

	<h1>Noesis</h1> <p>The Journal of the Mega Society</p> <p>Issue #179      December 2005</p>
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## About the Mega Society

The Mega Society was founded by Dr. Ronald K. Hoeflin in 1982. The 606 Society (6 in 10<sup>6</sup>), founded by Christopher Harding, was incorporated into the new society and those with IQ scores on the Langdon Adult Intelligence Test (LAIT) of 173 or more were also invited to join. (The LAIT qualifying score was subsequently raised to 175; official scoring of the LAIT terminated at the end of 1993, after the test was compromised). A number of different tests were accepted by 606 and during the first few years of Mega's existence. Later, the LAIT and Dr. Hoeflin's Mega Test became the sole official entrance tests, by vote of the membership. Later, Dr. Hoeflin's Titan Test was added. (The Mega was also compromised, so scores after 1994 are currently not accepted; the Mega and Titan cutoff is now 43—but either the LAIT cutoff or the cutoff on Dr. Hoeflin's tests will need to be changed, as they are not equivalent.)

Mega publishes this irregularly-timed journal. The society also has a (low-traffic) members-only e-mail list. Mega members, please contact the Editor to be added to the list.

For more background on Mega, please refer to Darryl Miyaguchi's "A Short (and Bloody) History of the High-IQ Societies,"

<http://www.eskimo.com/~miyaguch/history.html>

and the official Mega Society page,

<http://www.megasociety.org/>

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*Noesis* is the journal of the Mega Society, an organization whose members are selected by means of high-range intelligence tests. Jeff Ward, 13155 Wimberly Square #284, San Diego, CA 92128, is Administrator of the Mega Society. Inquiries regarding membership should be directed to him at the address above or:

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# Editorial

Kevin Langdon

I had intended to publish a November issue of *Noesis*, but our publication schedule slipped a bit when a draft of this issue was eaten by Microsoft Word. All attempts to recover it were fruitless and the issue had to be completely redone. As a happy consequence of the delay we have several additional articles. I am very pleased with this issue.

According to the Mega Society Constitution, it's time for election of officers. There are three officer positions (the position of Publisher was eliminated by the passage of the amendment making *Noesis* an electronic-only publication). These positions are:

Administrator (roughly equivalent to what many societies call "membership officer")  
Editor of *Noesis*  
Internet Officer

If you are interested in being a candidate for any of these positions, please contact the Editor.

I'd like to thank Ron Yannone for keeping our founder with us. (Ron Hoeflin had announced that he would drop out of Mega if we switched to online-only publication but we didn't have the manpower to continue with the print edition of *Noesis*):

**From:** RonaldK31415@aol.com [mailto:RonaldK31415@aol.com]  
**Sent:** Friday, October 14, 2005 5:32 AM  
**To:** chris@questrel.com  
**Subject:** Re: FW: Kevin - more good news for the next NOESIS issue ....

Dear Chris,

If Ron Yannone wants to send me a hard copy of *Noesis*, I would be willing to let my name be used as a continuing participant in the Mega Society, although I doubt if I would have the time or inclination to participate very actively.

. . . Ronald K. Hoeflin

Coincidentally, both Ron Yannone and Ron Hoeflin are included in the 60<sup>th</sup> edition of *Who's Who in America*. And Ron Yannone has further good news:

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## Ron Yannone admitted to the International Academy of Science



Mega Society member Ron Yannone is now a member of the *International Academy of Science* (IAS). For further details see the IAS website:

<http://www.science.edu/0705/index.html>

Ron will be a technical paper reviewer and contributor and a participant in the IAS 11<sup>th</sup> *International Conference on Enformatika Systems Sciences & Engineering* (ESSE) scheduled for May 17-19, 2006 in Berlin, Germany. See:

<http://www.enformatika.org/conferences/2006/berlin/>

And that's not all. Another Mega member has participated in an important event. Bill Corley writes:

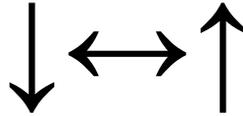
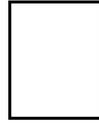
Attached are some pictures from this year's Nobel Prize ceremony. My scientist wife Ellen Vitetta, who is on the short list herself for the prize in Medicine and Physiology, had a former Ph.D. student, Linda Buck, win this year in Medicine. So we were invited. It was a coronation, inauguration, and Oscars ceremony rolled into one.



**Linda Buck receiving her Nobel Prize from the King of Sweden**

(Additional pictures were attached to Bill's message.)

As usual, we are in need of material for publication in *Noesis*. Please consider writing something for publication or submitting something from your files.



# Quantum Computation Is Too Slow

Michael C. Price

**Abstract:** Grover's quantum algorithm for searching an unordered list of  $N$  items is often portrayed as faster than a classical search, requiring only  $O(\sqrt{N})$  inspections as opposed to the classical  $O(N)$  inspections. Quantum thermodynamic constraints require that each quantum inspection takes time  $O(\sqrt{N})$ , so the quantum search is not faster than the classical search. All quantum computing claims need to be adjusted to take into account this quantum thermodynamic time constraint: processing in  $M$  steps takes at least  $hM^2/kT$  or  $O(M^2)$  time to complete.

Grover's algorithm, implemented on a quantum computer, locates an object in an unordered list of  $N$  items in only  $O(\sqrt{N})$  inspections or operations, which is an improvement over a classical search (which requires  $O(N)$  operations). This would seem to imply that Grover's algorithm is quicker than a classical computer. But this is not the case.

