RESEARCHING SCIENCE

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Key Words

scientific research, scientific method, peer review, surreal research

Summary

Examines what science is, what scientific research does, how it does it, and practical and theoretical constraints to implementation.

Contents

INTRODUCTION

Once upon a time scientists considered the philosophy of science and what might be achieved through science. Nowadays scientists simply follow those going before and get funds by promising an incremental gain. Even small potential gains can be portrayed as delivering wondrous benefits to all.

The method is simple. Memorise and accept what is taught in university and conduct research that supports the mainstream literature. For rapid promotion combine with leaders in the field to improve access to funds and publication of results.

Progress in science is now seen as extending existing knowledge with the extension presented as being new. There was a time, hypothetically at least, when science involved discoveries that countered existing knowledge. The thrust of science was directed towards changing our perceptions rather than reinforcing them.

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The situation is illustrated by the suggestion that to be accepted a new development must be capable of implementation by others. Logically there is no reason for this requirement as for acceptance the observations must simply be reliable. While reproduction is one means of testing reliability it is not infallible, for or against. For large institutions and scientific groups this reproduction requirement allows the claim that something does not exist until reinvented by them.

The main purpose served by having others reproduce results for testing relates to commercialisation. It is essential to allow others to commercially exploit developments.

The significance of commerciality is seen in successive Australian Governments seeking to have CSIRO become self funding. The publicly research funded research, ostensively initiated to provide public benefit, is expected to be commercial. That is against a background where the bulk of research in Australia is conducted by companies for commercial reasons.

Logically the objective of the Governments has been to have no research conducted for the public interest. The public is destined to be at the mercy of business even though it funds most research, directly through Government and indirectly through tax concessions. This is of particular consequence for the environment where business interests are invariably environmentally damaging, but it affects the full spectrum of research. For example, most medical research seeks to develop curative treatments that have great business potential. Preventative medicine gets little support when for the community it is the most cost effective and beneficial approach.

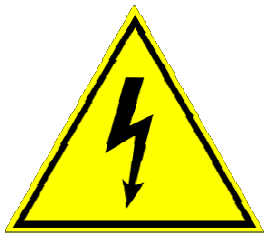
This paper arose through my decision to cobble together bits on the scientific method presented as context in various papers. The context was given to prevent adverse clichéd comments from those that had not considered the scientific method and expected my results to conform with the establishment views. That alone identifies a need to consider the scientific method but an added incentive was to see what I could logically say.

Many relevant issues are addressed in The Politics of Science and so are not addressed here. It would be beneficial if the book was published but that has yet to be achieved.

WHAT IS SCIENTIFIC RESEARCH

This has two components, research and the science.

Research



The apposite quote comes from Einstein: 'If I knew the answer it would not be called research.'

In science it is assumed the research is directed towards a new discovery and not another presentation of something that is already known to others. Research involves looking into the unknown and hopefully coming up with new information and insights.

Research implies the looking is structured rather than random. The structure involves working off existing knowledge to provide a framework for new observations. The framework determines the nature of the results and is therefore determined by the objectives of the research.

The definition of Research and Development (R&D) used by the Australian Tax Office (ATO) adds a further constraint, a risk that expected outcomes will not be achieved. The

risk is normally assumed to arise from technical limitations but most commonly arises from limitations in the abilities of the researchers. It's a case of been there done that for me.

The issue of risk can be addressed via the link between objectives and methods. If methods exist to achieve the defined objectives then there is no risk. If existing methods give no insights on how to achieve the defined objective then the risk is high. It is even higher where existing methods are misleading.

A perception exists that there are no problems, only issues, where that arises from the requirement for planners to always produce some form of solution. In some ways the perception is bureaucratic, and can sometimes be a necessity. An answer can be required and, while a good answer is preferred, any answer is better than none.

Making the word problem redundant solves nothing. In science problems are real and cannot be addressed by regarding a best guess solution as being correct. The word is particularly important because the ability to produce a solution depends almost entirely on problem definition as that determines the approach and methods used.

It cannot be stressed to highly that success depends almost entirely on how the problem is defined. It is the key aspect of scientific research. However, I find that it is also the least addressed. Thinking alone does not produce results and results are needed for a scientist to gain benefit. The focus is on doing with little thinking about what is being done.

