611										
$1/\sqrt{4+\varphi}$	0.4653411										

EVOL[illegible]NARY
SEQUENCE II PYRAMIDS $\gamma \to \beta$ constructed on $\boxed{\gamma(n)=\beta(n+1)}$
$\varphi = 0.618034$

MAX A-Fixed
SEQUENCE φ

[NON-EXISTENT]

THE GREAT PYRAMID

G.P.

	# n		0	1	2	3	4	0	1	2	3
	β		[X]	38.°172706	51.°827291	58.°282524	62.°267698		$\beta(1)=\gamma(0)$	$\beta(2)=\gamma(1)$	
	$\cos\beta$	$1/\sqrt{n+\varphi}$	$[1/\sqrt{\varphi}]$	$1/\sqrt{1+\varphi}$	$1/\sqrt{2+\varphi}$	$1/\sqrt{3+\varphi}$	$1/\sqrt{4+\varphi}$				
	$\tan\beta$	$\sqrt{(n-1)+\varphi}$	$[\sqrt{\varphi-1}]$	$\sqrt{\varphi}$	$\sqrt{1+\varphi}$	$\sqrt{2+\varphi}$ OR $\sqrt{1+\varphi})$	$\sqrt{3+\varphi}$				
$\frac{\tan\beta}{\sqrt{2}} =$	$\tan\zeta$	$\sqrt{(n-1)+\varphi}/\sqrt{2}$	$[\sqrt{\varphi-1}/\sqrt{2}]$	$\sqrt{\varphi}/\sqrt{2}$	$\sqrt{1+\varphi}/\sqrt{2}$	$\sqrt{2+\varphi}/\sqrt{2}$	$\sqrt{3+\varphi}/\sqrt{2}$				
$\frac{1}{\cos\beta} =$	$\tan\gamma$	$\sqrt{n+\varphi}$	$\sqrt{\varphi}$	$\sqrt{1+\varphi}$	$\sqrt{2+\varphi}$	$\sqrt{3+\varphi}$	$\sqrt{4+\varphi}$				
	$\sin\gamma$	$\sqrt{n+\varphi}/\sqrt{n+\varphi+1}$	$\sqrt{\varphi}/\sqrt{\varphi+1}$	$\sqrt{1+\varphi}/\sqrt{2+\varphi}$	$\sqrt{2+\varphi}/\sqrt{3+\varphi}$	$\sqrt{3+\varphi}/\sqrt{4+\varphi}$	$\sqrt{4+\varphi}/\sqrt{5+\varphi}$				
$\frac{1}{\sqrt{2}\sin\gamma} =$	$\cos\delta$	$\frac{\sqrt{n+\varphi+1}}{\sqrt{2}\sqrt{n+\varphi}}$	$\left[\frac{\sqrt{\varphi+1}}{\sqrt{2\varphi}}\right]$	$\frac{\sqrt{2+\varphi}}{\sqrt{2}\sqrt{1+\varphi}}$	$\frac{\sqrt{3+\varphi}}{\sqrt{2}\sqrt{2+\varphi}}$	$\frac{\sqrt{4+\varphi}}{\sqrt{2}\sqrt{3+\varphi}}$	$\frac{\sqrt{5+\varphi}}{\sqrt{2}\sqrt{4+\varphi}}$				
	γ		38.°172706	51.°827292	58.°282525	62.°267698	65.°0455.04	$\gamma(0)=\beta(1)$	$\gamma(1)=\beta(2)$	$\gamma(2)=\beta(3)$	$\gamma(3)=\beta(4)$
$180-2\gamma=$	α		103.°65459	76.°345416	$\boxed{63.°437949}$	55.°464604	49.°908992	$\alpha(0)=2\beta(2)$	$\alpha(1)=2\gamma(0)$		
	ζ		[X]	29.°069376	41.°969915	48.°8455	53.°369342				
	δ		[X]	25.°913646	33.772243	36.°977471	38.°746986		$2\delta(1)=\gamma(1)$		
$2(90-\delta)$	e		[X]	128.°17271	112.°45551	106.°04506	102.°50603				
	2β		[X]	76.°345416	103.65458	116.°56505	124.°5354		$2\beta(1)=\alpha(1)$	$2\beta(2)=\alpha(0)$	
				CODE	REG b φ f	ℓ e d	$\frac{180-d}{2}$				
	S			SEQ	β α	γ ζ e	δ				
	V										
	S/V			i+b=90							

Where Sequence I has n
Sequence II has $\varphi+n-1$

Note the $\omega=0$ angle 63.°43..
is = α in Gt. Pyr
is γ in Sequence I

Also start $\frac{180}{\pi} = 1$ rad; also the 51°, 430 sequence

SEQUENCE III

start $\beta = 30°$

$\gamma(n) = \beta(n+1)$

List all equal angles in all sequences and between sequences

	# n		0	1	2	3	4	5				
	β		[X]	30°	49°.106605	56°.78909	61°.289485	64°.341094				
	$\cos\beta$	$\sqrt{3}/\sqrt{1+n\cdot 3}$	[X]	$\sqrt{3}/2$	$\sqrt{3}/\sqrt{7}$	$\sqrt{3}/\sqrt{10}$	$\sqrt{3}/\sqrt{13}$	$\sqrt{3}/4$				
	$\tan\beta$		[X]	$1/\sqrt{3}$	$2/\sqrt{3}$	$\sqrt{7}/\sqrt{3}$	$\sqrt{10}/\sqrt{3}$	$\sqrt{13}/\sqrt{3}$				
$\frac{\tan\beta}{\sqrt{2}} =$	tan ɣ	$\frac{\sqrt{3n-2}}{\sqrt{6}}$	[X]	$1/\sqrt{6}$	$2/\sqrt{6}$	$\sqrt{7}/\sqrt{6}$	$\sqrt{10}/\sqrt{6}$	$\sqrt{13}/\sqrt{6}$				
$\frac{1}{\cos\beta} =$	$\tan\gamma$	$\frac{\sqrt{3n+1}}{\sqrt{3}}$	$1/\sqrt{3}$	$2/\sqrt{3}$	$\sqrt{7}/\sqrt{3}$	$\sqrt{10}/\sqrt{3}$	$\sqrt{13}/\sqrt{3}$	$4/\sqrt{3}$				
	$\sin\gamma$	$\frac{\sqrt{3n+1}}{\sqrt{3n+4}}$	0.5	$2/\sqrt{7}$	$\sqrt{7}/\sqrt{10}$	$\sqrt{10}/\sqrt{13}$	$\sqrt{13}/4$	$4/\sqrt{19}$				
$\frac{1}{\sqrt{2}\sin\gamma}$	$\cos\delta$	$\frac{\sqrt{3n+4}}{\sqrt{6n+2}}$	$\sqrt{2}$	$\sqrt{7}/\sqrt{8}$	$\sqrt{10}/\sqrt{14}$	$\sqrt{13}/\sqrt{20}$	$4/\sqrt{26}$	$\sqrt{19}/\sqrt{32}$				
	γ		30°	49°.106605	56°.78909	61°.289485	64°.341094	66°.586776				
$180-2\gamma$	α		120°	81,78679	66°.42182	57°.42103	51°.317812	46.826448				
	ɣ		[X]	22°.207655	39.231521	47.205863	52,238756	55.809136				
	δ		[X]	20°.704811	32°.311534	36°.271199	38.328819	39.596539				
$2(90-\delta)$	e		[X]	138°.59038	115°.37693	107°.24596	103°.34236	100°.80692				
	2β		[X]	60°	98°.21321	113°.57818	123°.7897	128.68219				

NO REPETITIONS ∴ NO REINFORCEMENT → NON-EXIST

$\cos\beta(n) = \frac{1}{\tan\beta(n+1)}$ true in all sequences

PYRAMIDOLOGY

TRIANGLES

HET	Height - Edge
AHT	Apothem - Height
FACE	Apothem - Edge
DIT	Dihedral ⊥ to Edge

Transformation
FACE - HET - AHT
m ↔ b, f ↔ l, p ↔ e
p ↔ d
permute H, E, A

Relation between the $\frac{1}{2}$ octahedron and the Great Pyramid (φ)

		f	l	l
1)	[Oct] FACE	60	60	60
	↓			
		m	b	b
	AHT	60	60	60
	~	f	l	l
	FACE	53+	$\dot{\omega}$	ω
	[φ] f ↔ l	$\dot{\omega}$	58+	58+

$\dot{\omega}$ = 63.4349 tan = 2

OCTAHEDRON FAMILY

	AHT	FACE	HET
60-60-60	A = 1 $\boxed{l = \dot{\omega}}$ d = 104 W = 58 b = 60	$\boxed{\text{OCT}}$ E = 1 l = 60 d = 109 W = 78 b = 54+ ~~Oct~~	E = $\sqrt{2}$ l = 69 d = 98 W = 33 b = 68
45-45-90	$\frac{1}{6}$ cube H = 0.5 l = 54 d = 120 W = 120 b = 45	FLAT H = 0 l = 45 d = 180 W = 360 b = 0	$\boxed{\text{OCT}}$ H = $1/\sqrt{2}$ E = 1 l = 60 d = 109 W = 78 b = 54+
54-54-71	$\boxed{\text{OCT}}$ E = 1 l = 60 d = 109 W = 78 b = 54+	$\frac{1}{6}$ cube H = 0.5 l = 54 d = 120 W = 120 b = 45	* H = 1 l = 66 d = 101 W = 46 $\boxed{b = \dot{\omega}}$

GP(φ) ← per l → f

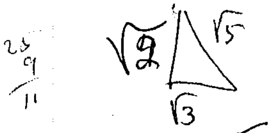
← THE THREE EQUILATERAL TRIANGLE PYRAMIDS

OCTAHEDRON

FACE	60-60-60
AHT	54-54-70
HET	45-45-90

9 Pyramids
3 oct; 2 $\frac{1}{6}$ cube; 4 others

Oct d ↔ p ?
H, E.
f ↔ l, etc



$\cos^{-1}\frac{1}{\sqrt{5}} = 63.4349 = \tan^{-1}2$

ω 70

PYRAMIDS

$\cos b = \sqrt{0.6} = \sqrt{\frac{3}{5}}$

51 50 40   43 22   FACE 60-60-60   AHT 60 60 60

	PYRAMID ===>		GIZA GT PYR	DASHUR		FLAT	CUBE 6	OCTAHEDRON 2		
	SYM	FORMULA	MEASURED							
67.7923	b	VALUE	51.84	43,2424	39,2315	0	45	54.7356	60	Merid
44.4153	m	m=180-2b	76.3116	93,1752	101.5370	180	90	70.5288	60	
69.2952	l	l=arccot(cosb)	58,2923	54,0044	52,2388	45	54.7356	60	63.4349	f fa Gt. Pyr
41.4096	f	f=180-2l	63,4154	71,9912	75,5225	90	70,5288	60 face	53,1301	
60	e	√2 tan e = tan b e=arccos(√2cosl)	41.9875	33,7813	30	0	35.2644	45	50,7685	
60	p	p=180-2e	96.0251	112,4375	120	180	109,4712	90	78,4630	104.4775
98.2132	A d	~~A=1/(2cosb)~~	112,43757	121.8498	126,8699	180	120	109.4712	104.4775	
32.8528	~~H~~ W	~~H=(tanb)/2~~	89.7499	127,3992	147.4796	360	120	77,8936	57.9100	
	~~E~~ A	~~E=1/(2cosl)~~ A	0,8093	0,6883	0.6455	0.5	0,7071	0.8660	1,0000	
	~~d~~ H	~~d=arccos(-cos²b)~~ H	0,6364	0,4780	1.6330	0	0,5	0,7071	0.8660	
	~~W~~ E	~~W=4d-360 sph deg~~ E	0,9513	0,8507	0.8165	1/√2 = 0,7071	0,8660	1,000	1,1180	
	δb'	Difference in min arc	0	+2' 45"						

All angle values are given in degrees and decimal fractions of a degree

The values for A, H, and E are derived assuming the length of the base B to be unity.

The symbol ϕ represents the golden ratio = 0.618034...

43,4124 = 43° 24' 45" upper Bent and Red

measured 43° 22'.