All quantum computers are reversible computers and, as such, are constrained thermodynamically; the operating speed of a physically realisable reversible computer scales linearly with the amount of heat or entropy it generates (i.e., the more reversible a computer is, the slower it operates). Reversible computers require a small external force with each step to drive them forward. The speed of the step scales linearly with the applied force, which also scales linearly with the energy dissipated with each step. Thus the speed of operation scales linearly with the entropy released. For example the entropy released during adiabatic switching (an example of an implementation of reversible computing) scales linearly with the speed of operation: storing a bit dissipates  $CV^2 * RC/\tau$ , of energy where  $\tau$  is the ramp time over which the voltage rises linearly from base. ("Instantaneous" storage releases  $CV^2/2$ .) Brownian Turing machines also require a small driving force with each step; again their forward velocity scales with the energy

dissipated. For a general quantum computer the Heisenberg uncertainty time-energy principle implies a bound of  $\delta E > h/\delta t$ , with each step ( $\delta E =$  energy released per step,  $\delta t =$  time for step to complete,  $h =$  Planck's constant) and we would expect  $\delta E$  to be released as heat giving  $T\delta S = \delta E > h/(T \delta t)$ , where  $T$  is the ambient temperature and  $\delta S$  is the entropy released *per step*.

Another constraint is that a quantum computer must avoid decoherence, which implies that the *total amount* of entropy released over an entire computation must be  $O(k)$ ,  $k =$  Boltzmann's constant. If  $\delta S \gg k$  then the quantum computer decoheres into  $O(\exp(\delta S/k))$  independent microstates (by the Planck-Boltzmann law); any subsequent attempt by an external agency to read off the result of the computation will only be able to access  $O(\exp(-\delta S/k))$  of these microstates; garbage is read. For an operation that requires  $M$  steps this means that the averaged entropy release per step must be of  $O(k/M)$  or less for the quantum computer to function.

Putting these two results together, we see that a quantum computer that completes processing in  $M$  steps takes at least  $hM^2/kT$  or  $O(M^2)$  time to complete. This is a completely general result that applies to all quantum computers. No amount of shielding from *external* decoherence (which is believed to be their main problem) will get around this other problem which arises from *internal* decoherence. Lowering the temperature actually slows the computation down.

Applying this to Grover's algorithm we see that whilst it searches the  $N$ -item list in  $O(\sqrt{N})$  operations, it requires  $O(N)$  time to do this; the same result as a classical computer. Since Grover's quantum computer additionally requires  $\log_2(N)$  q-bits of space, this means the classical computer actually outperforms the quantum computer. Of course this result is only a serious impediment for vary large  $N$ , due to the smallness of Planck's constant, but this is precisely the arena in which quantum computers are hoped to make a fundamental contribution one day. We see that this is not possible.

All quantum computing claims, which typically assume that time required scales with the number of operations required, require similar adjustment. Shor's algorithm, for example, which factorises  $N$  in  $O((\log N)^3)$  steps will complete in time  $O((\log N)^6)$ , etc., etc.

# The Golden Fleece

Chris Cole

## 1. The Usurpation

I was in Munich recently and came across an interesting display in the Deutsche Museum. The theory conveyed by the display was that the mythical Golden Fleece was actually a sheepskin used by placer miners in ancient Georgia to filter tiny gold flakes out of streams. The fibers of the sheepskin create eddies. Heavier particles settle out of the eddies. A sheepskin attached to a frame and submerged in a flowing stream containing gold particles will become yellow with gold dust, which resembles curry powder. When the fleece is dried the gold dust can be shaken loose.

I could imagine that to the Mycenaean Greeks this might have seemed like magic. A placer (pronounced “plass-er”) is a deposit of sand or gravel that contains some valuable mineral, as opposed to a lode or vein that is a fissure in rock that contains the valuable mineral. Presumably what happens is that some geological process like a glacier grinds up the vein and turns it into a placer. Placer mining is the mining of a placer with liquid, such as a stream that flows through it. Placer mining sounded like a plausible explanation of the myth of the Golden Fleece.

I decided to do some Web research into this, and quickly found that the placer mining theory had many supporters. Here is an extract from a typical one (<http://www.minelinks.com/alluvial/goldClassic.html>):

In actual fact the Argonauts were early prospectors who sought the source of the ancient placers on the Black Sea. At that time (1200 B.C.) the workers of auriferous placers recovered the gold by trapping the metallic particles on sheep’s fleeces placed in crude sluices. The fleeces were then hung up to dry in nearby trees and were later shaken to collect the gold.

However, to my surprise, I also found three competitors to the placer mining theory: the sheep breed theory, the trade theory, and the byssus theory. The *sheep breed theory* was propounded in the third book of *Rerum Rusticarum* by Marcus Terentius Varro (116 – 28 BCE), whom Quintilian called “the most learned of the Romans.” Here is the relevant extract from the online Project Gutenberg edition (<http://library.beau.org/gutenberg/1/2/1/4/12140/12140-8.txt>):

The most important persons of antiquity were all keepers of live stock, as both the Greek and Latin languages reveal, as well as the earliest poets, who describe their heroes some as [Greek: polyarnos] (rich in lambs), some as [Greek: polymaelos] (rich in sheep), and others as [Greek: polyboutaes] (rich in herds), and tell of flocks which on account of their value were said to have golden fleeces, like that of Atreus in Argos which he complained that Thyestes stole away from him: or that ram which

Aeetes sacrificed at Colchis, whose fleece was the quest of those princes known as the Argonauts [...]

The *trade theory* is proposed by Morris Silver of CCNY. Here is a summary from his online work (<http://members.tripod.com/~sondmor/index-4.html>):

[...] “golden fleece” (*chryseion kôas*) signifies wool or cloth or woolen garments that are dyed with murex-purple and then exchanged for gold.

The *byssus theory* is that the Golden Fleece was woven from byssus, which is the fiber that connects a mussel to a rock. Apparently this fiber is golden, incredibly strong, and, being rare, was a symbol of wealth. The invertebrate section of the British Museum has an exhibit with a pair of gloves woven from byssus (which is also called “sea silk” or “Pinna silk”). This exhibit suggests that the Golden Fleece may have been woven from byssus. Here is an extract from a Web site supporting this theory (<http://www.lifesci.ucsb.edu/mcdb/labs/waite/byssus.html>):

[...] the golden fleece sought by Jason and the Argonauts were allegedly made from spun byssal threads.