I find research most interesting when the objectives can only be broadly defined. The soil mapping is an example where the general requirement could be defined but the means of achieving the requirement was unknown. The key aspect of the research lay in defining objectives and constraints such that the solution became self evident. The same arose with constraints to vegetation development. The solutions would never have been found if the research had been structured on existing perceptions.

Risk V Benefit

People are inherently risk adverse but love benefit. The desire is low risk and high benefit, and that may sometimes arise. However, there is generally a link between risk and benefit. Research with low risk typically provides low benefit. High risk research is only undertaken where the potential benefits are high.

Various means are used to reduce risk. Business typically undertakes developments that it knows can be implemented. Realistically any risk relates to commercialisation rather than the development. Academics typically set their own problems where they know results will be publishable. Reward then arises even without ever solving a problem.

I found that CSIRO management would not accept research having high risk. They had to be convinced of the problem and that results would be useful. Achieving that without having the results was a greater problem than the research itself as, even where such a problem was solved, they generally would not accept it. Given that it did not exist elsewhere I could not have done it.

When leaving CSIRO I estimated that less than 50% of the research in CSIRO met the ATO definition of R&D, and that figure was declining. Moreover, most genuine research involved application of methods developed elsewhere to new situations and hence involved little risk. The level of genuine research in other organisations claiming to conduct research was much lower.

Science

Research can effectively be undertaken by just about anyone, as with establishing a family tree. The question therefore arises as to what differentiates scientific research from other forms.

My introduction to this question was being told that science is what scientists say it is. As scientists are identified by their conduct of science this suggestion resolves nothing other than to identify the capabilities of the lecturer making the comment.

In The Politics of Science I identify there is no such thing as science. There is scientific research which uses a process to develop new information. The suggested lack of a definitive entity called science creates difficulties in identifying what constitutes scientific research.

This anthropogenic issue can be pragmatically addressed by identifying that science addresses natural constraints. It attempts to determine how natural systems function. That effectively excludes social sciences from being science. While social 'scientists' can claim to be natural the systems they study are not.

The addressing is done in a structured way to increase efficiency. New work builds upon established knowledge with logic being used to identify viable options. The logic can be grammatical or numerical.

With this construct science is a method for developing information and knowledge on the structure and functioning of natural systems. The tangible aspect of science is then the scientific method.

The hoary question as to what constitutes information and knowledge arises yet again. Using pragmatism as usual, information is taken as deriving from reliable observations. It is our best guess as to what constitutes fact. Knowledge derives through interpretation of information and incorporates entities such as models and theories.

The key difference relates to fact v interpretation. Where reliable observations are discordant with knowledge the knowledge is incorrect. Knowledge progresses through the use of new observations to identify deficiencies in existing perceptions

SCIENTIFIC METHOD

The essential requirement for the scientific method to be effective is that existing knowledge is reliable. Where it is not any developed knowledge builds upon the errors making results worse than useless. The scientific method therefore incorporates means of testing the reliability of results.

Testing reliability is not a trivial issue. It has therefore been omitted from many suggested scientific studies with computer modeling being prominent. Predictions are presented as representing fact without there being any test of their reliability. Definitely not 'scientific' regardless of how a model is constructed.

I cannot see there being one scientific method that applies to all situations. Indeed, I have used many approaches with approaches being tailored to the problem at hand. In consequence I have had to consider what constitutes a valid test. What criteria must be met before results can be regarded as being reliable?

The simple answer is buggered if I know. My developments have negated many scientific considerations regarded as being completely reliable thus the tests applied by others were at best ineffective. Any suggestion of rigour, publication in a reputable scientific journal,

general acceptance, or best available science have no value. Any suggestion that good science is what scientists say it is becomes laughable.

Despite the above negatives science has been particularly effective in progressing the development of mankind. It receives support because of the developments where the developments have been increasing at an exponential rate at least. It must have something going for it.

Testing

A test applies to specific circumstances and has unknown applicability where circumstances differ. The testing of a drug cannot identify the drug is completely safe because it cannot be fully tested under the full range of circumstances under which it will be used.

The issue is illustrated by Popper's suggestion that testing can only be applied to parts of a system. Given that natural systems function through interaction results from tests on parts of a system cannot be simply combined to make comment on the entire system. Testing is required on the entire system if only to test the reliability of knowledge of the interactions.