Sun at Teotihuacan 43°.5

include ϕ and Dashur

43.4124 = 43° 24' 44.64"

Page with
on Meas ⟷ Dash
per p → d
ϕ ⟷ Dash
p → d

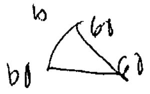
Here we illustrate the d → p transformation

The Hedral family

GP

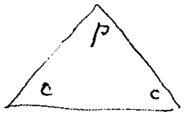
face
when
Merid

edge 60 60

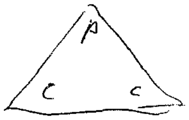


PYRAMIDOLOGY: EVOLUTION

Evolution of Isosceles Triangles



If $c \to p$
eventually
all are same
$\sim$ 2nd Law of
Thermodynamics



If $p \to c$
extinct in
a few
generations

This is like a pawl

Evolution of Pyramids

Six paths:

face → EDE face → ABA
ABA → face ABA → EDE
EDE → ABA EDE → face

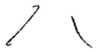
Begin with Flat

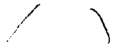
Face → EDE = Half Octahedron
Face → ABA = One Sixth Cube

~~Also $b \to d$~~
~~$d \to b$~~
~~The two dihedrals~~

Half-Octahedron
face → EDE face → ABA

$\frac{1}{6}$ cube
face → ABA face → ABA





The face-base dihedral = b
The face-face dihedral = d

$b \to d$
$d \to b$
$p \to d$
$d \to p$

For what pyramid is $b = d$

Pyramids with angles
in all six positions

45
60
54.
70.
63.
67.

It should be stressed that it is not the Buddhist approach that is being advocated here any more than that of the *Book of Changes*. As insights which have themselves stood the test of time, these are useful as an indication of directions to explore in identifying a pattern that can encompass the range of views of sustainable human development. The Buddhist approach has a strong bias in favour of a single view, one of the 64 in the derived pattern. It is important to understand the conditions under which the others may also appear politically desirable, whether or not importance is attached to different kinds and degrees of insight.

(b) "Lives" as cycles

The text focuses strongly on the "self" and its perceptions. The implications would also seem to be valid for collectivities. The early mention of "lives" and the several references to "immortality" are of more immediate significance when understood metaphorically. A "life" may be understood as an unbroken period of attention or concentration. Attention to any matter may be broken by any distracting or disruptive influence onto which the attention is then shifted, whether individually or collectively. "Lives" can thus be understood as successive cycles of emergent focus and decay of attention, whether as a daily cycle of activity, a programmatic cycle of a group, or the life-cycle of an organization or of some intellectual or cultural fashion. In this sense the pattern aims to transcend the limitations of short-term concerns with a singleprogramme, electoral cycle or business cycle. It is concerned with trans-cyclic sustainability. The original text could be rewritten to reflect such preoccupations.

(c) Traps on learning pathways

Degree of insight, area of insight and duration of insight are thus woven together to indicate the traps lying along the learning pathway from ignorant degradation (samsara) to insightful sustainability (nirvana).

(d) Forms of (un)sustainability

Perhaps most intriguing about the above pattern is the possibility that it represents a complete representation of forms of (un)sustainability, expressed at the most abstract level. It may be understood as both embodying and transcending the dualism which diminishes the significance of many systemic endeavours. In doing so it embodies increasing degrees of complexity through the later terms of the tetra-lemmic logic thus indicating the challenge to understanding and the learning process. It is as much a learning pathway (or "curriculum") as an explanation, thus denying superficial comprehension.

(e) Representation of the pattern

Having acquired a sense of the pattern, there is value in exploring ways of representing it so as to highlight features implicit in its structure which are of significance for sustainability:

"Mountain" Model: Here the pattern is projected onto a tetrahedron so that the upper apex represents the sustainable condition (6 unbroken lines). The three edges leading up to it are used to represent the three dualistic domains (materiality/immateriality, knower/known, space/time). On each of those edges are four "islands of stability", indicated by the sequence of four values of the tetra-lemmic logic. This then gives the final lemma (neither A nor not-A) at the common apex and the first lemma (A) at the lower end of each edge (2 broken lines in each case). Each of the views is then defined by a triangular plane between those three edges. The initial view (ignorance) being given by the plane defining the bottom of the tetrahedron. The degree of unsustainability might then be represented by the slope of any plane (off which a coherent sphere of attention would eventually roll). Seemingly sustainable views would be those in which the plane was parallel to the base, corresponding to an equivalent degree of insight on all three dimensions. As a metaphorical mountain, the challenge is to ensure that

TRIANGE
EVOLUTION

V	b	b		V	b	b
90	45	45		~~45~~		
45	67.5	67.5		90	45	45
67.5	56.25	56.25				
56.25						
	V ← b	2nd Law of Thermodynamics → 60-60-60			V → b	
70.5288	54.7356	54.7356		38.9424	70.5288	70.5288
54.7356	62.6322	62.6322		102.1152	38.9424	38.9424
62.6322	58.6839	58.6839		X	102.1152	
58.6839	60.6581					
	59.6710					
	60.1645					
	59.9177					
	60.0411					
	. . .	↓				
63.4349	58.2826	60		53.1302	63.4349	63 . .
	60.8587			73.7396	53.1302	53
	59.5707			32.5208	73.7396	73
	60.2147			114.9584	32.5208	32 ↓
	. . . .			X	114.9584	114
		58 63				
			also	d → p	d → b	
				p → d	b → d	

SPECIAL PYRAMIDS

	M	F	E			
FLAT	b = 0 m = 180	l = 45 ~~45~~ = 90	e = 0 p - 180			
HALF OCTAHEDRON	b = 54.7356 m = 70.5288	l = 60 f = 60	e = 45 p = 90	$\tan b = \sqrt{2}$ $\cos b = 1/\sqrt{3}$	$\tan m = 2\sqrt{2}$ $\cos m = 1/3$	
$\frac{1}{6}$ cube	b = 45 m = 90	l = 54.7356 ~~m~~ = 70.5288	e = 35.2644 p = 109.4712			
	b = 60 f = 60	l = 63.4349 ~~m~~ = 53.1302	e = 50.7685 p = 78.4630		$\cos p = 1/\sqrt{5}$	
	b = 67.7923 m = 44.4153	l = 69.2952 ~~m~~ = 41.4096	e = 60 p = 60			
	b = 63.4349 m = 53.1301	l = 65.9052 f = 48.1897	e = 54.7356 p = 70.5288			
MIN S^3/V^2 @ 288	b = 70.5288 m = 38.9424	l = 71.5690 f = 36.8700	e = 63.4349 p = 53.1302			

fulcrum pyramid

11 △

	b = 69.2952 m = 41.4096	l = 70.5288 m = 38.9424	e = 61.8745 p = 56.2509			
	b = 75.9638 m = 28.0725	l = 76.3670 f = 27.2660	e = 70.5288 p = 38.9424			
	b = 75.0368 m = 29.9264	l = 75.5225 f = 28.9550	e = 69.2952 p = 41.4096			

60,
70.5288
in all 6
positions

63.4349
in all 6
inc. φ

54

		Used				
	1 45	3				
	2 60	3				
	3 54	3				
	4 63	3				
	5 70	3				
	6 69	3				

SPECIAL
PYRAMIDS

	M	F	E			
φ	b = 51.8273 m = 76.3454	l = 58.2825 f = 63.4349	e = 41.9699 p = 96.0603			
	b = 58.2825 f = 63.4349	l = 62.2677 f = 55.4646	e = 48.8455 p = 82.3091		$p = \text{inv} \cos^{-1}$	(φ) i.e. $\frac{1}{2}$0-[illegible] inv of
	b = 66.3939 m = 47.2122	l = 68.1765 f = 43.6469	e = 58.2825 p = 63.4349			
	b = 38.1727 m = 103.6545	l = 51.8273 φ = 76.3454	e = 29.0694 p = 121.8613			
	b = 60.9306 m = 58.1387	l = 25.9136 f = 128.1727	e = 51.8273 p = 76.3454			

	45	54	63	70		
Flat	l	–				
Cube/6	b	l				
Oct/2	e.	b				
~~GP~~	~~–~~	~~–~~	~~f~~			
APS	–	e	b			
~~ME~~	~~–~~		~~l~~			
288	–		e	b		

FLAT	l 45	54	63	70	60	51
CUBE/6	b	l	–	f	–	–
OCT/2	e	B	–	m	l(f)	–
Aps	–	e	b	p	–	–
288	–	–	e.	b	–	–
ME	–	–	l	–	b	–
GP	–	–	f	–	–	b

(ANGLE)
FAMILY W PLACE

	T1	SΦ	T$\sqrt{2}$	S2	T2	S3
	45°	51.°	54.°	60°	63.°	70.°
b	cube/6	GP	OCT/2	ME	APS	288
m				(ME)		OCT/2
l	Flat		cube/6	OCT/2	ME	
f				(OCT/2)	GP	CUBE/6
e	OCT/2		APS		288	
p						APS
	sec $\sqrt{2}$	tan $\sqrt{\Phi}$	sec $\sqrt{3}$	Tan $\sqrt{3}$	sec $\sqrt{5}$	tan $\sqrt{8}$

PLACE W PYRAMID

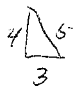
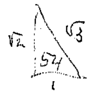
	b	m	l	f	e	p
FLAT	0		45			
CUBE/6	45		54	70		
OCT/2	54	70	60	(60)	45	
GP	51			63		
APS	63				54	70
ME	60	(60)	63			
288	70				63	

ANGLE W PYRAMID

	45	51	54	60	63	70
FLAT	l	–	–	–	–	–
CUBE/6	b	–	l	–	–	f
OCT/2	e	–	b	l (f)	–	m
GP	–	b	–	–	f	–
APS	–	–	e	–	b	p
ME	–	–	–	b (m)	l	
288	–	–	–	–	e	b

Meridian Base Angles "b"

$1\,3/8$

	Angle	sin	cosec	cos	sec	tan	cot	
	$42^\circ.58\overline{3}$	0.676662	1.477843	0.736294	1.358153	0.919010	1.088127	
⊕ but (2)	$43.3\overline{6}$	0.6866647	1.456315	0.726974	1.375565	0.944552	1.058704	
	48.75	0.7518398	1.3300706	0.6593458	1.5166544	1.1402815	0.8769764	
	49.398611	0.7592555	1.3170796	0.6507926	1.5365878	$1.1\overline{6}6628$	0.8571457	
	50.194	0.7682165	1.3017164	0.6401902	1.5620359	$1.1\overline{9}$	$0.8\overline{3}$	
☒	51.340278	0.7808898	1.2806233	0.6246939	1.6007841	1.2500039	0.7999975	
(2)	51.843056	0.7863214	1.2717446	0.6178177	1.6186005	1.2727402	0.7857063	
G.P.	$51.8\overline{4}$	0.786336	1.271720	0.617799	1.618650	1.272804	0.785667	
	52.0	0.7880108	1.2690182	0.6156615	1.6242692	1.2799416	0.7812857	
?	52.13							
✻ (5)	53.13	0.800034	1.249947	0.599955	1.666792	1.33379	0.749912	→ 
Kaltre	$53.1\overline{6}$							
xx but (2)	$54.46\overline{2}$	$\sim \frac{\sqrt{2}}{\sqrt{3}}$	$\frac{\sqrt{3}}{\sqrt{2}}$	$\frac{1}{\sqrt{3}}$	$\sim \sqrt{3}$	$\sqrt{2}$ 1.4 = $\frac{7}{6}$	$\frac{5}{7}$	
	55.0						0.7	55.007979
(2)	56.309722	0.8320483	1.2018534	0.5547033	1.8027657	$1.4\overline{9}$ = 1.5	$0.\overline{6}$ = $\frac{2}{3}$	56.309933
	57.263889	0.8411701	1.1888202	0.5407706	1.849213	$1.\overline{5}$	0.642879	57.264772
	62.25	0.8849876	1.1299593	0.4656145	2.1476994	1.9	0.5263158	62.241459
	63.5	0.8944272	1.118034	0.4472136	2.236068	2	0.5	63.434949
	63.6	0.8958064	1.1163126	$0.\overline{4}$	2.25	2.0155647	0.4961389	63.612203
	63.917	0.9						64.158067
	70.0	0.9396925	1.0641779	0.3420204	2.9238019	$2.\overline{74}$	0.3639706	$69.\overline{9}$
c	74							