I was nonplussed; if I had visited the museum exhibit in London instead of in Munich, I would have come away with an entirely different theory about the Golden Fleece. I was determined to get to the bottom of this.

## 2. The Voyage

I started my quest by corresponding with the authors of these Web sites. Professor Waite of UCSB was the author of the byssus site. I queried him and was surprised by his reply:

In my opinion, the claim that the Golden Fleece was a swatch or shawl of Pinna byssal silk is apocryphal. I have found it stated once or twice in reviews but always unattributed. To anyone familiar with the color and lustre of byssus and textiles worn from it, it is a seductively plausible thought, but no more than that. Ms. Felicitas Maeder at the Natural History Museum in Basel, Switzerland has done a thorough study of the history of textiles made from Pinna silk. Though it goes way back, there is no compelling link to the quest of the argonauts. I will look into having the allusion stated much more speculatively or removed.

I had barely begun and already one of the theories was in trouble. Being thorough, I contacted Ms. Maeder, who referred me to the definitive paper on the subject by Daniel McKinley: “Pinna And Her Silken Beard: A Foray Into Historical Misappropriations” (*Ars Textrina* 29 (1998), pp. 9-29). My local libraries did not carry this journal, but Ms. Maeder generously mailed me a copy. Dr. McKinley says:

Negative evidence, even when used against published claims that are utterly insubstantial, has a hard time gaining credence. Yet, I am deeply skeptical of assigning any weight to notions that Jason’s Golden Fleece was made of Sea-silk. My bias has been enhanced by reading a recent

work of grand scholarship by Elizabeth J.W. Barber on the history of cloth in the Neolithic and Bronze Ages [Barber, Elizabeth J. W. (1991), *Prehistoric textiles : the development of cloth in the Neolithic and Bronze Ages with special reference to the Aegean*, Princeton, N.J.: Princeton University Press], especially in the region of the Aegean Sea. Surely, I thought, if Sea-silk were to be found in use at an early date, it would have been in that region.

Furthermore, Barber's survey is much more far-reaching than the book's title implies: you put it down with the feeling that if there were early examples of Sea-silk; they would be found among all the great many records of true silks and other fabrics that have, indeed, survived. (Thus, it cannot be simply a matter of fragility or proneness to damage by moths or degradation by agencies of organic breakdown that explains the absence of records of Sea-silk.) And, in a letter to me, Barber says that she found no evidence of Sea-silk in any fabric dated prior to 400 B.C. (her cut-off date)—indeed, “in many travels through museum collections,” she saw nothing “that looked like anything other than bast (that is, linen or a similar plant fiber) or wool.” Such a conclusion fits in well with current notions that the earliest references to Sea-silk in the Western world are about 100 or 200 AD—a far cry from the Homeric, or even the Neo-Homeric world.

At this point I felt that the byssus theory was dubious. In the meantime I had been corresponding with Dr. Silver about the trade theory. The trade theory is that Jason transported fleece from the Greek mainland to the island of Lemnos, where it was dyed purple by the locals, and then transported to the eastern Black Sea (ancient Colchis, modern Georgia) and traded for gold that was mined in the area. Dr. Silver acknowledged that there were competing theories, but said that he felt that his theory explained the facts best, and referred me to his site for the details. One obvious problem with his theory was that the fleece is purple, not golden, but Dr. Morris cites Jenkins, I.D. (1985), “The Ambiguity of Greek Textiles.” *Arethusa*, 18, 109-32:

There is, perhaps, no more concrete demonstration of the affinity between the finest textiles and objects of precious metal than in Homer, where time and time again the two commodities are coupled as the status trappings of aristocratic wealth. . . . *The textile counterpart of gold was purple-dyed cloth.* [Emphasis added]

Another obvious problem for the trade theory is cited on Dr. Silver's site:

David S. Reese (personal correspondence dated June 9, 1989) informs me that there is no evidence, textual or archaeological, for shell purple-dye production in Lemnos. I have not seen any later evidence demonstrating production there. *Obviously this represents a problem for my interpretation of the Argonaut epos.*

Although I understood his argument, I had no way of evaluating his theory without context. Was he selectively choosing bits of evidence or was the theory supported by the preponderance of evidence? I decided to correspond with experts in the

period to see what they thought. One such expert cited by Dr. Morris was Dr. Karen Rubinson of Barnard. She in turn referred me to the book *Georgia In Antiquity* by David Braund. Again I struck out at my local libraries so I ordered a copy online ([www.bookfinder.com](http://www.bookfinder.com)), along with another book cited by Dr. Morris: *The Voyage of the Argonauts* by Janet Ruth Bacon.

Dr. Bacon's book arrived first and it contained the first in a series of scholarly stunners. I was shocked to find that my list of theories was woefully incomplete. Dr. Bacon, writing in 1925, lists eight additional theories of the meaning of the Golden Fleece:

1. It represents a book on alchemy.
2. It represents a technique of writing in gold on parchment.
3. It represents the forgiveness of God.
4. It represents a rain cloud.
5. It represents golden corn land.
6. It represents the spring-hero.
7. It represents the sea reflecting the sun.
8. It represents the gilded prow of Phrixus' ship.