This issue is addressed in science by identifying the constraints or boundary conditions under which a determination applies. While not resolving the issue the identification of boundary conditions is an essential step.

A practical issue arises with the belief that a test proves something, a belief that arises from abstract mathematical formulations. While sometimes presented as being natural the mathematical formulations simply represent our perception of how things work. At best they are approximations hence any proof relates to the approximation rather than reality.

In practice science evolves through disproof or negation. Something is accepted as being correct until negated. The negation need not be absolute and commonly only redefine the constraints under which a generalisation applies.

The situation is the same as in evolution. Natural selection eliminates non-viable options. The ones that remain are not necessarily 'correct' in providing the best solution but they are adequate. The ones eliminated by definition are wrong, at least for the prevailing circumstances.

A distinction between observations and theories is reiterated. Observations are the closest we come to establishing fact. However, even there an observation must be qualified by the circumstances under which it was obtained. That helps determine its reliability and potential range of applicability.

Theories, which include models, represent an interpretation of how things are thought to work. They range from fanciful, through plausible, to things that appear to be realistic. However, the appearance of realism does not identify that a theory is correct, it simply identifies that it is adequate for current purposes.

Developments in science typically improve the level of adequacy. Breakthroughs identify a new purpose.

An Example

I once marveled at quantum mechanics where large gains had apparently been made through abstract modeling. Given new insights on the structure of matter I now marvel at deficiencies in the science.

Investigations at the atomic level are difficult to test as observations almost invariably relate to aggregations of atoms. At the sub-atomic level physicists have bashed the shit out of atoms in attempts to identify component particles of matter at remarkably great expense.

The work has been conducted assuming their model of an atom is correct. That model has an atom being composed of different forms of particles, the assumption being that, because an atom comprises matter, its component units are particles of matter.

The model I present has atoms being formed from energy in the form of electromagnetic waves thus they disaggregate into energy rather than particles. There is currently no way for the physicists to determine whether the particles they identify as fragments of atoms represent energy or matter.

Cyclotrons address the ultimate in expensive experimentation. Back at a reasonable level we see that electrons are identified as particles with electricity arising from the flow of electrons. Semiconductor theory has holes developing in materials to allow the flow of electrons. As electricity is energy their entire construct of an atom is obviously irrational.

Mathematical models have continued where the experiments stopped. Taking the assumed construct of atoms interpreted from observations they have constructed a picture of what they consider to be the fundamental elements of matter, strings. A designated number of different forms of strings is identified as forming all matter in the universe, while also having the capacity to produce multiple universes somewhat in parallel.

The 'tests' applied relate to how well the modeled results match their perception of reality. The model is assumed to be correct because the abstraction emulates all they know when that knowledge was built into the model. Their test only serves only to demonstrate their skills in modeling and says nothing about the validity of their conclusions. Failure would simply demonstrate limitations in their modeling skills.

The absence of a test that is independent of the development determines there is no valid test. They have produced a self-fulfilling prophecy that incorporates the basic elements of religion. To my mind it is an insult to our intelligence through being presented as being at the forefront of science.

This stance is against what physics has become through being taken over by mathematicians. Reflecting on my work the similarities lie with ancient physics where developments were based on the logical analysis of factual observations. While mathematics represents one form of logic it is not the only form, and it is diabolical deceit to present a mathematical abstraction as representing reality.

The issue identified above with physics is now general throughout science. It has occurred in addressing climate change where the models of a few have been presented as identifying the absolute truth. Given they don't incorporate all of the elements known to be important they can at best provide a very coarse approximation. At worst they are misleading as I consider has occurred.

The ultimate development of this approach has occurred in CSIRO with an economist heading biodiversity research. The natural reality is now irrelevant, the only issue is how to adjust current practices to increase socioeconomic benefit, and that is best achieved through purpose designed abstract models.

Systemic Failure of the Scientific System

The punch line here is given first, nothing new in that. The only difference now relates to scale and importance. Society has grown to be completely dependent on science and failures in science can now cause considerable damage to society.

Success for most scientists comes through incremental developments. They build upon accepted theories as that ensures acceptance of their work. It removes most of the risk from a high risk profession.