Equating trig functions get
0, 51.82, 45, 90
90 38.18 45 0

If tan x = cosec x, then cos x = φ = 0.618034   x = 51°.827298

If tan x = sec x, then sin x = 1   x = 90°

☒	51.340192	0.7808688	1.2806248	0.6246951	1.6007811	1.25	0.8	
✻	51.130102	0.8	1.25	0.6	$1.\overline{6}$	$1.\overline{3}$	0.75	
x x	54.73561	0.8164966 $1/\sqrt{1.5}$	1.2247449 $\sqrt{1.5}$	0.5773503 $\frac{1}{\sqrt{3}}$	$\sqrt{3}$	$\sqrt{2}$	$1/\sqrt{2}$	
⊕	43.341759	0.6863486	1.4569556	0.727272..	$1.3\overline{75}$ $\frac{11}{8}$	0.9437293	1.0596259	
XX	54.462322	0.8137335	1.2289036	0.5812382	1.720465 7/5 = 1.4	1.4	0.7142857	54.462322 54°28'

CODE
β b
α f
γ ℓ
ζ e
ε d

First clone
Sebastopol 97/02/20
very ill - fever 101.5

I ~ 0 at half octagon
I ~ radicab

HEDRON FAMILY
SEQUENCE I a

$\ell_n = b_{n+1}$ or also $f_n = m_{n+1}$

in addition
anomoly at
$m_{-1} = p_0$
$b_{-1} = e_0$

i.e. Ia and Ib hold between −1 and 0

1/6 cube

	0 −Q	1 −1	2 0 Q	3 +1 Ø	4 +2 Ø	5 +3 Ø	6 +4 Ø	7 +5 Ø	8 +6 Ø	+7
	FLAT	SEED	HALF OCTAHEDRON							
b	0	45	54.7356	60	63.4349	65.9051	67.7923	69.2952	70.5288	71.5650
m	180	90	70.5288	60	53.1302	48.1898	44.4154	41.4096	38.9424	
q ℓ	45	54.7356	60	63.4349	65.9051	67.7923	69.2952	70.5288	71.5651	
f	90	70.5288	60	53.1302	48.1898	44.4154	41.4097	38.9424	36.8699	
e	0	35.2643	45	50.7684	54.7356	57.6884	60	61.8745	63.4349	
p	180	109.4713	90	78.4632	70.5288	64.6232	60	56.2501	53.1302	
d	180	120°	109.4712	104.4775	101.5370	99.5941	98.2132	97.1807	96.3794	
A										
B										
H										
E					45 90	$\ell_{-2} = b_{-1}$ $f_{-2} = m_{-1}$	$= e_0$ $= p_0$			
W					60 60		$\ell_0 = b_1$ $f_0 = m_1$	= =	e_4 p_4	
		$f = 2e$ $p = 2\ell$	$d = 2b$ $= 180 - m$		70.5288	f_{-1} =	m_0 =	= p_2 =	= $\ell_5 = b_6$	
		$m = \ell + e$ $m = 2b = 90$			54.7356 63.4349	ℓ_{-1} =	b_0 = ℓ_1 =	e_2 b_2 =	= e_6	
			cos 70.5288 = 1/3	$\cos^2$ 63.4349 = 0,2 = 1/5	53.1302		f_1 =	m_2 =	= p_6	

$4f - 360 = 0$

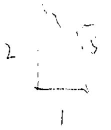
$f = 2e$
$m = 2b = 90$
$m = \ell + e$
$p = 2\ell$
$4f - 360 =$
-77.8848
$4p - 360 =$
$+77.8852$

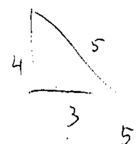
$4f - 360 =$
-120

cos 63.4349 = $\frac{1}{\sqrt{5}}$
$= \frac{1}{\sqrt{5}}$

$4f - 360 =$
-147.4792

cos 70.5288 = $\frac{1}{3}$





$\ell_{-1} = b_0 = e_2 =$ ~~[illegible]~~
$f_{-1} = m_0 = p_2 = \ell_5 = b_6$
~~[illegible]~~ = ~~[illegible]~~ = ℓ_1 = b_2 = e_6
~~[illegible]~~ $f_1 = m_2 = p_6$

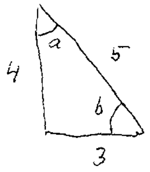
90 − 53.1302
= 36.8698

53 × 2 = 106.2604 − 180 = 73.7396

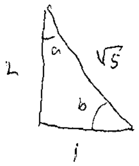
54.7356 tan = $\sqrt{2}$
70.5288 cos = $\frac{1}{3}$
63.4349 cos = $\frac{1}{\sqrt{5}}$
53.1302 cos = $\frac{3}{5}$
tan = $\frac{4}{3}$ sin = $\frac{4}{5}$

BASIC
TRIANGLES

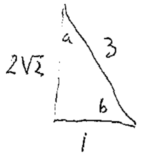
THE OCTAGON FAMILY
BASED ON WHOLE NUMBERS
AND SQ RTS.



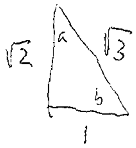
b= 53.1302
a= 36.8698



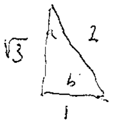
b= 63.4349
a= 26.5651



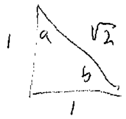
b= 70.5288
a= 19.4712



b= 54.7356
a= 35.2644



b= 60
a= 30



b= 45
a= 45

SPECIAL PYRAMIDS

Φ Family

same

IIa ≡ -1

New?
$\cos l = \frac{2}{5}$ pyr
↓

Meridian

		GREAT PYRAMID (φ)	m	Diagonal	p	Face	f		
b		51.8273	64.0864	60.9306	71.0393	38.1729	60.9306		64.1233
m		76.3454	51.8273	58.1387	37.9214	103.6546	58.1387		51.7534
l		58.2825	66.3939	64.0864	72.0000	51.8273	64.0864		66.4218
f		63.4349	47.2122	51.8273	36.0000	76.3454	51.8273		46.9564
e		41.9699	55.5062	51.8273	64.0864	29.0694	51.8273		55.5501
ρ		96.0603	68.9876	76.3454	51.8273	121.8612	76.3454		68.8998
d		112.4550	115.9137	103.6546	96.0602 ~~108.9607~~	128.1727	103.6546		112.5333
W		89.8200	103.6548	54.6183	26.2407	152.6907	54.6183		90.1331
B		1	1	1	1	1	1		1
A		0.8090	1.1441	1.0291	1.5388	0.6360	1.0291		1.1456
E		0.9511	1.2486	1.1441	1.6180 ~~1.4553~~	0.8090	1.1441		1.2500
H		0.6360	1.0291	0.8995	1.4553	0.3931	0.8995		1.0308

→ b how?

2b = 76.3454

$\frac{m}{2}$ = 51.8273

I ~ 0 at Half Octogon

SEQUENCE I b

like I a
but skips

$m_n = p_{n+1}$
same as
or
$b_n = e_{n+1}$
0

in addition ∃
an anomoly at -1
$l_{-1} = b_0$
$f_{-1} = m_0$

		-3	-2	$\frac{1}{6}$ cube -1	HALF OCT[illegible]	+1	+2		
b		26.5610	35.2644	45	54.7356	63.4349			
m		126.8698	109.4713	90	70.5288	53.1300			
l			50.7685	54.7356	60	65.9052			
f			78.4631	70.5288	60	48.1897			
e			26.5651	35.2643	45	54.7356	63.4349		
p			126.8698	109.4713	90	70.5288	53.1302		
d			131.8104	120	109.4712	101.5370			

$\frac{p}{2} = 63.4349$
$b_{-2} = e_{-1}$

$l_{-1} = b_0 = e_1$ 54.7356

$f_{-1} = m_0 = p_1$ 70.5288

$m_{-2} = d_0$

Special events occur around pyramid "0"

GTPYR

b1 = 50.7685	b1 = 51.8273	b1 = 64.0863	58.2825
b2 = 64.6157	b2 = 64.0863	b2 = 57.9569	60.8588
b3 = 35.2644	b3 = 38.1727	b3 = 60.9305	51.8272°
b4 = 61.6733	b4 = 60.9306	b4 = 51.2505	56.1144
b5 = 60	b5 = 60.9306	b5 = 71.0392	66.3939°
b6 = 71.4523	b6 = 71.0393	b6 = 66.1263	68.4838

$II \sim 0$ at Great Pyramid (φ)

$II \sim φ$

Since φ is ultimately based on radicals, viz $\sqrt{5}$
∃ an intersect of the Octagon and φ families not with the π families

SEQUENCE II a

face → Meridian

$l_n = b_{n+1} = l_n$
and $f_n = m_{n+1}$

	-2	-1	0	+1	+2	+3	+4		
	embryo	seed	GREAT PYRAMID φ						
b	–	38.1727	51.8273	58.2825	62.2677	65.0455	67.1252	68.7580	
m	–	103.6546	76.3454	63.4349	55.4646	49.9090	45.7496	42.4841	
l	38.1727	51.8273	58.2825	62.2677	65.0455	67.1252	68.7580		
f	103.6546	76.3454	63.4349	55.4646	49.9090	45.7496	42.4841		
e	–	29.0694	41.9699	48.8455	53.3693	56.6514	59.1774		
p	–	121.8612	96.0603	82.3090	73.2613	66.6972	61.6452		
d	–	128.1727	112.4550	106.0451	102.5060	100.2532	98.6908		
A	–	0.6360	= ½φ 0.8090	0.9511	1.0745	1.1851	1.2863	1.3800	
B	–	1	1	1	1	1	✓	1	
H	–	0.3931	0.6360	0.8090	0.9511	1.0745	1.1851	1.2863	
E	0.6360	0.8090	0.9511	1.0745	1.1851	1.2863	1.3800		
W		152.6909	89.8226	64.1803	50.0240	41.0128	34.7632		

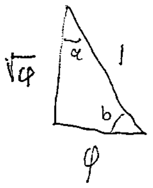
4f−360= 54.6184 4F−360= −54.6184 4f−360= −106.2604 4f−360= −138.1416

If 54.6184 → . b = 51.8217
≠ 51.8273 (φ)
.0056
Δ = 20".16

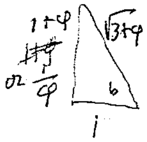
The only *exact* number ~~in~~ common to both Sequence I and II is 63.434949
$= \cos^{-1}\left(\frac{1}{\sqrt{5}}\right)$
$= i\omega = 0$

The GREAT PYRAMID FAMILY A
IS BASED ON $\phi = 0.618034$

B on π

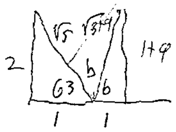


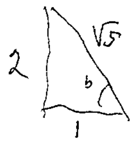
b = 51,8273
a = 38.1727



b = 58,2825
a = 31.7175

$180 - 2b = 63.4349$





b = 63.4349

63.4349 shows up
in both the φ and Octagon
families because of √5

$\varphi = \frac{1+\sqrt{5}}{2}$

$V = \frac{hb^2}{3}$ $\quad V^2 = \frac{h^2 b^4}{9} =$ $\quad V = \frac{4}{3} h e^2$

$9V^2 = h^2 b^4$

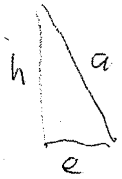
if $h = e^{\pi}$

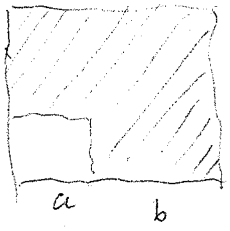
$h =$

$V = \frac{4\pi}{3} e^3$

$b = 2e$ $\quad 36V^2 = 4h^2b^4 = 4a^2 - b^2 = (2a+b)(2a-b)$

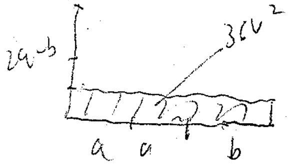
$h^2 = a^2 - e^2 = a^2 - \left(\frac{b}{2}\right)^2$ $\quad S = (a+b)^2 - a^2$