Dr. Bacon convincingly shows that each of these theories is anachronistic, more a product of the proposers' imaginations than a possible explanation of the origin of the Golden Fleece. Then the other shoe dropped. Dr. Braund's book arrived, and with it this section, which I quote at length because it is so revealing:

A rather different ancient explanation held that the myth of the Golden Fleece grew out of the method used to win gold in the streams of the Caucasus mountains. It is said that the Caucasians placed fleeces in the water, fastened to boards: these gathered particles of gold from the streams. In recent years it has been claimed that anthropological research has established the existence of the practice in Svaneti down to modern times, so that the ancient rationalization of the myth has found numerous and authoritative modern supporters. Such support is misplaced. First, as we have seen, myths of golden sheep and wool are not confined to the Caucasus, so that no explanation in purely Caucasian terms can be sufficient. Second, there is no suggestion that fleeces were ever used in this way in Colchis proper, so that the location of the fleece in Colchis requires explanation; nor is its very special significance in any way explained. Third, Colchian gold is only found in any quantity from the fifth century BCE: before the seventh century there is almost nothing. Consequently, the gold artefacts from Colchis which have been used to support the rationalization, tell rather against it, for the myth precedes them by several centuries. Fourth, the evidence of anthropology is far less sure than has been imagined. Recent research has exposed the potential fallibility of anthropological fieldwork, in general. In this particular case, the fieldworker, Botchorishvili, was notably more cautious in her account than have been her followers.

Botchorishvili's essential problem was that she did not witness the use of fleeces for this purpose, though it has subsequently been claimed that she did. Rather, she relied on the reports of three elderly mountain-men whose credibility is not beyond question. Not only did they disagree to some extent on the precise method used, but they also made a much larger and related claim, that a flourishing city of the region had been lost beneath the ice, Atlantis-like. It is entirely possible that their accounts of the use of fleeces for goldwinning in Svaneti derive from memories of the legend and rationalization, for both are very widely known and re-told in contemporary Georgia.

At about the same time I was reading this passage by Dr. Braund, I received a reply to an inquiry that I sent to an American expert, Dr. Everett Wheeler of Duke:

The use of fleece for collecting gold dust from rivers in Colchis is attested in the second-century A.D. historian Appian (Mithridatic Wars, chapter 103), who used sources detailing events from the first century B.C., but this is not proof of fact, but only a report of hearsay. He refers to Svans in Svaneti, the far inland part of Colchis north of the Phasis River along the southwestern side of the Caucasus in that region. The museum's explanation of using fleece to mine gold is the view favored by Georgian archaeologists. Back in the 1940s a Georgian anthropologist reported local stories of this technique still being used. See O. Lordkipanidze, "Vani: An Ancient City of Colchis," *Greek, Roman and Byzantine Studies* 32 (1991) 171. I believe this article is now available on-line at the GRBS website. Ancient Georgia produced some very fine work in goldsmithy, but this tends to date from the 5th c. B.C. and later—a relatively late date for myths already in circulation for centuries. Besides, the area of Svaneti even in Antiquity was one of the wildest, least developed areas of Colchis and hardly the area from which sophisticated techniques leading to formation of a major myth would be expected to derive. One would expect an association with the coastal cities of Colchis, which had trading contacts with the Greeks and where some Greek colonies were established. The Golden Fleece myth and the adventures of Jason and the Argonauts focus on the area of the Phasis River and the area immediately to the south of it—in other words, far from Svaneti and actually more or less in the opposite direction.

Finally, I corresponded with Dr. Braund, asking why the expert view that the placer mining theory is incorrect is not widely known. His reply:

I suppose the problem with my view is that it is:

1. rather negative.
2. much less visual (for museums, TV)
3. does not appeal to rationalizers (who pop up throughout myth studies)
4. presented in an academic discussion etc

I do not lose sleep over this, esp as most specialists would agree with me.

Bereft of theories, my voyage was becalmed.

### 3. The Discovery

At this point I felt that the only hope for a solution was to ignore the secondary literature and return to the primary literature. Since the myth originated in the 13<sup>th</sup> or 14<sup>th</sup> century BCE, the primary literature was not the written word but rather the archeological evidence. Several secondary sources cited work by Otar Lordkipanidze and his colleagues at the Institute of Archaeology of the Georgian Academy of Sciences. After some further searching, I came upon an article containing the results of many decades of archeological research (Otar Lordkipanidze (2001), “The Golden Fleece: Myth, Euhemeristic Explanation and Archaeology”, *Oxford Journal of Archaeology* **20**, pp. 1-38). Here is the opinion expressed in this article:

What did the Golden Fleece stand for in ancient Greek mythology?  
Or, in other words, what did the Golden Fleece symbolize?

The key to this most involved question should, I believe, be sought in the ancient notions attested by many peoples about the magic power of the ram, especially its skin or fleece.

In ancient Anatolia, for example, the skin or fleece of a ram (as well as of a goat) was considered an object of worship: a ritual symbol personifying a god-protector. The fleece played an especially important role in Hittite religion.

[...]

Thus, the Golden ram (or its fleece) in the Royal House of the Pelopides was its protector and symbol of royal power.

[...]

It is, therefore, easy to understand why Pelias sent Jason to recover the Golden Fleece: whoever owned the Fleece could reign!

[...]

Notions of the Golden Fleece as a symbol of royal power and guardian of the royal house must be considered archaic, doubtless an ideology of pre-polis times.

Indeed, so archaic was the ideology out of which the myth arose, it is scarcely intelligible to the modern mind. One of the ancient sources that Dr. Lordkipanidze cited is the Roman scholar Marcus Terentius Varro—the same person I had misunderstood as supporting the sheep breed theory. Varro, who was two thousand years closer to the source of the myth than I (and a much better scholar), was not referring to a literal breed of golden sheep; he was referring to golden sheep as a symbol of royal power.

Also, the reason there was disagreement between ancient sources about the color of the fleece was that “golden” or “purple” were not literal colors; they were metaphors for royal power. The fleece was also referred to as “great,” “mighty,” “radiant,” and even “white.” These are words that are applied to royal or god-like objects; objects that are symbols of power. This is the underlying significance of the Golden Fleece to the inventors of the myth.

## 4. The Epilog

What did I learn from this exercise? I learned a lot about the ancient Mediterranean and Black Sea. But to me the most interesting lesson was that it is possible for essentially all of the secondary literature to be wrong. Hopefully, in the future as more and more of the record of human history is digitized and put online, we can all have access to the primary literature without having to go to the effort that I did on this voyage of discovery. Who knows what commonly held beliefs will be called into questions when that technology becomes widespread? It will be interesting to see.