Problems arise where existing theories are wrong. To maintain success a scientist must either transfer to the new theory or defend the old. They almost invariably defend the old where that has been the basis for their success. Students are typically the ones supporting new theories.

The machinations are addressed in some detail in The Politics of Science. The focus here is on the failure of a system touted as being fundamental to modern science, that of peer review. Basically it provides a mechanism for established scientists to maintain their dominance by suppressing alternatives. It reinforces established views. Moreover, it provides financial benefits to the established scientists and commercial benefits to scientific journals. Linking journals to the establishment guarantees sales.

In historic times reviews were solely used as a means of improving research as the author essentially had final say on what was published.[1] Nowadays the journal editor has final say and their decision is usually based on the views of unnamed reviewers. Secrecy has been, and still is, a mainstay of peer review.

The use of secrecy has several implications. Legally it addresses potential liabilities. It also allows the reviewing scientists, who are typically well established, to suppress work that is prejudicial to theirs. In that it is adverse to the development of science.

Scientists proclaim that the provision of research results should be free and open, that there should be no censorship of science. Against that public proclamation they run a system of strict censorship based on the claim that it is necessary to maintain scientific standards. The effect is seen in the development of physics and addressing of issues such as dryland salinity. The censorship associated with the current peer review process kills good science and promotes corrupt practices.

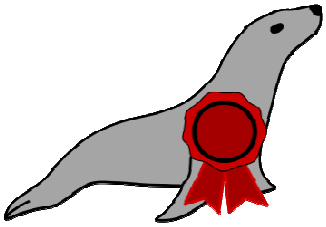
I remain puzzled as to why peer review is regarded as being necessary other than for commercial reasons. It appears as if scientists think that publication in a 'reputable scientific journal' gives a stamp of approval assuring that the research is good and the results correct. They flag their deficiencies in using others to tell them what they should accept.

I find most journal publications useless. They are mostly repetitive rubbish that supports work presented before. Frequently they are wrong. I regard it as my responsibility to evaluate the veracity of information presented and that responsibility must be taken by all scientists.

[1] Essentially inevitable given the limited means of communication. Most work was recorded in a form that would now be regarded as research notes.

The Solution

It would be simple to say their aint one but that is defeatist.



A solution occasionally arises where a development stands out and appeals to the imagination of scientists. Some significant developments are not in conflict with established views. These can gain rapid acceptance within the existing system.

The usual solution is publish as best you can and so depends on the means and perseverance of the proponent. Historically it meant self publication and that is the path eventually taken by me. It was also the path taken by scientists in the USA interested in evolution referenced in my paper of evolutionary direction.

The World Wide Web (WWW) has the major benefit of allowing cheap publication with a potentially large audience. Scientific journals are read by few, the papers on the ERIC web site have been read by thousands.

The normal reaction of scientists to such publication is that the work cannot be trusted through not having been peer reviewed. That has the same validity as my saying that journal publications cannot be trusted through having been peer reviewed. In all situations it is buyer beware. It is up to the reader to make their own judgment and no one has the right to attempt to control that judgment either by way of the material available or prejudicial comment on validity. Well considered objective assessments are welcomed but reactionary attacks and belligerent vitriol are not.

A critical aspect of this solution relates to the means of presentation. Scientists write papers to be read by scientists. In general they are poorly written and full of technical jargon making them unreadable by most. No one would read a scientific paper unless they had too, and I decided that reading was seldom necessary.

I suffered a Divisional Chief that maintained there was only one way to present science. Against that I developed reporting forms that made the information comprehensible to Defence. One report was even discussed by troops during the afternoon drinking session. The changes in presentation did nothing to damage the science but they greatly increased the readability, comprehension and interest.

I have an aversion to references due to their abuse, and my PhD thesis did not contain a literature review. The abuse takes many forms but the main one involves use of a reference to provide proof for something considered important. The worst study encountered essentially provided a literature review to demonstrate their knowledge when they understood nothing of consequence about the topic. As it involved a State agency funded by the Australian Government the garbage results were used in developing the plan for the Murray Darling Basin which had slightly higher status.

My discarding of references originally arose through being needed to make reports readable to Defence. I now use it as a means of getting people to make an effort to find the relevant information. Accessing the information is no longer difficult given the WWW, and the searching exposes them to more views than expressed in any publication that I could reference. It greatly increases the readability and educational value of the papers.