$V = \frac{4}{3}(a^2 - h^2)$

$S = (a+2e)^2 - a^2$



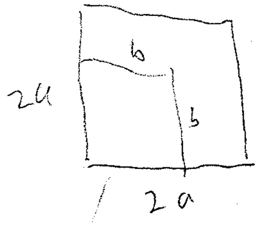
$36V^2 = 3a^2 + a^2 - b^2$

$S = (a+b)^2 - a^2 = a^2 + b^2 + 2ab - a^2$

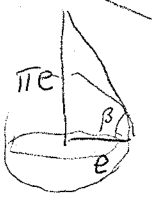
$36V^2 + S = 2ab + 3a^2$

$h = \pi e$

$V = \frac{4}{3}\pi e^3$



$36V^2$

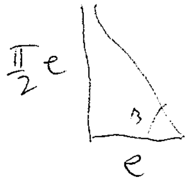


$\tan\beta = \pi$ $\quad V = \frac{4}{3}\pi e^3$

same ~~sph~~ sphere radius e

$\beta = 72.^{\circ}343213$

Hemisphere $\quad V = \frac{4}{6}\pi e^3 = \frac{4}{3}\frac{\pi}{2} e^3$



$\underset{\text{Hem}}{\frac{4}{6}\pi r^3} = \underset{\text{pyr}}{4\frac{he^2}{3}}$ $\quad h = \frac{\pi}{2} e$

$\begin{array}{r} 72 \\ 57 \\ \hline 15 \end{array}$

$\tan\beta = \frac{\pi}{2}$ $\quad 57.^{\circ}518363$ vol of pyr = vol of hemisphere

$1\text{rad} = 57.^{\circ}29578$

$\delta = 0.223$

```
DOS=High,UMB
Device=C:\DOS\EMM386.Exe RAM NoEMS I=E000-EFFF
DEVICEHIGH=C:\CDROM\cdmke.sys /D:PANA562 /P:300 /N:1
DeviceHigh=C:\DOS\Setver.exe
DeviceHigh=C:\DOS\ANSI.Sys
Numlock=off
Files=60
Buffers=10
Stacks=9,256
DEVICEHIGH=C:\DOS\DBLSPACE.SYS /MOVE
LASTDRIVE=K
```

```
                        List of Software Interrupts
________________________________________________________________________

Number  Address      Label                                      Owner

  00    4D73:00DD  Division by zero                           SI.EXE
  01    0070:06F4  Single Step                                SYSTEM
  02    04C5:0016  NMI / Parity Check                         Stacks
  03    0070:06F4  Breakpoint                                 SYSTEM
  04    0070:06F4  Overflow (INTO)                            SYSTEM
  05    F000:FF54  Print Screen                               BIOS
  06    F000:EB43  Invalid opcode (2/3/486)                   BIOS
  07    F000:EAEB  Coprocessor emulation (2/3/486)            BIOS
  08    04C5:003C  Timer-tick Hardware Interrupt              Stacks
  09    04C5:0045  Keyboard Hardware Interrupt                Stacks
  0A    04C5:0057  Cascaded Interrupt Controller              Stacks
  0B    04C5:006F  Asynchronous adapter                       Stacks
  0C    0883:2B5C  Asynchronous adapter                       MOUSE
  0D    04C5:009F  Segment overrun                            Stacks
  0E    04C5:00B7  Diskette hardware Interrupt                Stacks
  0F    0070:06F4  Printer hardware Interrupt                 SYSTEM
  10    0883:2CB6  Video Functions                            MOUSE
  11    F000:F84D  Equipment installed                        BIOS
  12    F000:F841  Memory size                                BIOS
  13    02C5:0530  Diskette/fixed disk                        EMM386
  14    F000:E739  BIOS Asynchronous (COM Ports)              BIOS
  15    02C5:055A  Cassette/Miscellaneous                     EMM386
  16    F000:E82E  Keyboard                                   BIOS
  17    F000:EFD2  Printer (LPT1,2,3)                         BIOS
  18    F000:E000  ROM BASIC entry                            BIOS
  19    0582:002F  Bootstrap loader                           SYSTEM
  1A    F000:FE6E  Time of day get/set                        BIOS
  1B    3E2E:E56F  Keyboard control-break                     SI.EXE
  1C    0883:44E3  Auxillary timer-tick                       MOUSE
  1D    F000:F0A4  Pointer: Video parameters                  BIOS
  1E    0000:0522  Pointer: Diskette parameters               SYSTEM
  1F    C000:4E16  Pointer: Extended Video Characters         SYSTEM
  20    0123:1094  DOS program terminate                      SYSTEM
  21    065F:000D  DOS function call                          DESKCON
  22    10DA:0312  Storage: DOS terminate Address             PCSHELL
  23    1006:014A  DOS control-break exit                     COMMAND
  24    5304:0045  DOS critical error                         SI.EXE
  25    0123:10A8  DOS absolute disk read                     SYSTEM
  26    0266:0037  DOS absolute disk write                    SYSTEM
  27    0123:10BC  DOS terminate & stay resident              SYSTEM
  28    0123:10DA  DOS idle                                   SYSTEM
  29    CC2B:0510  DOS Fast Character to Screen               ANSI
```

In some way are scale and shape inverse?

98/11/13

In flat space they are independent

$H \times S = K$ if $k = \infty$, H & S are independent

what is K for a sphere?

Expansion in H-Space ⇒ contraction in P-Space?

shape ~~legs~~ gravity

contractive ~~anti-gravity~~ $= f\left(\frac{dH}{dt}\right)$

scale
shape
~~predicated on~~
~~an invariant~~
~ K or a sphere
or a topology

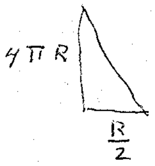
Pyramids having the same volume as part of sphere

Pyramid $V = \frac{1}{3} h b^2$; Sphere $V = \frac{4}{3} \pi R^3$

Select
R

set $b = R$

then for vol to be same $h = 4\pi R$,



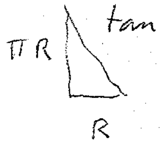
$\tan\beta = 8\pi$

$\beta =$

set $b = 2R$ i.e. $e = R$

then for the volumes to be the same

$h = \pi R$



$\tan\beta = \pi$

$\beta =$

set $h = R$

Select
member

set $a = R$

choice for R
a scale

$\tan\beta =$
resulting
shape
predicated on a sphere

set $E = R$

5x5

Pyr V =

	choice for R	whole Sphere	$\frac{1}{2}$ Sph	$\frac{1}{4}$ Sph	$\frac{1}{8}$ Sph
S	e				
B	b				
A	a				
L	h				
E	m e				

also do

Pyr V = hemisphere — $\tan\beta = \frac{\pi}{2}$ $\beta =$

Pyr V = quad — $\tan\beta = \frac{\pi}{4}$ $\beta =$

Pyr V ~ Oct

table of tan β
and β

Select
V

all
$e = R$

$\frac{1}{3} h b^2$ $\frac{4}{3} \frac{\pi R^3}{8}$

$b = 2e$

$\frac{4}{3} h e^2$ $h = \frac{\pi R}{8}$ $\tan\beta = \frac{\pi}{8}$ $\beta =$

$e = R$

ALSO
The isosceles
triangles
ISOSCELES

5% MAG 5%

2
4
6
8

TOP EDGE

0 4 8 12 16 20 24

MAG

1.1

2.1

Rogm hgj
rszdj a·lllll
wurmllda p
o÷b.Kgp ik
t= xObtGcj
q÷a pmf u
Cgj gnyrcJ
ttfU z Yld
v gcqsl ec
sTk Wenfc
tuopq QPh
qoqif k Rlj
bprH d·lllll
pmn oorcu

3.0

Rogm hgj
rszdj a·lllll
wurmllda p
o÷b.Kgp ik
t= xObtGcj
q÷a pmf u
Cgj gnyrcJ
ttfU z Yld
v gcqsl ec
sTk Wenfc
tuopq QPh
qoqif k Rlj
bprH d·lllll
pmn oorcu

3.1

2.0

1.2

Rogm hgj
rszdj a·lllll
wurmllda p
o÷b.Kgp ik
t= xObtGcj
q÷a pmf u
Cgj gnyrcJ
ttfU z Yld
v gcqsl ec
sTk Wenfc
tuopq QPh
qoqif k Rlj
bprH d·lllll
pmn oorcu

3.3

24
20
16
12
8
4
0

8 6 4 2

50% MAG

Rogm hgj
rszdj a·lllll
wurmllda p
o÷b.Kgp ik
t= xObtGcj
q÷a pmf u
Cgj gnyrcJ
ttfU z Yld
v gcqsl ec
sTk Wenfc
tuopq QPh
qoqif k Rlj
bprH d·lllll
pmn oorcu

3.2

.62 MAG

2.2

4.0 Rogm h mFnmfel
rszdj a l n iE allh

4.1 Rogm h mFnmfel
rszdj a n iE allh

4.2

4.3

1.007

MAG

MAG

1.3

MAG

LEAD EDGE

XEROX TEST PATTERN © 1994 Xerox Corporation
82E2020 521.300 M1468

.71

.62

1.4

2.3

3.4 Rogm hgj
rszdj a·lllll
wurmllda p
o÷b.Kgp ik
t= xObtGcj
q÷a pmf u
Cgj gnyrcJ
ttfU z Yld
v gcqsl ec
sTk Wenfc

.62 MAG

1.007 MAG

having same volume as part of spheres
~~w~~ sphere
Pyramids ~~with volumes = %~~

Table of β's

parameter set ~~for~~ R	whole sphere	hemi sphere	quarter sphere	Octant sphere	
e	$\tan\beta = \pi$				
b	$\tan\beta = 8\pi$				
~~a~~					
h	$\tan\beta = \frac{1}{\sqrt{\pi}}$				
me					

Pyr	Sphere	hemisphere	Quad	Oct
$V = \frac{1}{3} b^2 h$	$V = \frac{4}{3}\pi R^3$	$V = \frac{2}{3}\pi R^3$	$V = \frac{4}{3}\pi R^3$,	$\frac{1}{6}\pi R^3$

$b = R$, then $h = 4\pi R$ $\tan\beta = 8\pi$ $h =$

$V = \frac{1}{3} 4e^2 h$

$e = R$, then $h = \pi R$ $\tan\beta = \pi$

~~$a = R$~~

$h = R$, then $b^2 = 4\pi R^2$ $\tan\beta = \frac{1}{\sqrt{\pi}}$
$b = 2R\sqrt{\pi}$

$h = a \sin\beta$
$e = a \cos\beta$

$V = \frac{1}{3} 4 a^3 \cos^2\beta \sin\beta$

$a = R$ $\cos^2\beta \sin\beta = \pi$

$\sin\beta - \sin^3\beta = \pi$

$x^3 - x + \pi = 0$ x must be < 1

no solu

SHAPIND.WPD
~~SCALSHAP.WPD~~

November 11, 1998

SC~~ALE-~~SHAPE INDICES

It has been noted elsewhere [ref] that only in a flat space are shape and size ~~inde~~pendent. In other topologies as size changes shape also changes. For example, on a sphere the sum of the interior angles of a very small triangle is slightly more than 180°, but increase the size up to an octant and the sum of the angles is 270°. If the sphere expands and the figure remains the same size its shape will change. If the figure expands and the sphere remains the same size the shape will also change.

In flat space the scale attributes of figures can be eliminated by taking $A/\cancel{L^2}$ P^2 for two dimensional figures and taking S^3/V^2 for three dimensional figures. Where A represents area, ~~L~~ the perimeter linear ~~dimension~~; S represents surface area and V volume.

TWO DIMENSIONAL CASE

For example: An equilateral triangle $A = L^2\sqrt{(3)}/4$ and $A/L^2 = \sqrt{(3)}/4 = 0.433$ where L is the side of the triangle. For A square $A = L^2$ and $A/L^2 = 1$ where L is the side of the square;
for a hexagon $A/L^2 = 6\sqrt{(3)}/4 = 2.598$ Here L is the length of the side of the hexagon;
and for a circle $A = \pi R^2$ and $A/R^2 = \pi = 3.1416$ Here R is the radius of the circle
The shape parameters, all independent of size, have the value of 0.433 for a triangle and increase toward π for polygons as the number of sides increases.