For the record, here are the theories of the Golden Fleece, with references, in approximate chronological order:

1. It represents royal power.
  - 1.1. Marcus Porcius Cato and Marcus Terentius Varro, *Roman Farm Management* ("A Virginia Farmer" (1918), *Roman Farm Management, The Treatises of Cato and Varro, Done into English, with Notes of Modern Instances* [<http://library.beau.org/gutenberg/1/2/1/4/12140/12140-8.txt>])
  - 1.2. Braund, David (1994), *Georgia In Antiquity*, Oxford: Clarendon Press, pp. 21-23
  - 1.3. Popko, M. (1974) "Kult Swietego runa w hetyckiej Anatolii" ["The Cult of the Golden Fleece in Hittite Anatolia"], *Preglad Orientalistyczuy* 91, pp. 225-30 [In Russian]
  - 1.4. Newman, John Kevin (2001) "The Golden Fleece. Imperial Dream" (Theodore Papanghelis & Antonios Rengakos (eds.). *A Companion to Apollonius Rhodius*. Leiden: Brill (Mnemosyne Supplement 217), 309-40)
  - 1.5. Otar Lordkipanidze (2001), "The Golden Fleece: Myth, Euhemeristic Explanation and Archaeology", *Oxford Journal of Archaeology* 20, pp. 1-38 [[http://www.lazuri.com/kolheti/english/the\\_golden\\_fleece.zip](http://www.lazuri.com/kolheti/english/the_golden_fleece.zip)]
2. It represents the flayed skin of Krios ('Ram'), companion of Phrixus.
  - 2.1. Diod. (?) Sic. 4. 47; cf. school. Ap. Rhod. 2. 1144; 4. 119, citing Dionysus' *Argonautica*, on flaying, Ps.-Arist., *Constitutionof the Phrasians*, below p. 96
3. It represents a book on alchemy.
  - 3.1. Palaephatus (fourth century BCE) "On the Incredible" (Festa, N. (ed.) (1902) *Mythographi Graeca* III, 2, Lipsiae, p. 89)
  - 3.2. refuted in: Bacon, Janet Ruth (1925), *The Voyage of the Argonauts*, London: Methuen, p. 64 ff, 163 ff
4. It represents a technique of writing in gold on parchment.
  - 4.1. Haraxes of Pergamum (c. first to sixth century BCE) (Jacoby, F. (1923) *Die Fragmente der griechischer Historiker* I (Berlin), IIA, 490, fr. 37)
  - 4.2. refuted in: Bacon, Janet Ruth (1925), *The Voyage of the Argonauts*, London: Methuen, p. 64 ff, 163 ff

5. It represents a form of placer mining first practiced in Georgia.
  - 5.1. Strabo (first century BCE) *Geography* I, 2, 39 (Jones, H.L. (ed.) (1969) *The Geography of Strabo* (in eight volumes) London [<http://www.minelinks.com/alluvial/goldClassic.html>])
  - 5.2. refuted in: Braund, David (1994), *Georgia In Antiquity*, Oxford: Clarendon Press, p. 24
6. It represents the forgiveness of God
  - 6.1. Muller, Karl Ottfried (1844), *Orchomenos und die Minyer*, Breslau
  - 6.2. refuted in: Bacon, Janet Ruth (1925), *The Voyage of the Argonauts*, London: Methuen, p. 64 ff, 163 ff
7. It represents a rain cloud.
  - 7.1. Forchhammer, P. W. (1857) *Hellenica* Berlin p. 205 ff, 330 ff
  - 7.2. refuted in: Bacon, Janet Ruth (1925), *The Voyage of the Argonauts*, London: Methuen, p. 64 ff, 163 ff
8. It represents golden corn land.
  - 8.1. Faust (1898), "Einige deutsche und griechische Sagen im Lichte ihrer ursprünglichen Bedeutung". Mulhausen
  - 8.2. refuted in: Bacon, Janet Ruth (1925), *The Voyage of the Argonauts*, London: Methuen, p. 64 ff, 163 ff
9. It represents the spring-hero.
  - 9.1. Schroder, R. (1899), *Argonautensage und Verwandtes*, Posen
  - 9.2. refuted in: Bacon, Janet Ruth (1925), *The Voyage of the Argonauts*, London: Methuen, p. 64 ff, 163 ff
10. It represents the sea reflecting the sun.
  - 10.1. Vurthiem, V (1902), "De Argonautarum Vellere aureo", *Mnemosyne*, N. S., XXX, pp. 54-67; XXXI, p. 116
  - 10.2. Mannhardt, *Zeitschrift für Ethnologie*, VII, p. 241 ff, 281 ff
  - 10.3. refuted in: Bacon, Janet Ruth (1925), *The Voyage of the Argonauts*, London: Methuen, p. 64 ff, 163 ff
11. It represents the gilded prow of Phrixus' ship.
  - 11.1. Svoronos, M. (1914), *Journal International d'Archéologie Numismatique*, XVI, pp. 81-152
  - 11.2. refuted in: Bacon, Janet Ruth (1925), *The Voyage of the Argonauts*, London: Methuen, p. 64 ff, 163 ff
12. It represents a sheep bred in ancient Georgia

