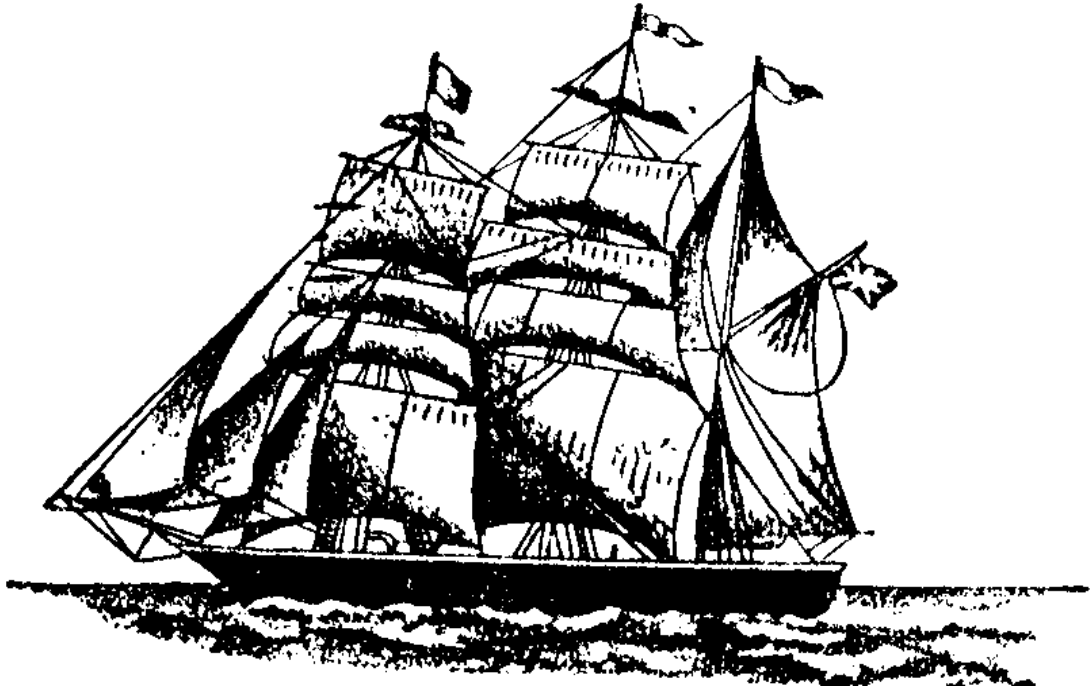


ISBN 1176-1075

**NELSON LITERARY
SCIENTIFIC & PHILOSOPHIC
INSTITUTE** Founded on board the Whitby 1841.



Incorporated by Act of Parliament 1907

**Incorporated under the
Incorporated Society Act of 2022.**

REVIEW No 70. February 2025.

HOW MUCH WASTE ?

The Chuquicamata mine is in North Chile. That area became Chile's after a war. The mine is located in a very dry area, almost a desert. The mine has a width of 3,500 metres and a length of 5000 metres roughly. It has a depth of about 1000 metres. That is some volume especially as it was once a mound. It is not even the largest open cast mine in the world. The copper content is about 1% with some molybdenum recoverable, so a lot of waste has been extracted and put somewhere. Hope it does not rain there with the new climate and flood the underground works.

LISE MEITNER.

The book “*A Life in Science*” written by Ruth Lewin (1996) provides a thorough journey through the life of Lise Meitner (born 1878). She was born in Vienna, a Jew, daughter of liberal and idealist lawyer. She was one of five daughters and was a curious listener to interesting visitors talk. They all got an advanced education. At 14 Lise went to a private school oriented to teacher training, studying Greek, Latin, Physics, Botany, Zoology, and Mineralogy. In 1901 when she was 23 she passed a difficult exam that enabled her to enter the University of Vienna studying Physics, Calculus, Chemistry, and Botany.



Figure 2 Lise Meitner.

Her second year in Physics was taught by the noted scientist Ludwig Boltzmann. She was a close friend of his daughter Henriette and was introduced to a sample of Uranium provide by the Curies. In 1905 she started her doctoral work on Maxwell’s equations and heat flow. She completed it in the next year and became the second woman with a PhD in Vienna. She became employed in Berlin’s Kaiser Wilhelm Institute where she discovered a new element for the periodic table, Protactinium. It was a great shock in 1906 when Boltzmann committed suicide.