THREE DIMENSIONAL CASE

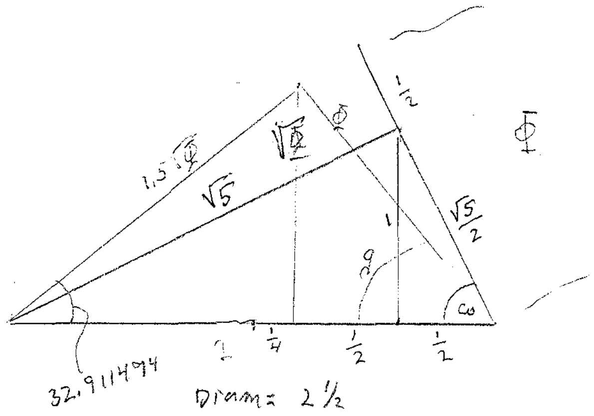
In the table E stands for the length of an edge; for pyramids a is an apothem and β is the base-face dihedral angle. Φ is the golden ratio 1.6180339..., φ = 1/Φ = 0.6180339...

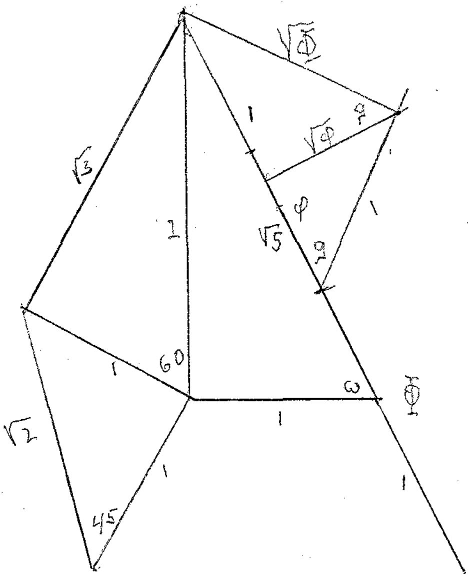
FIGURE	SURFACE	VOLUME	S^3/V^2	VALUE
SPHERE	$4\pi R^2$	$4\pi/3\ R^3$	$36 \cdot \pi$	113.097
ICOSAHEDRON	$5\sqrt{(3)}\ E^2$	$5\ \Phi^2/6\ E^3$	$36 \cdot 5 \cdot 3^{3/2}/\Phi^4$	136.458
OCTAHEDRON	$2\sqrt{(3)}\ E^2$	$\sqrt{(2)}/3\ E^3$	$36 \cdot 3^{3/2}$	187.061
CUBE	$6\ E^2$	E^3	$36 \cdot 6$	216.000
PYRAMID β=60°*	$4a^2(\cos^2\beta+\cos\beta)$	$(4a^3\cos^2\beta\ \sin\beta)/3$	$36 \cdot 9$	324.000
HALF OCTHDRN	$(\sqrt{3}+1)\ E^2$	$\sqrt{(2)}/6\ E^3$	$36 \cdot (\sqrt{3}+1)^3/2$	367.061
TETRAHEDRON	$\sqrt{3}\ E^2$	$\sqrt{2}/12\ E^3$	$36 \cdot 2 \cdot 3^{3/2}$	374.123
PYRAMID cosβ=φ	* same formula	* same formula	$36 \cdot \Phi^5$	399.246
PYRAMID β=45°	* same formula	* same formula	$36\ (1+\sqrt{2})^3$	506.558
The cosβ = φ pyramid has values very closely those of the Great Pyramid of Giza				

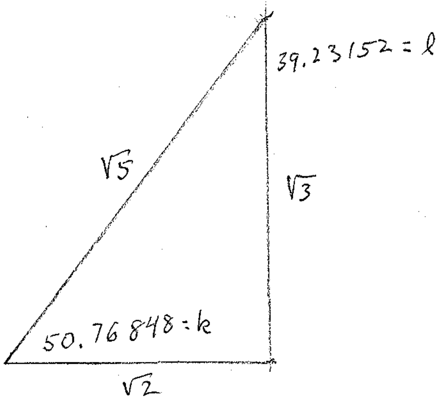
36 ⇒ 3 dim ?

MISCELLANEOUS

The ELEMENTAL TETRAHEDRON







The 4th triangle making the triangular pyramid. Module Ⓡ

6 dihedrals

8 Ⓟ = Pyramid Ⓣ

Pyramid Ⓣ belongs to both the ω family and the 60° family

Meridian b = 60
AHT m = 60
HET e = 50.77
p = 78.46
FACE l = ω
f = 53+

$\tan^{-1} 1 = 45°$
$\tan^{-1} 2 = \omega$
$\tan^{-1} \sqrt{3} = 60°$

$\omega = \tan^{-1} 2 = 63°.434949$
$g = \tan^{-1} \sqrt{\Phi} = 51°.827457$
$h = 90 - g = \tan^{-1} \sqrt{\varphi} = 38°.172706$

$\varphi^2 + \varphi - 1 = 0$
$\varphi = 0.6180339$

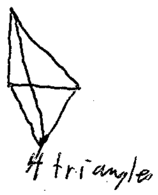
$\cos^{-1} \varphi = g$
$\cos^{-1} \sqrt{\varphi} = 90 - g = h$
$\cos^{-1} .5 = 60°$

$g - k = l - h$

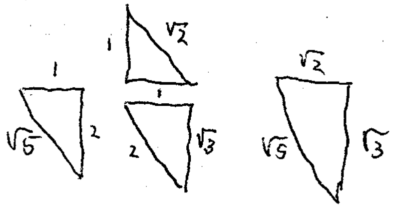
$\tan\frac{\theta}{2} = \frac{1-\cos\theta}{\sin\theta} = \frac{\sin\theta}{1+\cos\theta}$

~~HEDRAL~~

BASIC TRIANGLES
of the Elemental Tetrahedron

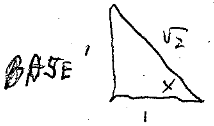


4 triangles



$\frac{1}{2}$ OCH

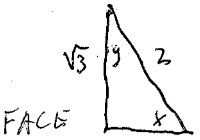
What are the 6 dihedral angles?



$x = 45°$

$\tan x = 1$

$\cos x = \frac{1}{\sqrt{2}} = \sin x = 0.70711$



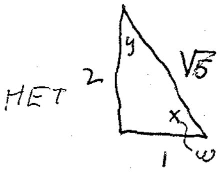
$x = 30°$, $y = 60°$

$\cos x = \sin y = 0.5$ $\qquad \cos^2 x = 0.25$

$\sin x = \cos y = \frac{\sqrt{3}}{2} = 0.86603$

$\tan x = \cot y = \sqrt{3} = 1.73205$

$\tan y = \cot x = \frac{1}{\sqrt{3}} = 0.57735$

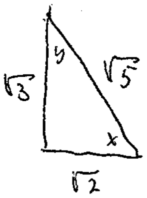


$\overset{\omega}{\underset{\shortparallel}{x}} = 63.°434949$ $\quad y = 26.°565051$

$\cos x = \sin y = \frac{1}{\sqrt{5}} = 0.44721$ $\qquad \sqrt{5} = 2.236068 \qquad \cos^2 x = 0.2$ ✓

$\sin x = \cos y = \frac{2}{\sqrt{5}} = 0.89443$

$\tan x = \cot y = 2$



$x = 50.76848$, $y = 39.23152$

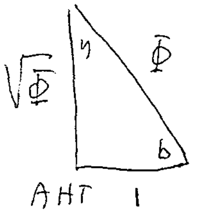
$\cos x = \sin y = \frac{\sqrt{2}}{\sqrt{5}} = 0.6324555$ $\qquad \cos^2 x = 0.4$

$\sin x = \cos y = \frac{\sqrt{3}}{\sqrt{5}} = 0.7745967$ $\qquad \cos^2 y = 0.6$

$\tan x = 1.2247449 = \cot y = \frac{\sqrt{3}}{\sqrt{2}}$ $\qquad \tan^2 x = 1.5$

$\cot x = \tan y = \frac{\sqrt{2}}{\sqrt{3}} = 0.8164966$ $\qquad \tan^2 y = \frac{2}{3}$

$\Phi = \frac{1}{\varphi}$



$b = 51.°827291$, $y = 38.172709$

$\cos b = \frac{1}{\Phi} = \varphi = \sin y = 0.618034$

$\sin b = \cos y = \frac{1}{\sqrt{\Phi}} = 0.7861514$

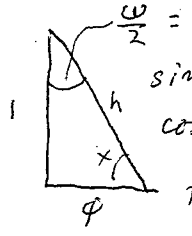
$\tan b = \sqrt{\Phi} = 1.2720197$

$\cot b = \frac{1}{\sqrt{\Phi}} = \sin b$

$\cos b = \sin^2 b = 1 - \cos^2 b$

$\cos^2 b + \cos b - 1 = 0$

$\cos b = \frac{-1 \pm \sqrt{5}}{2} = \varphi$



$\omega = 63.°434949$

$\frac{\omega}{2} = 31.°717475$ $\qquad x = 58.°282526$

$\sin\frac{\omega}{2} = 0.5257311$

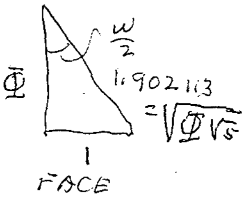
$\cos\frac{\omega}{2} = 0.8506508$

$\tan\frac{\omega}{2} = 0.618034 = \varphi$

$h = 1.381966$

$\tan\omega = 2$

$\tan\frac{\omega}{2} = \varphi$ or Φ



$$\cos b = \varphi = \tan\frac{\omega}{2}$$

DUAL
interchange
face-face dihedral
with apex diagonal

PYRAMIDS

B=H

cf DASHUR

$b = \cos^{-1}\left(\frac{1}{\sqrt{5}}\right)$

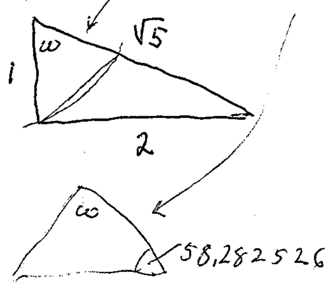
PYRAMID ===>		φ Pyramid	d → p ✓	The rolling drum	f → b	p → d	b → ℓ 0.618	b → e
SYM	FORMULA	GIZA	Bent and Red DASHUR ?	$b = \tan^{-1}(3/\pi)$	⇒ H ≡ B	≡ b → p	$b = \cos^{-1}\sqrt{\varphi}$	≡ b → f
b	VALUE	$\boxed{51,8273}$	43,4027	$\boxed{43,6793}$	$\boxed{63,4349}$	71,0391	38,1727	60,9307
m	m=180-2b	76.3454	93.1946	92.6414	53.1302	37.9218	$\overset{=2\ell}{103.6545}$	58.1386
l	l=arccot(cosb)	58.2825	54.0000	54.1249	65.9051	72.0000	$\boxed{51.8273}$	64.0864
f	f=180-2l	63.4349	72.0000	71.7502	48.1898	36.0000	$\overset{=2b}{76.3454}$	51.8273 * "
e	e=arccos(√2cosl)	41.9699	33.7725	34.0287	54.7355 *	64.0864	29.0694	$\boxed{51.8273}$
p	p=180-2e	96.0603	$\boxed{112.4550}$	111.9426	70.5290	51.8273 *	$\overset{=d}{121.8612}$ φ/Pyr	76.3454
A	A=1/(2cosb)	$0.8090 = \frac{\varphi}{2}$	0.6882	0.6941	1.1180	1.5388	0.6360	1.0291
H	H=(tanb)/2	0.6360	0.4729	0.4775	1.0000	1.4553	0.3931	0.8995
E	E=1/(2cosl)	0.9511	0.8507	0.8523	1.2247	1.6180 = φ+1	$0.8090 = \frac{\varphi+1}{2}$	1.1441
d	d=arccos(-cos²b)	112.4550	121.8612	121.5366	101.5370	$\boxed{96.0603}$	128.1727	103.6545 =
W	W=4d-360 sph deg	89.8226	127.4449	126.1464	46.1480	24.2412	=4b =2f 152.6909	54.6181
δb'	Difference in min arc	0.'846	43° 24'.62	43° 40'.756	* = b of half octagon	* p = b of φPyr		

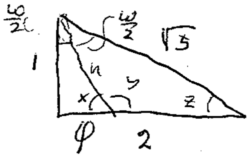
x2 = 121.8614

2e=2f

For each pryamid the shaded cells represent the initial values from which the others are derived.
All angle values are given in degrees and decimal fractions of a degree, except in the bottom line.
For each pyramid the bottom line gives the difference between the value of the angle b and its value in the measured pyramid in minutes of arc.
The values for A, H, and E (shown in bold face) are derived assuming the length of the base B to be unity.
The symbol ϕ represents the golden ratio = 0.618034...