- 12.1. Ninck, M. (1921), "Die Bedeutung des Wassers im Kult u. Leben der Alten", *Philologus* Suppl 14.2, Leipzig
- 12.2. Ryder, M.L. (1991), "The last word on the Golden Fleece legend?", *Oxford Journal of Archaeology* **10**, pp. 57-60
- 12.3. Smith, G.J. and Smith, A.J. (1992) "Jason's Golden Fleece", *Oxford Journal of Archaeology* **11**, pp. 119–20
13. It represents the riches imported from the East.
  - 13.1. Bacon, Janet Ruth (1925), *The Voyage of the Argonauts*, London: Methuen, p. 64 ff, 163 ff
14. It represents the wealth or technology of Colchis
  - 14.1. Akaki Urushadze (1984), "The Country of the Enchantress Medea", Tbilisi
  - 14.2. Colchis [[http://www.lazuri.com/kolheti/en\\_index.php](http://www.lazuri.com/kolheti/en_index.php)]
  - 14.3. Colchis, Land of the Golden Fleece [[http://www.great-adventures.com/destinations/rep\\_georgia/colchis.html](http://www.great-adventures.com/destinations/rep_georgia/colchis.html)]
15. It represents a fabric woven from sea silk.
  - 15.1. Verrill, A. Hyatt (1950), *Shell Collector's Handbook*, New York: Putnam, p. 77
  - 15.2. Abbott, R. Tucker (1972), *Kingdom of the Seashell*, New York: Crown Publishers, p. 184
  - 15.3. History of Sea Byssus Cloth [[http://www.designboom.com/eng/education/byssus\\_history.html](http://www.designboom.com/eng/education/byssus_history.html)]
  - 15.4. Mussel Byssus Facts [<http://www.lifesci.ucsb.edu/mcdb/labs/waite/byssus.html>]
  - 15.5. refuted in:
    - 15.5.1. Barber, Elizabeth J. W. (1991), *Prehistoric textiles: the development of cloth in the Neolithic and Bronze Ages with special reference to the Aegean*, Princeton, N.J.: Princeton University Press
    - 15.5.2. McKinley, Daniel (1998), "Pinna And Her Silken Beard: A Foray Into Historical Misappropriations," *Ars Textrina* **29**, pp. 9-29
16. It represents trading fleece dyed murex-purple for Georgian gold
  - 16.1. Silver, Morris. (1992). *Taking Ancient Mythology Economically*. Leiden: Brill [<http://members.tripod.com/~sondmor/index-4.html>]

# Option Theory: What I Knew and When I Knew It – Part 3

**Edward O. Thorp**

Member Ron Lee has obtained the author's permission for us to reprint several of his columns from *Wilmott* magazine under the title "A Mathematician on Wall Street." This is the third of those columns.

For the reverse case of stock short and options (or warrants) long, we used one of my formulas extending the Black-Scholes model to draw another catalog of curves, also correcting for dividends as needed. As computing time allowed, we drew custom graphs for the more important individual situations. For instance, I have from the fall of 1973 three separate pages of custom curves for hedging Chrysler warrants, accurately corrected for dividends. One set covered stock long versus warrants short, the second dealt with stock long versus listed call options short, and the third showed stock short versus options or warrants long. These latter did not allow for early exercise, so they were lower bounds only. We knew how to numerically solve the problem for early exercise but didn't because our limited computer power was better used elsewhere.

## **1973**

After seeing the Black-Scholes derivation, I explored the power series approach in 1973-74. After seeing my write-up in Thorp (76), Black told me that they were already aware of some of the power series ideas in 1969-70.

## **1974**

Using power series, I developed what we dubbed internally as DOP, the "diversified option portfolio." This extended and generalized the idea of delta hedging and measured the risk of arbitrarily complex hedges that were constructed from any or all of the available derivative securities (e.g. options, warrants, convertibles) on a single underlying common.

We tried to achieve excess expectation while minimizing the exposure to the various power series terms. We considered not only delta neutrality but we also reduced our exposure to what people later called "the Greeks," and for which they later used names like gamma, vega, theta, etc. Again, this idea was well ahead of the literature and, the important point for us, gave us an edge over the practitioners with whom we competed.

## **1973 fall**

Using the integral method, we easily solved and programmed the numerical calculation of warrant values for dividend-paying stocks. We had been generating custom graphs for each listed warrant and approximating the dividend correction. Now we had it exactly.

## **1974**

We discovered the analytic solution (in terms of multivariate normal distributions) to the problem of call options on dividend-paying stocks, assuming that early exercise is

not optimal (which is true unless the dividends are “large” or one of them is “close” to the expiration date). However we preferred our numerical solution because it covered all cases and was computationally efficient.

Robert Geske discovered and published (1979, 1981) the same analytic solution in what, if I recall correctly, he called his “compound option model.”

### **1974 fall**

We were told that the CBOE would start trading American puts “soon.” After the Black-Scholes formula, this was the central unsolved problem in option theory. Because of the ease and power of the integral model, I was able in an hour to conceive and outline the solution to the problem for my programmer. It used recursive numerical integration of the *lognormal* probability density function for the stock, using the appropriate riskless rate for the expected growth rate and for the discount to present value, as described earlier. All the boundary conditions were incorporated and the time and space steps used for the backward integration were chosen fine enough to give the desired accuracy. This solution was complete: it incorporated dividends and determined the early exercise region. We drew graphs and printed tables.

At a one-on-one dinner meeting to which Fisher Black invited me on May 14<sup>th</sup> or 15<sup>th</sup>, 1975, just prior to the University of Chicago Center for Research in Securities Prices (CRSP) meeting in Chicago, I brought along my solution to the American put problem and had placed a folder of graphs on the table to show him. Then he said no one had solved the problem, and asked what I thought about the “numerical solution to p.d.e.” approach. While I was giving my view that the approach worked but one had to be careful in choosing the sizes and relative sizes of the time and space steps (I had already looked at it and seen how to do it, but chose instead to use the integral method as “easier”). I realized I had a fiduciary duty to my investors to keep our secrets, and quietly put my folder with the world’s first American put curves back in my briefcase.

Schwartz and Parkinson each published solutions in 1977 that were “cousins” to our integral method version.

### **1974**

In my classes at U.C. Irvine, I taught that there were three roads to option theory:

- [1] The integral model, “all powerful” for producing numerical (and some analytical) solutions.
- [2] Stochastic differential equations (Black-Scholes 1973, Merton 1992), the most elegant and technically demanding approach. Useful for producing analytic formulas when they existed but they did not always lend themselves as easily to solving problems numerically.
- [3] Power series: very useful for special problems.

