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Resistance by scientists to
scientific discovery,
“Science” Sept 1, 1961

This source of resistance has
yet to be given the scrutiny
accorded religious and
ideological sources

Established scientists present the main obstructions to new ideas in areas related to their field. Why? An hypothesis. A scientist's view of his field of science has matured at an early stage of his career (e.g. age of 30 years). New ideas in this area, almost by definition, fall outside of the conceptual framework of our scientist, and so there is a natural tendency to reject them.

There is analogy.

Linguistic studies show a maturation of the primary language of a speaker at for example 18 years, after which only minor linguistic modifications are made.

I would suggest that the same phenomenon is prevails in the developing picture of the scientists field of work.

Of course this is quite idealized. There are other factors. Leaders are busy and most new ideas are wrong or unimportant! New ideas are also opposed because they might contradict some religious dogma, etc, etc.

Example. Biology departments in the 1950's tended to be of two types. Botany and Zoology. When molecular biology came on the scene (Crick and Watson) there was no home for it. New departments were formed, and eventually many of the old departments were swallowed up.

Next example. Small Pox, Great Scourge of the ages.

Reference: Barquet and Domingo oct 15, 1997 in Annals of Internal Medicine.

Edward Jenner was the hero: he made the scientific breakthrough, manuscript in 1796.

Background of Variolation and vaccination. These preventive measures tended to be almost folk remedies, especially vaccination.

... the President of the Royal Society rejected Jenner's manuscript for publication in the *Philosophical Transactions of the Royal Society*. The Council repulsed Jenner because he was in variance with established knowledge and "incredible". Jenner was further warned: "He had better not Promulgate such a wild idea if he valued his reputation".

Max Planck:

“A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather its opponents eventually die, and a new generation grows up that is familiar with it.”

In his scientific biography.

Creativity, two phases.

1. discovery, and
2. overcoming barriers

Factors in success:

For 1, an important, new,
and sound idea.

For 2, good
communication,
persistence, and
established reputation.

Example of Newton:
Newton's Principia was recognized by scientists after a relatively short period. But recall how he said: "If I have seen farther, it is by standing on the shoulders of giants."
Letter to Robert Hooke.
The time was ripe for Newton. Already Hooke was making similar discoveries.

The work of Copernicus, Kepler and Galileo took centuries before acceptance. Both the church and contemporary scientists vigorously resisted their ideas.

In this situation one might say that the revolutionary developments were made by these three scientists and that Newton did a great unification and consolidation with the Principia.

One may see Thomas Kuhn,
“The Copernican
Revolution” on these
matters.

The situation reminds one of the solution of the Fermat problem by Andrew Wiles.

That work received an immediate positive reception by mathematicians.

It could be understood as standing within the existing framework rather than changing that framework.

Albert Einstein: 1905,
photoelectric effect and
1915, general relativity.
The last was confirmed in
1919. The Nobel Prize
was given in 1921
explicitly removed the
work in general relativity
from consideration.
Moreover it was decades
before mainstream physics
seriously pursued general
relativity.

Mathematics is different?
Time magazine lists three
mathematicians of the 20th
century among 100
“movers”, namely, Kurt
Goedel, Alan Turing, John
von Neumann.

How has the mathematics
community recognized
them?

The Fields Medals of
1936:

Lars Ahlfors, Jessie
Douglas.

Dynamics and chaos, 1960 to present. Some of the early pioneers were Arnold, Sinai, and Moser. The first Field Medals in dynamics were Yoccoz-1994 and McMullen-1998. See James Gleick “Chaos” where one sees a broad panorama of the founders of this new field of science.

Cholesterol: studies from the 18th century.

Connection to heart disease in the 20th century.

Ancel Keyes developed evidence that saturated fats (dairy products, red meat) were a risk factor for high Cholesterol and heart disease.

Keyes on cover of Time magazine, Dec 19, 1961.

1970's Framingham, Oslo studies confirm Keyes.

The FDA: Causal relationship between blood cholesterol levels and [heart] disease has not been proved. ... labeling of fats and oils that they will mitigate heart heart disease ... constitutes misbranding within the meaning of the federal food, drug ... act. 1959.

Reaffirmed-1964

Reversed-1999

Later Einstein himself rejected the developments of quantum mechanics. In a letter to Max Born:
“You believe in a God who plays dice , and I, in complete law and order”.