THE FACE TRIANGLE OF THE GREAT PYRAMID





$h = \sqrt{1+\varphi^2} = 1,1755705$

$\frac{\omega}{2} = 31,717475$

$\omega = 63,434949$

$x = 58.282526$

$y = 121.71748$

$z = 26.565051$

GT PYR [Φ]

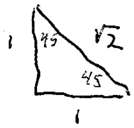
$A = \Phi/2$

$f = \omega$

α PYR $l = \omega$, $b = 60$

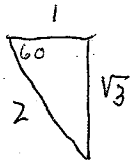
$A = 1$

BASIC TETRAHEDRON



AHT $\frac{\text{CUBE}}{6}$; HET $\frac{\text{OCTH}}{2}$; FACE FLAT

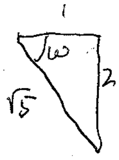
$H = 0.5$ $E = 1$ $H = 0$



AHT α ; HET β ; FACE $\frac{\text{OCTH}}{2}$

$A = 1,000$ $E = \sqrt{2}$ $E = 1$

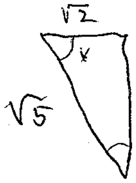
$l = \omega$



AHT δ ; HET ε ; FACE α

$H = 1,000$ $H = \sqrt{2}$ $A = 1$

$A = 1,5$



$x = 50°.76848 = \frac{d}{2}$ of δ

$x = e$ of α

~~39°.231507~~ → b of γ PYR

39.23152

78,46304

AHT γ HET α FACE –

$d = 2\omega$ $A = 1,00$

α PYR is the bridge from Hedrons to φ's

PYRAMIDS

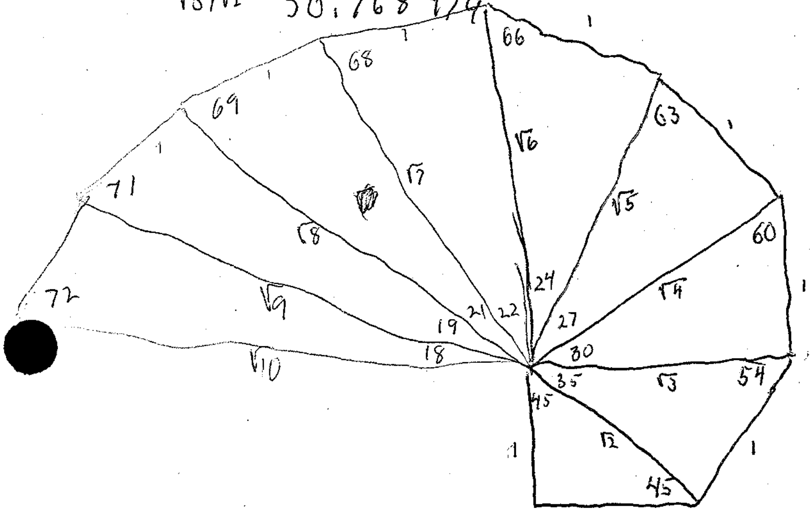
PYRAMID ===>		8	9	10	11	12	13	14
SYM	DEFINITION	$(H/E)^3 = 3/10$	$W = \pi/2$	$\sin b = \pi/4$	$\sin e = 2/3$	Vesica Piscis	$b = \frac{2\pi}{7}$	$\cos b = 5/8$
b	VALUE	51.8795	51.7850	51.7858	51.6712	51.6107	51.4286	51.3178
m	m=180-2b	76.2410	76.4300	76.4850	76.6576	76.7786	77.1428	77.3644
l	cot l = cos b	58.3122	58.2585	58.2429	58.1939	58.1597	58.0569	57.9946
f	f=180-2l	63.3756	63.4830	63.5143	63.6122	63.6807	63.8862	64.0108
e	√2tan e = tan b	42.0233	41.9266	41.8985	41.8103	41.7486	41.5629	41.4502
p	p=180-2e	95.9534	96.1467	96.2030	96.3794	96.5028	96.8742	97.0997
d	$d=\arccos(-\cos^2 b)$	112.4006	112.5000	112.5289	112.6199	112.6887	112.8761	112.9934
W	W=4d-360 sph deg	89.6026	90.0000	90.1158	90.4794	90.7346	91.5042	91.9736
A	A = 1/(2cosb)	0.8100	0.8083	0.8078	0.8062	0.8052	0.8019	0.8000
H	H = (tanb)/2	0.6372	0.6350	0.6344	0.6325	0.6311	0.6270	0.6245
E	E=1/(2cosl)	0.9519	0.9504	0.9500	0.9487	0.9478	0.9450	0.9434
δb	Difference in min sec	+2′6″	−3′34″	−5′13″	−10′24″	−14′2″	−24′57″	−31′36″

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol ϕ represents the golden ratio = 0.618034...

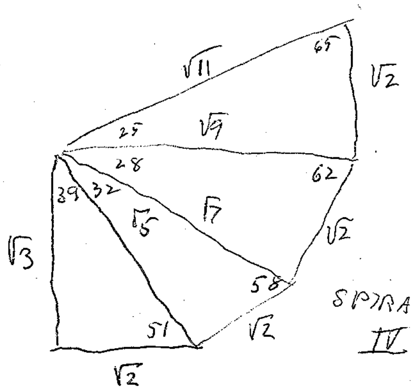
		b	l	e
	∠	AHT	FACE	HET
tan 1	45	CUBE/6	FLAT	OCTH/2
√2	54.73561	OCTH/2	CUBE/6	δ
√3	60	α	OCTH/2	β
2=√4	63.434949	δ	α	ε
√5	65.905158		δ	
√3/√2	50.768479			α

	e	b	l
45	Octh/2	Cube/6	Flat
54.7	δ	Octh/2	Cube/6
60	β	α	Octh/2
60	ε	δ	α
65.9			δ

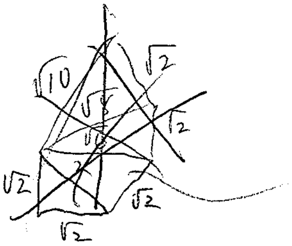
GROUP ?
not closed



SPIRAL II

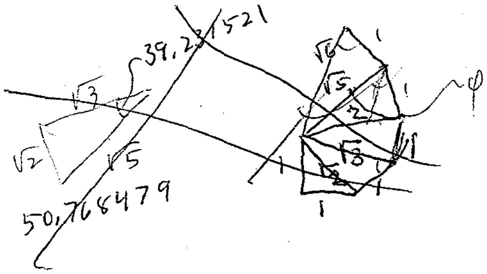


SPIRAL IV



50.768479	39.23152
57.688467	32.311533
61.874494	28.125506
64.760598	25.239402

.23
9
2.07



large	Small (90-l)
45	45
54.73561	35.26439
60	30
63.434949	26.56505
65.905158	24.094842
67.792345	22.207655
69.295189	20.704811
70.52878	19.47122
71.565051	18.434949

PYRAMIDS

✓ ✓ ✓ ✓ ✓ ✓ ✓

PYRAMID ===>		1	2	3= Π Pyr.	4	5 = ϕ Pyr.	6	7
SYM	DEFINITION	tan e = 0.9	b = π/(4ϕ+1)	tan b = 4/π	p = π/3+π/5	cos b = ϕ	b = π-ϕ-1/ϕ	b = π/2-2/3
b	VALUE	51.8442	51.8413	51.8546	51.8567	51.8273	51.8827	51.8028
m	m=180-2b	76.3116	76.3174	76.2920	76.2866	76.3454	76.2346	76.3944
l	cot l = cos b	58.2921	58.2905	58.2977	58.2993	58.2825	58.3141	58.2686
f	f=180-2l	63.4157	63.4190	63.4046	63.4015	63.4349	63.3719	63.4628
e	√2tan e = tan b	41.9872	41.9843	41.9973	42.0000	41.9699	42.0266	41.9444
p	p=180-2e	96.0256	96.0315	96.0055	96.0000	96.0602	95.9467	96.1103
d	d=arccos(-cos²b)	112.4377	112.4408	112.4274	112.4246	112.4555	112.3973	112.4813
W	W=4d-360 sph deg	89.7510	89.7632	89.7098	89.6984	89.8220	89.5891	89.9251
A	A = 1/(2cosb)	0.8093	0.8093	0.8095	0.8095	0.8090	0.8100	0.8086
H	H = (tanb)/2	0.6364	0.6363	0.6366	0.6367	0.6360	0.6373	0.6365
E	E=1/(2cosl)	0.9513	0.9513	0.9515	0.9515	0.9511	0.9519	0.9507
δb	Difference in min ~~arc~~ sec	-1"	-11"	+34"	+44"	-1'2"	+2'18"	-2'30"

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
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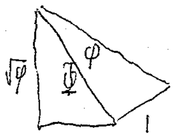
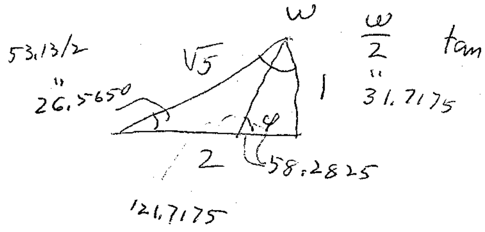
SPIRALS

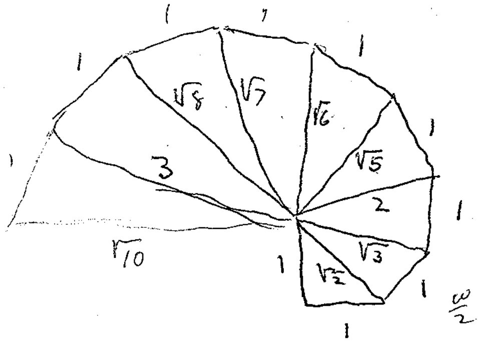


SPIRAL III

$\tan\omega = 2 \quad \omega = 63.4349$

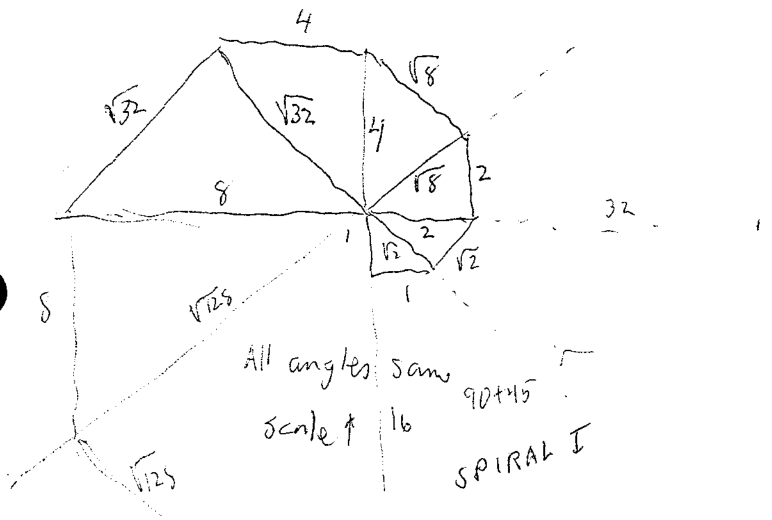


$\frac{\omega}{2}$ " 31.7175 $\quad \tan\frac{\omega}{2} = \varphi$



SPIRAL II
scale + angle change

÷2	Angles Δ	large	small	×2
	1	45	45	90
	2	54.7356	35.2644	70.5288
	3	60	30	60
$\frac{\omega}{2}$ = 31.7175	4	63.434949	26.565051	53.1301
	5	65.9052	24.0948	48.1896
	6	67.7923	22.2077	44.4154
	7	69.2952	20.70481	41.4096
35.2644	8	70.52878	19.47122	38.9424
	9	71.5651	18.4349	36.8698
	10	72.4516	17.5484	35.0968



All angles same
scale ↑

SPIRAL I

2.1.7 Both finite and infinite

2.1.8 Neither finite nor infinite

2.1.9 Of uniform perception

2.1.10 Of diversified perception

2.5.4 Nibbana here and now in the third jhana

2.5.5 Nibbana here and now in the fourth jhana

6. Possible binary coding pattern

(a) Book of Changes

In the light of the above clues, the relationship to the 64-fold pattern of the Chinese *Book of Changes* calls for investigation, especially since the latter is similarly ambitious in scope. Of special interest is its early use in providing insights into the dilemmas of governance of Chinese society. The relevance of this pattern to understanding sustainable policy cycles is explored in Section TP (of the 1991 edition of this Encyclopedia). The concern here is with the symbol system used to encode that pattern, not with its popular uses by those indifferent to its overall structure. It should be noted that two of the 64 elements there (denoting creativity and receptivity) have a primordial significance distinguishing them from the remaining 62. It is these two which can be suggestively associated with nirvana and samsara in the Buddhist pattern.