She was a teacher by day and a researcher by night. She had to ask Max Plank for permission to attend his lectures as an exception. She was confident in her science to ask questions of the great man. She teamed up with Otto Hahn who had worked with Ernest Rutherford and Harriet Brook. They worked together for 31 years. He was the chemist to her physics. Her work on examining the effect of radiation on various elements was well recognised as when Rutherford returning from receiving his 1905 Nobel Prize in Stockholm on meeting her he was heard to exclaim “I thought you were a man!”.

In 1914 Lise was offered a job in Prague under the great chemist Emile Fischer and at double her salary which had been very low. With the outbreak of WW I Otto Hahn and Hans Geiger (working for Rutherford at Manchester) were called up believing it would be a short war. Scientists in Germany were interned and Meitner and Plank helped interned James Chadwick with scientific equipment as he continued science as a prisoner. Lise volunteered as an X-ray nurse just like Marie Curie. She was constantly in touch with Otto Hahn but only about science matters.

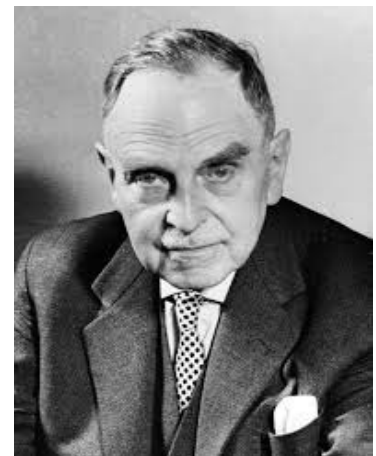


Figure 3 Otto Hahn.

Postwar was a difficult time with little food and severe reparations so there was much doom and gloom. In 1919 Lise had time in Sweden teaching enabling her to regain her health. She became a Professor, the first woman in Germany. She was publishing papers regularly but with Hahn recognised first even as she did the major part of the work.

She lost her positions in 1935 because of the anti-Jewish Nuremberg Laws of Nazi Germany, and the 1938 Anschluss resulted in the loss of her Austrian citizenship. On 13–14 July 1938, she fled to the Netherlands with help. Then on to Sweden where she could get some work. This a problem for a lot of Jewish scientists. Rutherford became active in the AAC (Academic Assistance Council) finding work for refugee scientists assisted by Albert Einstein.

In 1927 her nephew Otto Richard Frisch with a Vienna Doctorate came to work in Berlin. The neutron was discovered in 1932 by James Chadwick and became an additional nuclear missile to bombard elements. Bombarding Uranium and producing radioactivity it was thought a new element (Curiosum) was being produced.

In 1939 without Meitner, Hahn working with Strassmann published a paper on the strange results of bombarding Uranium with neutrons. In Sweden hearing of this Meitner and nephew Otto Frisch worked out that the Uranium atoms were splitting with a release of energy. Meitner named this **fission**. This was the knowledge that the USA was able to use to develop the atomic bomb.

She lived in Stockholm for many years, ultimately becoming a Swedish citizen in 1949, and later moved to the UK where she died in 1968 at 90 years old

Meitner did not share the 1944 Nobel Prize in Chemistry for nuclear fission, which was awarded to her long-time collaborator Otto Hahn. Several scientists and journalists have called her exclusion "unjust". According to the Nobel Prize archive, she was nominated 19 times for the Nobel Prize in Chemistry between 1924 and 1948, and 30 times for the Nobel Prize in Physics between 1937 and 1967.

DESK-KILLERS.

A new type of shooting has occurred in the USA. CEO Brian Thompson was assassinated last year. A suspect has been found and now awaits trial. There is evidence that the reason is that the executive of UnitedHealthCare medical insurance business was seen as behind having his employees deny costly essential medical work prescribed by Doctors. This has been seen as the cause of many deaths. This seems to qualify as desk-killing (German: Schreibtischtäter).

The classic case is that of Adolf Eichmann who as a Nazi official organised transport for Jews to be taken to the death camps. He was hunted down by Israel, tried, found guilty and hung.

There is a popular movement of sympathy for the accused killer and is thought of as a folk

hero. It is suggested that if he gets a fair trial, a jury will find it hard to convict. A mistrial is likely, requiring another trial or there could be what is known as ‘Jury nullification’ with a not-guilty verdict.

YACHTS OF THE RICH

Did you see the news item of the yacht Bayesian sinking in a storm in August with the drowning of the rich owner Mike Lynch and his daughter. The yacht is being salvaged with a lot of legal processes going on. This has drawn attention to the race of the rich to own even bigger yachts. Jeff Bezos, the founder of Amazon rather than buying the usual massive luxury liner type of grandiose yacht has opted for a sailing yacht. The vessel was built in the Netherlands taking a couple of years to build. It is thought that it cost half a billion dollars to manufacture with an additional annual maintenance cost of at least \$30 million.