The bottom line is that scientific information should be readily available and be presented in a form that is comprehensible to as many as possible. The many will vary considerably, as with my paper On The Nature of Matter being difficult. The words are simple but the logic is not. At present I see that limitation as unavoidable and depend on others to provide translations.

From a personal perspective papers should be interesting to read, and preferably also enjoyable. Such attributes certainly increase circulation if not uptake and acceptance. I now also expect enjoyment from writing them.

IMPLEMENTATION

Scientific research can be conducted by a diversity of individuals when taking authorship on scientific publications as reference. A science degree is not essential as many publications derive from engineers. The arts also contribute if only through geographers.

There is also no requirement to have reached a specific standard. A PhD gives no priority in publication over a pass degree. There is no requirement to have had specific training in scientific research, or to have achieved a specific level of proficiency[2].

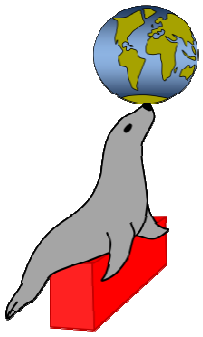
There are compelling reasons to retain the existing situation but there are also compelling reasons to review it so as to provide improvements. For example, engineers are trained to achieve very low risk when the conduct of scientific research involves substantial risk. Few engineers have the psyche to achieve a major breakthrough in science. They generally are, however, good at linear developments.

Pass degree scientists are not specifically trained in research and that is now even extending to those with PhDs. That deficiency is compounded by the generally lower capabilities. A science degree is regarded as tough, but obtaining a PhD and conducting scientific research is much tougher. If the system works properly the best obtain PhDs and are best placed to provide gains through scientific research.

Fulltime conduct of scientific research is the pinnacle of development for scientists. Pass degree scientists therefore strive to conduct their own research where they can. The consequence in CSIRO has been research being led by those with little competency. The consequence in State agencies has been the same only more extensive. The overall consequence has been a downgrading of the standard of research compared to what should have occurred.

This malaise has many implications additional to reducing the standard of research. The competition involved means those with lesser abilities use political means to succeed. In consequence good scientists can be suppressed, often strongly so. It also reduces the value of research scientists generally and thereby their remuneration. Relative to their skills, qualifications, and benefits provided, research scientists in Australia are very poorly paid.

The requirement is to have those with best abilities to lead research where leading involves active participation. This is usually thwarted by management expecting to lead where remuneration for management is generally greater than for conducting research. Political considerations are generally counterproductive to the best utilisation of research scientists.



Employing the Best

This has two elements, identifying what constitutes the best and placing them in a position conducive to the conduct of research.

The key skills of research scientists are:

- Knowledge of existing theories

[2] Titles such as Professor provide an advantage in applications for research funds and reviews for publication hence the great explosion of Professors in Australia.

- Knowledge of existing information
- Strong logical capacity

Knowledge is often expressed as knowing a lot about little or a little about a lot. For good scientific research the knowledge must be a lot about a lot. The breadth of knowledge is as important as the detail as breadth is used to develop an appropriate context for the research. One reason for the long time needed for ecologists to hit their straps relates to the vast knowledge required across several disciplines. My research abilities continue to increase as my knowledge increases.

Scientists with little capacity for scientific research have their knowledge restricted to a narrow field and/or have limited logical ability. Given that PhDs normally address a narrow topic receipt of a PhD provides little indication of research competency. I know several scientists with PhDs employed to undertake research that have produced no developments over a research career. The number expands greatly if significant developments are considered.

I am unsure how logical ability can be reliably tested. Protocols exist for maths but not for general logic represented through grammar. My experience is that those with limited abilities fail to comprehend detailed logic thus few have the competency to evaluate others. The work doesn't make sense to them where they can't follow the logic and hence is regarded as being wrong. Essentially without exception the deficiency is assigned to the developer rather than themselves.

The ERIC test for employment addressed some of the requirements. A degree was essential but the discipline was of little consequence. The test involved implementation of procedures not previously experienced by them. It took applicants outside their specific training and so examined several requirements, a key one being the willingness to ask questions when unsure. It tested their ability to think and apply their existing knowledge to new situations.