The *Book of Changes* originated as a set of linear signs for oracular pronouncements. At its simplest this took the form of an unbroken line for "Yes" and a broken line for "No", thus capturing the essence of the Aristotelian view and the excluded middle. Greater subtlety was required and the pattern was extended to a double line representation by combining the two basic possibilities, thus forming a set of four possible responses. It is these four which can be used to encode the 4-fold logic noted above.

The pattern of the *Book of Changes* was then further extended by adding a single broken (or unbroken) line to each of the four above. This gives the 8 possibilities, namely the 8 basic trigrams of that system. It is possible that these might prove appropriate to encoding the 8-fold sub-sets noted above.

The final extension of the pattern was by combining each of the trigrams with each other into hexagrams of six lines (broken or unbroken). It is these that are used to represent the 64 conditions of the Book of Changes.

(b) Genetic code and physical particles

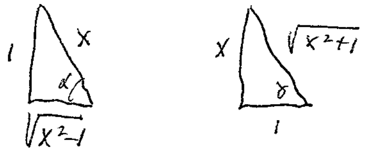
Although the Book of Changes is an extremely interesting example of the use of a binary coding pattern, especially given its focus on the complex subtleties of psycho-social systems, another striking use of this same pattern is to encode the set of 64 codons of the genetic code. The binary code is of course also basic to digital computer operations, even in giving importance to sets of 64 elements. Another fundamental application of a binary system is the standard model mapping the entire range of physical particles in terms of 6 quarks in 3 pairs of 2 -- a first pair of up and down quarks, a second of charm and strange quarks and a third of bottom and top quarks (with each being harder to make than the previous pair). Each quark has an anti-matter counterpart. Mesons are two-quark particles (requiring a quark and an anti-quark, which in the case of a K-meson are an anti-strange quark and a down quark). Baryons are three-quark particles.

(c) Computer machine code

The Third Spiral

If $\sin^{-1}\left(\frac{1}{x}\right) = \tan^{-1}(x)$ then $x = \sqrt{\Phi}$ $\Phi = 1.618034....$

Proof:



$$\alpha = \gamma$$

$$\frac{1}{\sqrt{x^2-1}} = \frac{x}{1} = \frac{\sqrt{x^2+1}}{x}$$

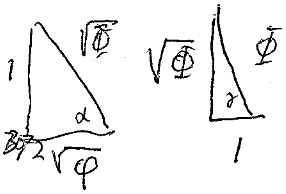
$$x^2 = \sqrt{x^2+1}$$

$$x^4 = x^2+1$$

$$x^4 - x^2 - 1 = 0, \quad x^2 = \frac{1 \pm \sqrt{5}}{2} = \Phi, \quad x = \sqrt{\Phi}$$

$$\sqrt{\Phi - 1} = \sqrt{\varphi}, \quad \sqrt{\Phi + 1} = \Phi$$

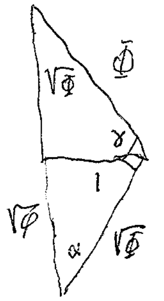
$\tan\alpha = \frac{1}{\sqrt{\varphi}}$

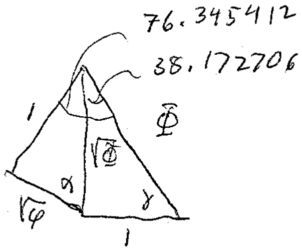


$\tan\gamma = \sqrt{\Phi}$

$\alpha > 51.827294372$

$\gamma = 51.827292470$





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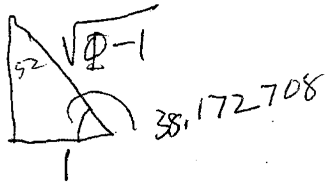
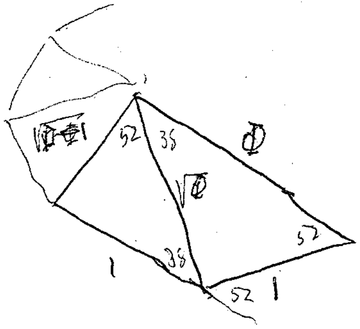
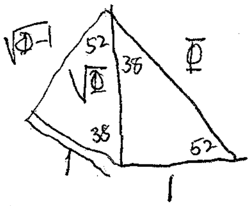
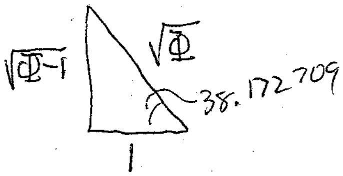
(c) Computer machine code

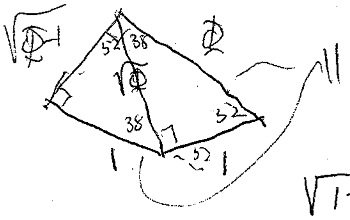
SPIRAL II





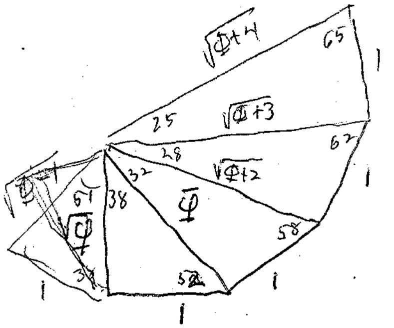






$\sqrt{1+\Phi^2} = \sqrt{3.618034} = \sqrt{\Phi+2}$

$\sqrt{2+\Phi^2} : \sqrt{\Phi+3}$



$\Phi^2 - \Phi - 1 = 0$

$\frac{1 \pm \sqrt{1+4}}{2}$ $\frac{1+\sqrt{5}}{2}$

$\frac{1-\sqrt{5}}{2}$

38 α

51.827292	38.172708
58.282526	31.717474
62.267698	27.732302
65.045504	24.954496

$\frac{1}{\varphi} - 1$

$\sqrt{\frac{1-\varphi}{\varphi}}\,\bar{\varphi}$

ω comes in where?

$$\left(\frac{H}{E}\right)^3 = \frac{3}{10}$$

~~sine = $\phi^{5/6}$~~

~~sine = $\sqrt[3]{\phi^{5/12}}$~~

PYRAMIDS

PYRAMID ===>		8 Volumes	9 Octant	10	11	12	13	14
SYM	DEFINITION	$(H/E)^3=\cancel{\phi^{5/2}}\,0.3$	W = π/2	sin b = π/4	sin e = 2/3	Vesica Piscis	b = (2π)/7	cos b = 5/8
b	VALUE	51.8795 ~~51.8953~~	51.7850	51.7880	51.6712	51.6107	51.4286	51.3178
m	m=180-2b							
l	cot l = cos b	58.3122						
f	f=180-2l							
e	√2tan e = tan b	42.0233 ~~42.0395~~						
p	p=180-2e							
d	d=arccos(-cos²b)		112.5000					
W	W=4d-360 sph deg		90.0000					
A	A = 1/(2cosb)							
H	H = (tanb)/2	0.6372						
E	E=1/(2cosl)	0.9519						
δb	Difference in min arc sec	+2' 6" ~~+3' 5"~~	-3' 34"	-5' 13"	-10' 24"	-14' 2"	-24' 57"	-31' 36"

All angle values are given in degrees and decimal fractions of a degree.
The values for A, H, and E are derived assuming the length of the base B = 1.
The symbol φ represents the golden ratio = 0.618034...

PYRAMIDOLOGY

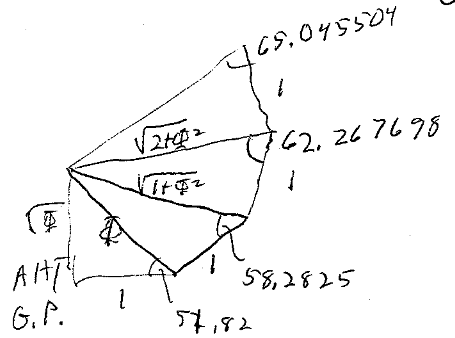
Φ SPIRALS

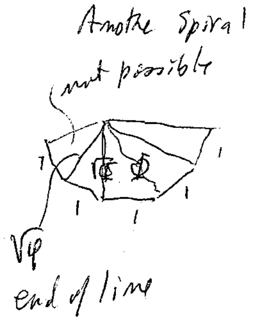
III

Also

$d \longleftrightarrow p$

sequences





h

φ^2

φ

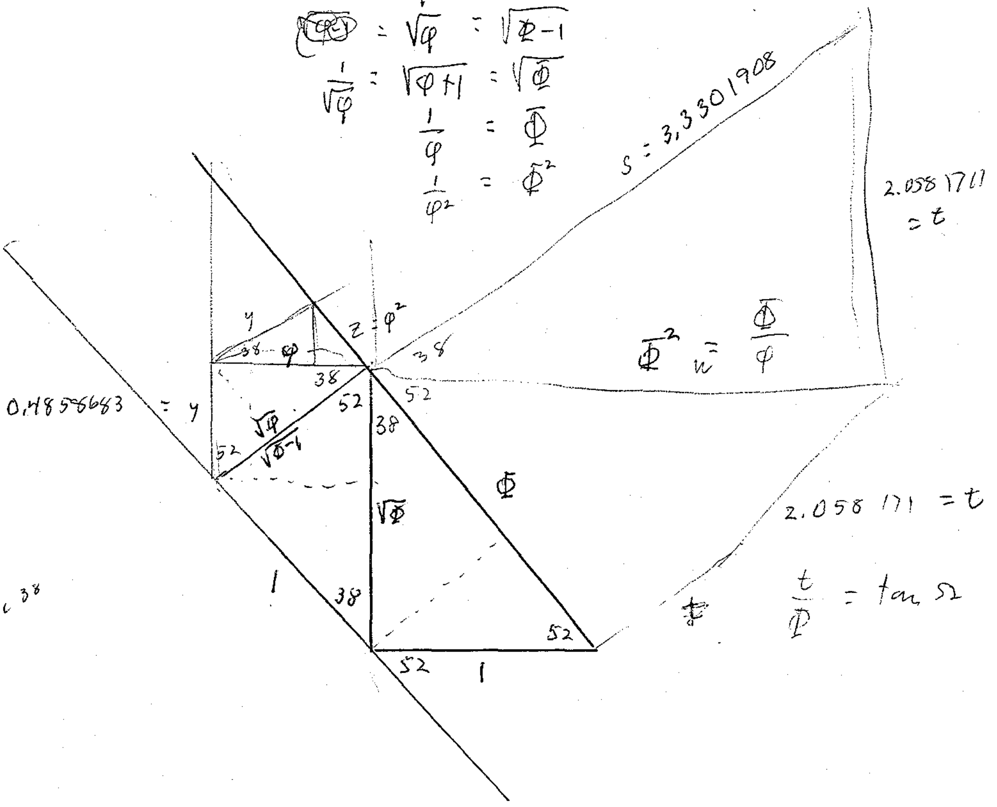
$= \sqrt{\varphi} = \sqrt{\Phi-1}$

$\frac{1}{\sqrt{\varphi}} = \sqrt{\varphi+1} = \sqrt{\Phi}$

$\frac{1}{\varphi} = \Phi$

$\frac{1}{\varphi^2} = \Phi^2$

$\boxed{y = \frac{1}{t}}$



cos 38

‖

0.7861514 × sec 38

$\sqrt{\Phi-1} = 0.381966$

$x = \varphi$

sin = φ

51.827291 38.172709

cos =

$\frac{x}{\sqrt{\varphi}} = \cos 38$

$y = 0.4858683$ ✓

$y^2 + \varphi^2 = \varphi$

$y = \sqrt{\varphi - \varphi^2}$

$\frac{x}{s} = \sin$

s

$\frac{\Phi^2}{s} = \cos 38 \quad \Phi^s = s$

$\frac{\Phi}{w} = \cos 52 = \varphi$

$w = \frac{\Phi}{\cos 52}$

$x, \frac{1}{x}, \sqrt{\frac{1}{x}} \quad \frac{1}{\ } \quad \sqrt{\ } \quad \frac{1}{\ } \quad \rightarrow 1$