It is a three-masted sailing yacht 127 metres long with a beam of 17 metres. The masts are 70 metres tall slightly less than that of the Bayesian. In Rotterdam where it was built it was announced that the city's historic De Hef bridge would be temporarily partially dismantled paid for by Bezos to allow the yacht to pass



through. This move was controversial because the bridge is a Dutch national monument owing to its history. A protest demonstration was likely so it was dismantled, taken out to where it could have the three masts re-installed. It allows for 18 passengers and 40 crew. Also built for Bezos is a tender of a modest 75metres with a heli-pad for the passengers to go to the sailing yacht. It is named Koru after the Maori symbol. Just like traditional sailing ships it has a bowsprit female figure. She has a Koru necklace.



ECONOMICS AS PART OF PHILOSOPHY.

Philosophy is the study of the fundamental nature of knowledge, reality, and existence, especially when considered as an academic discipline or a theory or attitude which acts as a guiding principle for behaviour. So science as verified knowledge must come under philosophy. Economics must be part of philosophy also and pretends to study the fundamentals of economic reality. The history of economics starts with the Greek philosophers. Economists honestly believe their model of the economy and have a cognitive wall resisting any alternative perceptions as they depend on what they can think, not facts from reality.

Adam Smith is generally seen as an important founder of the discipline of economics. He is also known as a moral philosopher. His observations on the manufacture of pins is often quoted as he saw it as a triumph of specialisation. He did not see the application of machinery and energy were just as important.

In 1835 Professor of Mathematics Antoine Augustin Cournot drew the first graph of a supply and demand intersection which remains the basic image of economics yet still there is no empirical evidence for what is graphed. Thousands of textbooks have been published with this versions of this diagram but there is no word about evidence, it was just philosophical imagining.

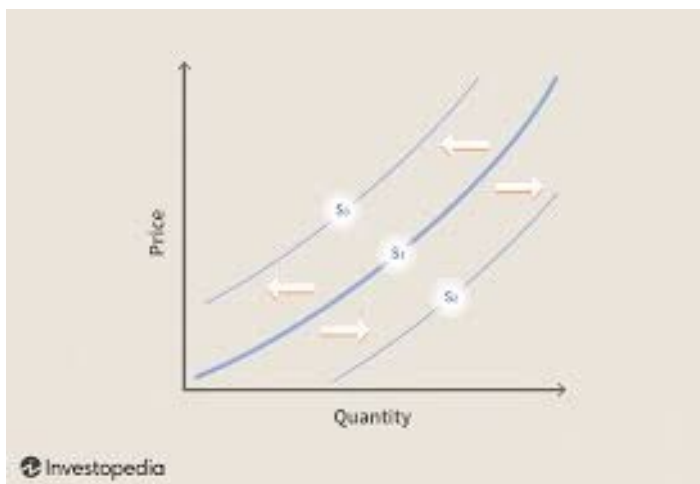


Figure 6 False supply economics.

Using scholastic type considerations, economists have formed a concept of how consumer's goods are produced with a combination of land, capital, and labour. When reality has disrupted this pattern, **technology** has been added to explain an anomaly. It is assumed (**assumptions** are popular in economic discourse) that necessary material inputs come in from land exploitation. Energy, the fundamental process behind any change is not included.

Economists are energy blind. Earlier thinkers called physiocrats (in France) had realised that land's production through the sun's energy, that there was a free gift of nature which was the source of what is now known as a 'free lunch' and is the basis of profit. Only the clear concept and word **energy** had not been formed at this time. Adam Smith is not the only person to overlook the role of energy. All orthodox economists do not understand energy yet nothing happens without an energy process.

Energy as something to apply philosophical thought to has become the domain of science rather than pure philosophers. Scientists have established a theory and universal thermodynamic laws. One philosophical essence has been established that is fundamental; while energy is something conserved in changes, it declines in usefulness and must turn into unuseable waste.

An anomaly in science was resolved when it was established that energy came small elements which we now call quanta. We know that matter and electric charge are elemental but does space and time also come in small indivisible elements?

FORECASTS AND PREDICTIONS.

Someone said that making predictions was difficult, especially about the future. In this world of turmoil and uncertainty this is especially true. Once people could expect things to be much as they were before. Things were underway that could have predictable results. Short term predictions are impossible to make if they go beyond the routine. Economists predictions are usually wrong. They should get an economic figure within a couple of standard deviations. There seems to be always something new to disrupt the economic trend and confound economists predictions.

