

U.S. anti-submarine defense: the relevance of Johannes Kepler

by Robert Gallagher

An article in the January 1984 issue of the *Proceedings* of the U.S. Naval Institute at Annapolis, Maryland has sparked a controversy in naval warfare doctrine. Lieutenant Commander Ralph E. Chatham, a military assistant to the Defense Science Board with a degree in experimental laser physics, argues in "A Quiet Revolution" that detection of Soviet submarines, especially ballistic missile submarines, will soon become impossible and that therefore U.S. "hunter killer" attack submarines should be redeployed away from the anti-submarine warfare (ASW) mission.

Chatham is wrong for several reasons. Anti-submarine warfare capability is a necessity for the defense of the nation, not a project whose value is arguable. His argument that U.S. attack submarines are "too expensive" is based on incompetent economics.

But more important is Chatham's methodological blunder: He bases his argument that Soviet submarines will soon become undetectable on the bankrupt tradition of statistical mechanics from Isaac Newton through Ludwig Boltzmann.

Chatham maintains that technology is reducing the intensity of sound and other detectable radiation emitted by a submerged submarine to a level *below* that of the noise of the ocean itself—with the result that we will soon not be able to detect submarines at ranges necessary for defense. Chatham argues that there are limits to acoustic detection of submarines and that the development of any other long-range detection method is "improbable."

First, the detection range to a submarine is a function of the ratio of the sound signal put out by the sub to the background noise against which that signal must be heard. Second, submarines are getting quieter, but the oceans are not. . . . Although the search for better sensors and processors is vital for the short term, there is a need to recognize that . . . we are approaching physical limits to sonar detection of submarines. . . . when a target's sound signal becomes significantly less than the ambient ocean noise, that target will not

be detectable by any sonar [because of] the physical reality that for a given ocean noise level and a given detection system, there is some signal level below which a detection is improbable. . . . The physical laws of signal to noise lead inevitably to decreasing detection ranges.

Chatham is pointing to a real problem for the U.S. anti-submarine force. But his argument is based on the widely shared common-sense illusion that effective action occurs in the universe only as the result of an object banging into something else, or affecting something else through some gravitational or electromagnetic action at a distance.

Today the hegemonic physical doctrine—derived from the statistical thermodynamics of the immoral Viennese eccentric Ludwig Boltzmann—is that it is only such one-on-one interactions of individual masses or particles that "connect" one part of the universe with any other part. According to this view, there is a background level of "noise" in the universe from "the random quantum fluctuations" of the energies of the particles which make it up. "Work," action upon the universe, only occurs when the ambient noise level of particle-particle interactions rises above the statistically determined average noise level, or "threshold," with the result that a "disturbance" propagates. Therefore, a submarine need only reduce its noise level below the ocean noise level to be undetectable. This is precisely what the Soviet Navy is doing.

The bankruptcy of statistical mechanics

Under these circumstances, U.S. Navy ASW researchers must choose between failure or the adoption of the scientific tradition opposed to that of Newton and Boltzmann to guide them in solving the problem—the tradition of European republicans Nicolaus of Cusa, Johannes Kepler, Gottfried Leibniz, and others.

This scientific tradition demonstrated that the discontinuous particle-particle interactions that we see in visible space

are the mere appearances or projection of an underlying continuous physical manifold. As Lyndon H. LaRouche, Jr., wrote in "Why I Must Attack Albert Einstein" (*EIR*, August 2, 1983):

Action in the universe does not conform to the notions of one-on-one interactions among isolated particles in empty space. There are determinations which belong to the manifold as a whole, which override what might appear to be inferred from a mechanistic misinterpretation of space.

Cusa referred to this manifold as the "Not Other," that without which "all existing and non-existing things would necessarily cease." Such conceptions offend the philistinism of contemporary physicists.

Johannes Kepler's proof of the existence of an underlying continuity is particularly relevant. Were it true that the organization of the solar system was the result of the interaction of point masses—as statistical mechanics believes—no one would expect to find that the motions of the planets display a systemic musical harmony. In such a world, the "probability" of such an organization of the solar system would be close to zero. But Kepler demonstrated that the planetary motions are harmonic. Ergo, statistical mechanics is invalid.

Kepler's Third, or Harmonic, Law—that the cubes of the periods of the planetary orbits are proportional to the squares of their average distance from the sun—confirms that the solar system is force free and that there is a finite number of determinate planetary orbits that are stable. "Force" is experienced only in moving something against Kepler's laws. As Leibniz emphasized, "work" only occurs in the form of action against the entirety of the universe.

This has some interesting implications for ASW. A submarine cannot hide behind some "ambient ocean noise level." Yet, from the standpoint of Kepler's Laws, anything in the universe is potentially in resonance with anything else. Our problem is to discover the ASW "tuning fork"—a detection system that will by design place itself in resonance with a target.

The principal problem with U.S. submarine detection technology is not that it is primarily acoustic and based on sonar technology, but that research and development are guided by the mystical assumptions of statistical mechanics. Secondly, research in anti-submarine warfare against ballistic missile submarines conflicts with the doctrine of Mutually Assured Destruction. MAD assumes that defense against nuclear war is impossible, that any attempt to gain a defensive capability is "destabilizing," and indeed that it is the very vulnerability of the potential combatants which ensures that general nuclear war will not break out. On the basis of that perverse reasoning, former Defense Secretary Robert McNamara downplayed ASW, and adherents of MAD have continued to do so down to the present day.

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