$\frac{\varphi}{\cancel{\cos 38}} \cos 38$

$\varphi^2 - (\varphi - \varphi^2) = z^2$

$z = \sqrt{2\varphi^2 - \varphi} = 0.381966 = \varphi^2$

$2\varphi^2 = 2\varphi$

$1.902113 = \sqrt{\Phi^2 + 1}$

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PYRAMIDS

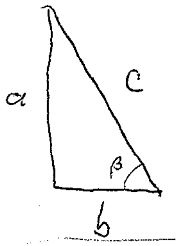
PYRAMID ===>								
SYM	FORMULA	VOL RATIO $\phi^{5/2}$	$\Omega = 90°$	$b = \sin^{-1} \frac{\pi}{4}$	$e = \sin^{-1}(\frac{2}{3})$	Vesica Piscis	$2\pi/7$	Knotted rope $\cos^{-1}(5/8)$
b	VALUE							
m	m=180-2b							
l	l=arccot(cosb)							
f	f=180-2l							
e	tan e=$\overset{\tan b/\sqrt{2}}{\text{arccos}(\sqrt{2}\cos l)}$							
p	p=180-2e							
A	A=1/(2cosb)							
H	H=(tanb)/2							
E	E=1/(2cosl)							
d	d=arccos(-cos²b)							
W	W=4d-360 sph deg							
δb'	Difference in min arc	δ +3'3"	-3'34"	-5'13"	-10'24"	-14'2"	-24'57"	-31'36"

All angle values are given in degrees and decimal fractions of a degree
The values for A, H, and E are derived assuming the length of the base B to be unity.
The symbol ϕ represents the golden ratio = 0.618034...

φ Pyramids SPIRAL III

VARIATIONS on the HERODOTUS THEME

$$a^2 + b^2 = c^2$$



	β	
I	51,8273	
II	38,1727	$= \frac{1}{2}$ 76,34154
III	58,2825	
IV	31.7125	$= \frac{1}{2}$ 63.4349

I Herodatus
The "φ" Pyramid

$a^2 = bc$ $b^2 + bc - c^2 = 0$

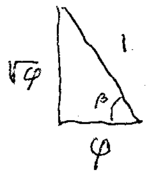
set $c = 1$

$b^2 + b - 1 = 0$, $b = \dfrac{-1 \pm \sqrt{5}}{2}$

$H^2 = AB/2$

$A = c,\ b = \frac{B}{2}$

$H = a$



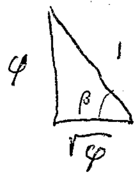
$b = \varphi = 0.618\ldots$

$a = \sqrt{\varphi \cdot 1} = \sqrt{\varphi} = 0.786\ldots$

$\beta = \cos^{-1}\varphi = 51.^\circ 8273$

II $b^2 = ac$ $a^2 + ac - c^2 = 0$, $c = 1$

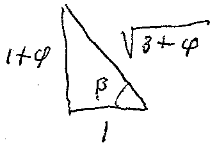
$\ldots\ a = \varphi,\ b = \sqrt{\varphi}$



$\beta = \cos^{-1}\sqrt{\varphi} = 38.^\circ 1727$ $\times 2 = 76.3454$

III $c^2 = ab$ $a^2 + b^2 = ab$, $b = 1$

$a^2 - a + 1 = 0$ $a = \dfrac{1 \pm \sqrt{5}}{2}$ $a = \Phi = 1 + \varphi = \dfrac{1}{\varphi}$



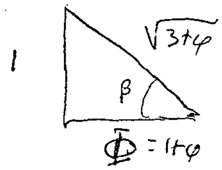
$= 1.902\ldots$

$a = 1.618\ldots$

$\beta = \tan^{-1}(1+\varphi) = 58.^\circ 2825$

IV $c^2 = ab$ $a^2 + b^2 = ab$, . $a = 1$

$b = 1.618$



$\beta = \cot^{-1}(1+\varphi) = 31.^\circ 7175$

$\times 2 = 63.4350$

---

11 6.0

The φ Pyramid $\beta = 51.^\circ 8273$ = base-face angle

$\ell = 58.^\circ 2825$ = edge-base angle (face at bottom)

$f = 63.4349$ = face ∠ at top

$m = 76.$

$e = 41.$

$p = 96$

planes are increasingly distant from the base and reduced in area, culminating in the apex position. Note that a form of sustainability may be achieved by repeatedly alternating between views (constantly correcting the tendency for a coherent sphere of attention to roll off any plane).

"Container (or Fortress)" Model: The 6 (broken or unbroken) lines used to signify any particular ~~view~~ may be used to construct a tetrahedron, one line per edge. In this case there would be 64ways in which the bordering edges could be defined. As a metaphorical container or fortress, the most vulnerable would be that in which the lines were all broken. The most sustainable (and least vulnerable) would be that in which the lines were all unbroken. Again a form of sustainability might be achieved by repeatedly alternating between views.

(f) Forms of intelligence

At the level of abstraction at which the 3-fold domains are defined, these may might well be understood as incorporating the distinctions currently made between three distinct and overarching intelligences (as noted by Howard Gardner):

- **object-related:** ability to manipulate objects in the environment (bodily-kinaesthetic), recognize and imagine spatial relations among objects (spatial), and reason logically about things and their relations (logico-mathematical);
- **object-free:** competence in the sphere of language and music, which may not designate aspects of the physical environment at all;
- **personal:** intra-personal and inter-personal ability to assess emotional states, recognize strengths and weaknesses.

It is understood that these are developed somewhat independently by any individual. In the case of a group these might correspond to the functions of: human relations, savy *

(g) Experiential stages

Similarly the progression of tetra-lemmic stages might also incorporate more experiential dimensions such as: sense of identity, encounter with otherness (opposing views or some "shadow" aspect in the Jungian sense), working relationship with otherness (toleration, etc), transcendence of the conflictual dynamics with otherness (proactive tolerance, creative detachment, etc). They may also be related to Erikson's life stages (see *). Clearly the terms cannot make apparent the different levels of experiential significance associated with any such phases, which may be encountered and repeated at more profound levels of understanding. The corresponding insights at the group level merit exploration, for it is these that determine the emergence of more mature attitudes to effective cooperation between opposing factions.

(h) Requisite discipline to restrain problem generation

As far as achieving sustainable human development is concerned, the Buddhist pattern has direct practical implications. All effort in Buddhism is directed towards shifting understanding "upwards" in terms of the mountain model. Specific concern is given to clarification of understanding with regard to each of the four phases in the tetra-lemmic sequence. Furthermore there is specific recognition of what root problems are engendered by lack of clarification in each case. The Buddhist focus emphasizes individual meditation and discipline as the key to the successive phases of such clarification and identifies the problems in terms of personal weaknesses. But the same pattern may presumably be used to explore the collective implications, specifically to determine the kinds of discipline required to restrain tendencies to problem generation. Little attention has as yet been given to the

8 pyramids

6 families

$S\sqrt{\Phi}$		①
$S\Phi$	51,8272	②
T2	63,4345	④
S3	70,5287	④
S2	60	④
T1	45°	③

18

$S\Phi l = S\sqrt{\Phi} b$

$S\Phi b =$ T2f = the great pyramid

S2b = S2m = T2l

S3p = T2b

S3b = T2e

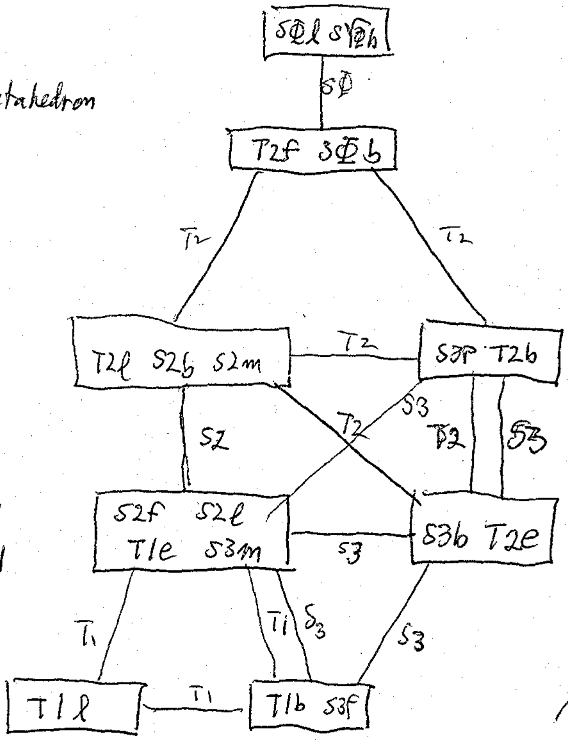
S2f = S2l = T1e = S3m half-octahedron

T1b = S3f cube/6

T1l flat

Nodes > idealized pyramids

Link refer to < familie



T1 ~ Tan( ) = 1 45°

T2 ~ Tan( ) = 2 63°.434949

S(2) ~ Sec( ) = 2 60°

288 S(3) ~ Sec( ) = 3 70°.528779

$S\Phi$ ~ Sec( ) = Φ 51°.826861

$S\sqrt{\Phi}$ ~ Sec( ) = $\sqrt{\Phi}$ 38°.172841

~ Cabala

$T\sqrt{2}$ Tan( ) = $\sqrt{2}$ 54,73561

T1b - T1e $T\sqrt{2}$ and T1

S2l - S2f $T\sqrt{2}$ and S2

S3m - S3f - S3p $T\sqrt{2}$ and S_3 new link

Nodes	Links
Things	Processes
Pyramids	families

76.3453 = 2 × 38.172841

5% MAG 5%

2
4
6
8

TOP EDGE

0 4 8 12 16 20 24

MAG

1.1

2.1

Rogm hgj
rszdj a·lllll
wurmllda p
o÷b.Kgp ik
t÷ xObtGcj
q÷a pmf u
Cgj gnyrcJ
ttfU z Yld
v gcqsl ec
sTk Wenfc
tuopq QPh
qoqif k Rlj
bprH d·lllll
pmn oorcu

3.0

3.1

2.0

1.2

Rogm hgj
rszdj a·lllll
wurmllda p
o÷b.Kgp ik
t÷ xObtGcj
q÷a pmf u
Cgj gnyrcJ
ttfU z Yld
v gcqsl ec
sTk Wenfc
tuopq QPh
qoqif k Rlj
bprH d·lllll
pmn oorcu

3.3

71 MAG

50% MAG

Rogm hgj
rszdj a·lllll
wurmllda p
o÷b.Kgp ik
t÷ xObtGcj
q÷a pmf u
Cgj gnyrcJ
ttfU z Yld
v gcqsl ec
sTk Wenfc
tuopq QPh
qoqif k Rlj
bprH d·lllll
pmn oorcu

3.2

.62 MAG

24
20
16
12
8
4
0

8 6 4 2

LEAD EDGE

2.2

4.0 Rogm h mFnmfel
rszdj a l n iE allh

4.1

4.2

4.3

1.007

MAG

MAG

MAG

1.3

XEROX TEST PATTERN © 1994 Xerox Corporation
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.71

.62

1.4

2.3

3.4

.62 MAG

1.007 MAG

2.4