Predictions for the distant future are easier. We can be sure that our sun will enlarge into a red dwarf and swallow up the earth. Well before that, life on earth will become impossible and before that, human life will be extinguished.

Some people looking ahead are thinking we should build rocket ships and move to other suitable planets in the universe. This is ridiculous. Considering how long the journey would be and the resources every person needed for such a journey make it ridiculous and impossible, yet work is wasted on this idea.

Space is no place for humans. We do not know that humans will be able to have healthy children in space. We do not know that humans born in space will be able to develop in a way to replace astronauts. The amount of energy and materials needed to attempt this is not available. It is interesting to know if there is life on other planets but considering the distances in space, at the time we detect anything significant out there, then that messenger will already be extinct.

Just as each of us will die, so will humanity. If you have been aware of how overheating of the climate has been destroying our infrastructure faster than we replace it, then it is apparent that the end is coming closer. Stopping the build up of greenhouse gases will just delay the end and by doing nothing, then the end be sooner.

The effect of heat is to accelerate the water cycle. More water will evaporate so the atmospheric rivers will cause bigger floods. Hailstones are getting bigger and aviation encounters larger down drafts. Long droughts will produce fire-storms. This happens now. The patterns of the weather will change. The polar vortex will shift indicating that micro climates so that dependable agriculture required will no longer be viable. Heat and humidity in combination are already causing hyperthermia deaths. Certain localities will become uninhabitable for this reason alone.

Short term more of the same, long term, extinction, but what about the medium term of say one generation? Politicians must know that the policies needed will get few votes. War and preparations for war produce a lot of greenhouse gases that politicians will not touch. We must note what the scientists tell us. There will be floods, droughts, landslides blocking roads, storms with roofs being lost. People migrating will increase.

The extra human effort needed to repair damage will mean a decline in the production to satisfy consumerism and luxuries. The extraction of minerals because the easiest supply is used first will become more expensive implying permanent inflation. In efficiency theory, the price of a depleting resource like petroleum fuels should be steadily price increased so people trend to substitution in time. Consumption should drop just as the resource run out. However while the price of petroleum fluctuates, few preparations are made. The end of supply of petroleum fuels will be sudden with dramatic responses by the public. Our love affair with private vehicles use ending will be drastic.

SKEPTICS.

Michael Shermer is well known in the USA as he helped set up the Skeptics Society and started the Skeptic magazine. He wrote a skeptics column for the scientific American. He appeared often in the media, TV, books, TED talks, and debates on religion. He is noted for pointing out; Type 1 Error: Believing a falsehood, Type 2 Error: Not believing truth.



At 17 years he got into religion but after studying psychology, he gave up religion and became a skeptic when as a professional cyclist he saw through all the nostrums of medical training aids. His book “*In Darwin’s Shadow*”, a look into the life of Alfred Russel Wallace was the result of a study project. He was a climate change denier but he changed saying with the evidence, it became undeniable.

Published in 2016 his book “*Skeptic* “ (Viewing the world with a rational eye.) covers his work on skepticism. He covers a lot of items. They are small items under the headings of 1. Science, 2. Skepticism, 3. Pseudo-science and Quackery, 4. The Paranormal and the Super-natural, 5. Aliens and UFOs, 6. Borderlands Science and Alternative Medicine, 7. Psychology and the Brain, 8. Human nature, 9. Evolution and Creationism, 10. Science, Religion, Miracles and God.

He covers a lot, even covering items from his cycling days and the Scientific American magazine. He says “I was wrong” are three words that separate scientists from the posers. You must be able to say “I do not know”. His book is a great resource for someone trying to teach ‘Critical Thinking’.

He discusses the question; ‘Why do smart people believe weird things?’ He came up with an answer: ‘Smart people believe weird things because they are skilled at defending beliefs they arrived at for non-smart reasons.’ He notes what he called Shermer’s Last

Law: “Any sufficiently advanced extraterrestrial intelligence is indistinguishable from God.”. We get into trouble when we do not allow ourselves to say “I do not know.” In this internet age the gullible will become victims of scams to take their money and destroy their knowledge of reality.

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Future programs noted at <https://www.nelsontasman.nz/events>

The Institute program recommences 2pm, Sunday, 2 March, Suter Theatre. Cost: \$5. The talk by **Dr Katie Ben** is entitled: *Unpacking the End of Life Choice Act – the practice of Assisted Dying within New Zealand.*