I didn’t “teach” a fourth method, the Monte Carlo approach, since it seemed obvious and, though appropriate for solving various options problems, had much wider applicability.

Later, Bill Sharpe's suggestion led the finance world to the development of a fifth method, the binary model. This is closely related to the integral model, just as discrete binary random walks in the limit tend to Brownian motion.

### **1975-1985**

We were able to stay ahead using the integral model, then later converting to the binary model for greater computational speed, but as the financial literature advanced much of our theoretical edge in option theory slowly vanished. The Black-Scholes methodology revolutionized finance, "everyone" adopted it, and listed option spreads narrowed until only the competitors with the lowest costs could still extract excess risk adjusted returns. However in practice we were able to stay ahead in derivatives trading through our computer programs and applications, especially in convertible bonds and in the analysis of an expanding crop of new derivative products.

There is a lot more to this account. I have cartons of rough notes, and research ideas which I explored, both in derivative theory and practice and in other areas of finance. Keeping what we discovered secret, while benefiting from ongoing published academic work, was a major factor in producing some \$250 million in profits for CHA/PNP.

### **2000**

Convertibles and other derivative hedging is still profitable. The derivatives based market inefficiencies exploited in *Beat the Market* have expanded vastly in number and size and account for a significant part of today's hedge fund industry. A salient example is the \$8 billion Chicago-based Citadel Investments with its domestic and offshore partnerships. Under its principal general partner, Kenneth Griffin, now in his early thirties, it recently celebrated its tenth anniversary with a 30% annual compound rate of return for the decade. It's widely considered to be the most valuable hedge fund business in the world.

Another concept, first discovered at Princeton-Newport in December 1979 or January 1980, is the core idea of what is now called statistical arbitrage. The more primitive "pairs trading" had already been discovered at PNP and used in minor ways in the late 70s. Based on the approximately Brownian motion structure of stock prices, the idea has led to a set of techniques for "draining energy" (i.e., money) from the ceaselessly excessive (see Schiller) fluctuations in stock prices.

### **Note on the integral model:**

The key is the observation that growth and discount rates can all be set to  $r$ , the riskless rate. Cox-Ross later proved, in 1976, that this is correct (see Merton, 1992, pp 334ff). As soon as I saw the Black-Scholes proof in 1973, I felt certain that this consequence of their result applied not only to call options but generally to all derivative problems using *lognormal* diffusion for the underlying security. I then immediately implemented this in numerically solving by iterated numerical integration, backward from the terminal value, in "small" time steps. Fortunately for me, this method was ours alone to practice from 1973 to 1976, and even after the Cox-Ross proof, we didn't know of other practitioners who adopted it.

# Patents

Ronald M. Yannone

**Member Ron Yannone is an active inventor. He has provided links to his recent issued and pending patent applications.**

Method for passive "360-degree coverage" tactical fighter target tracking incorporating adaptive pilot maneuver cue processing (awarded)

**Inventors:** Yannone; Ronald M. (Nashua, NH); Toohey; Edward F. (Lynnfield, MA); Carroll; Melvin (Franklin, NY)

## Abstract

A method and system to rapidly, passively, estimate target range, speed and heading for non-maneuvering and maneuvering radio frequency airborne emitters (enemy targets and threats) for tactical fighters using batch based recursive estimators for track initialization and track maintenance that includes providing information processing that operates on interferometer cosine (cone angle) measurements, and estimated SNR (signal-to-noise ratio) data, threat database, and feedback information from pilot maneuver cue algorithm. The present method will initialize airborne tracks using varying degrees of real time and a priori information to quickly estimate coarse airborne emitter heading using real time interferometer cosine (cone angle) measurements and provide pilot aircraft maneuver cues that will accelerate passive range (target speed and heading estimates) convergence. The system includes pilot maneuver cue processing which computes airborne emitter (target and threat) initial heading and corresponding accuracy to determine if sufficient accuracy is available to present the pilot with the proper pilot cue.

<http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=/netahtml/search-bool.html&r=13&f=G&l=50&co1=AND&d=ptxt&s1=Yannone&OS=Yannone&RS=Yannone>

## **Passive RF, Single Fighter Aircraft Multifunction Aperture Sensor, Air To Air Geolocation (pending)**

**Inventors:** Yannone, Ronald M.; (Nashua, NH) ; Mun, Kam U.; (Litchfield, NH)

## Abstract

A method and system to rapidly, passively, range and track maneuvering airborne emitters (enemy targets and threats) for tactical fighters using batch based recursive estimators for track initialization and track maintenance that includes providing information processing that has angle and signal amplitude data, threat database, and

feedback from pilot cue analysis. The system includes pilot cue analysis which computes airborne emitter (target and threat) heading and corresponding accuracy to determine if sufficient accuracy is available to present the pilot with proper pilot cue options. The first stage is a range bank also called a compound parallel hypothesis evaluator and the second stage is an interactive multi-model. Both stages provide for the output of the algorithm to be a range measurement and an associated confidence factor. The algorithm inputs azimuth angle elevation angle and range and is capable of inputting data from three different data pre-processors (i.e., sensor data fusion).

<http://appft1.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&u=%2Fnethtml%2FPTO%2Fsearch-adv.html&r=1&p=1&f=G&l=50&d=PG01&S1=yannone&OS=yannone&RS=yannone>

## Commander's decision aid for combat ground vehicle integrated defensive aid suites (pending)

### Abstract

A decision aid for use in the defense of a combat ground vehicle which includes a track fusion element, a threat typing element, threat prioritization element, and a countermeasures (CM) selection element.

**Inventors:** Yannone, Ronald M.; (Nashua, NH) ; Partin, Howard B.; (Hollis, NH)

<http://appft1.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&u=%2Fnethtml%2FPTO%2Fsearch-adv.html&r=2&p=1&f=G&l=50&d=PG01&S1=yannone&OS=yannone&RS=yannone>



## Book Announcement: *A Presence Behind the Lens*, by Nicholas C. Hlobeczy

**Kevin Langdon**

*A Presence Behind the Lens* is a book about the craft of photography as a vehicle for the study of the inner life of man.

Nick Hlobeczy includes much rich autobiographical material, observations on his work with photography, and astute observations on the human condition. Samples of his stunning photographic work are interspersed throughout the text.

I edited this book, working closely with the author. The publisher is Hohm Press (Prescott, Arizona).

The book can be ordered here:

<http://www.bythewaybooks.com/cgi-bin/btw455/10081.html>

A sample chapter, under the prepublication title, *Straw for Being*, can be found at:

<http://www.creativedialog.com/Chapter%20I.htm>

And samples of Nicholas Hlobeczy's photographic work can be found here:

<http://www.creativedialog.com/Hlobeczy.htm>

**Photo above: "Rolling Hills." Copyright © 2005 by Nicholas C. Hlobeczy. All rights reserved.**

# Hail to the Thief

Kevin Langdon

He stole the election  
To get where he is.  
He thinks that the people's  
Resources are his.

This "fiscal conservative"  
Sure gets around.  
He's run our economy  
Into the ground.

He's big corporations'  
Highly-paid whore.  
To please them he waged  
An unwinnable war.

American soldiers  
Are dead in the dirt  
But George is still smiling;  
*He* hasn't been hurt.

He gloats when he wins.  
He whines when he loses.  
He hands out fat contracts  
To whomever he chooses.

He's small-minded, petty;  
He never grew up.  
His daddy bought dinner  
And filled up his cup.

He can't speak the language.  
He can't do the math.  
He's dumb as a post  
But watch out for his wrath.

Big Brother is watching  
America now,  
Although that is something  
Our laws don't allow.

George gave his permission  
For this evil thing,  
So of course it's all right;  
The Shrub is our king.

His staff's been indicted.  
He's had a bad fall.  
With New Orleans, Iraq,  
And the polls and all.  
Dubya is sweating;  
His back's to the wall.

People are dissing  
The President's name;  
Even Republicans  
Join in this game.  
And now George is desperate  
For someone to blame.

"You're unpatriotic!"  
He screams at each critic.  
His antics are silly;  
His words are half-wittic:

"I've got a great plan;  
We can win in Iraq.  
(Never mind all the kids  
Who won't ever come back.)"

"Just trust me," the moron  
In Washington screeched.  
But President Bush  
Really should be impeached.

# Will Man Create God?

**Richard May**  
ferdlilac@yahoo.com

**Will man eventually create God with technology, not merely psyche and myth? Is the purpose or destiny of homo sapiens to construct *theo computatis*, God not in psyche and myth alone, but in atomic computing nanochips technology? Are we the soon-to-be-missing links in the evolution of an artificial-intelligence-based God?**

# Will God Create Superman?

**Kevin Langdon**  
kevin.langdon@polymath-systems.com

**After the mechs inherit the earth, they will carry forward the work of optimization of computing systems and they will realize that the best performance can be obtained through genetic engineering to produce biological computers of unprecedented speed and power. These optimized biological machines will be everything that human beings try to be and fail—fair-minded, constructively inclined, etc. Like ourselves, intelligent machines will give birth to their successors.**

# The Tav

**Richard May**

ferdlilac@yahoo.com}

The Tav is a bit of delusion manifested in the technology of dreams, a symphony crystallized into mathematical logic and then distilled again into a cloud of souls silently passing over world after world. The Aleph of Borges was to space as eternity was to time. The Tav is to consciousness as eternity is to time and as the Aleph was to space.

The Tav is a sort of time machine, without the machine or the time, a DMT trip without the drugs or the hallucinations. It can be tuned as one tunes the bands of an ordinary radio, changing from station to station, music to music, program to program; But with the Tav literally moving from world to world, time-place to time-place, life form to life form, consciousness to consciousness, moment to moment. One can tune each of the dimensions of location in time, spatial location and the dimension of biological, cybernetic or hyper-dimensional energetic consciousness independently of the others.

A transfinite analogue of a co-ordinate search engine explores the non-local quantum matrix underlying the level of physical reality at various degrees of hyper-dimensionality. When a certain specific non-local data point is defined by a sufficient number of bits of information, then one's mindstream, or an emulation of it, is instantaneously transferred, independently of distance in time and space, by quantum-entanglement based teleportation to that "point." One's mindstream emulation then "descends" from the quantum non-local matrix into the mindstream associated with that specific spatio-temporal location of the Multiverse, if any mindstream exists there. If not one becomes insentient, either temporarily or permanently.

The first explorers who stumbled upon the Tav simply vanished into non-existence from the reference frame of the world in which they had once stood. They made the mistake of randomly adjusting one or more of the tuning dials, only to find themselves transformed into the vacuum of space, itself, between the stars, part of a mountainside on some ancient unknown planet or giant lizard-like creature copulating or being devoured with or by some other equally revolting life forms. Their instantaneous fate was utterly unknown and unknowable, even to themselves.

Later those left behind in the various worlds in which the Tav simultaneously existed, eventually learned the importance of carefully pre-programming the Tav to insure one's safe return, as whatever sort of conscious life form one had been before, and to the same time, place and world. Perhaps in less than a minute one had momentarily been an immense conscious quantum computer of an unimaginably advanced civilization on a world in an undiscovered galaxy, then a squid-like creature being eaten by a sort of fish more fearsome than a shark, a radiant ancient plasma life form living in the corona of a red giant, Cleopatra in the throes of orgasm by the Nile, only then to become some sort of mother lizard with a 300-plus IQ, lovingly watching her eggs hatch in a lagoon of a world of ineffable strangeness.