Throughout some of university and all employment as a research scientist in CSIRO I found that thinking was discouraged. The requirement was to be active in producing results that did not upset the status quo. While I viewed research as coming up with something new the Division expected conformity with what existed.

My perception is that the current system is designed to train students in procedures other than thinking. Business wants certain skills and universities are determined to instil those skills into students. The training is in technical implementation of defined procedures rather than developing the thinking needed to address new situations. The approach is short sighted as the most effective means of addressing changes that inevitably occur is to train students to think.

Research facilitation

The requirement is to place the best researchers in positions where they can devise and implement research with adequate support and no interference by others. As those scientists should not be particularly active in management this requires very sympathetic and competent senior managers. Basically pie in the sky or pigs might fly.

I experienced a brief period when the requirements were met. Otherwise the best I could do was to isolate my activities from others through access to external funds where that had major disadvantages. However, the disadvantages were much less than having senior

management determine my research. Controlled by them I would have achieved less than them which would have been pathetic.

Cannot

Cannot is an oft abused word in science. If they can't do it it cannot be done. If the mechanism is unknown then it cannot work. If results are inconsistent then it cannot be right.

The first assumes they possess the requisite knowledge and expertise to make such assessments, which to those making such comment is axiomatic given their assumed status. Their stance indicates that both assumptions are wrong. The second assumes we must know all for something to work when mechanisms are usually deduced well after a discovery is made. Inconsistency generally identifies insufficient knowledge on the constraints needed for effective operation.

Such comments can be seen as putdowns used to maintain status, which they are. However, their use identifies an underlying deficiency of greater importance. Either their logical capacity is deficient or it involves intentional deceit.

Integrity

Progress in science arises through building upon existing knowledge and information and that is the reason for its efficiency. However, to be effective the reference knowledge and information must be reliable.

Science is conducted by humans for humans and therefore incorporates all human characteristics. It works well where scientists have good intent and focus on the production of good results. It fails where scientists focus on using the system for self promotion.

The general requirement is for scientists to make every effort to ensure that what they present is correct. While that cannot eliminate errors it would greatly reduce them.

It ultimately comes down to trust, or lack thereof. I have a blacklist of scientists I know have intentionally lied to sustain a position. Nothing they do or say is accepted until ratified by others. My select scientists do everything possible not to mislead.

PHILOSOPHY

I was recently informed that hypothesis testing had been a dirty word. I still fail to see why but it did explain a much earlier response to my work by my then leader. Science involves testing and there is little difference whether the test is applied to a proposition, concept, suggestion or hypothesis. A test must be applied to something and without testing science cannot exist.

The adverse reaction evidently related in some way to philosophical considerations of the scientific method. While I advocate consideration of philosophy such considerations become counterproductive if philosophy is allowed to dictate. Philosophy is a means of examining what one is doing and why, where such examination can be used to improve performance. Philosophy involves mind games and does not provide a definitive tangible means of conducting science.

Little is currently taught to science students on what the scientific method is. The method is simply illustrated by way of example applications. It is illustrated by way of procedures / process used to achieve the objective of determining something new. The applicability of the

approach and the potential availability of alternate procedures are not considered. Scientific research is addressed as simply being a technical exercise.

This mechanistic approach to science suites many as it essentially guarantees some form of result that can be published. The approach is tailored to achieving incremental gains but not well suited to new or complex problems. The research follows along the same path as others rather than breaking new ground.

In being designed to give an answer where the solution represents an extension of prior work the mechanistic approach is unsuited to addressing complex systems. The approach fails with complex systems as interactions prevent such linear projections having validity.

Various quotes address the situation. The mechanistic approach situates the appreciation when the requirement is to appreciate the situation. The method is inductive in projecting results from existing knowledge when deduction is needed to determine what the situation really is. It extrapolates from the known when interpolation is much more reliable.

In complex systems there is a need to consider the nature of the system by way of constraints and interactions before attempting to define the problem. While the objectives may have been set there is a need to consider the characteristics of the system before defining the problem to be resolved.

Philosophy ultimately comes down to thinking about what one is doing, and why. The thinking can be used to identify deficiencies in existing approaches and to develop alternatives. The philosophical conclusions are not of prime importance, it is the professionalism to think logically about what one is doing in as broad a context as possible.

Having said that it is still worth identifying some philosophies. Popper considered what constitutes an appropriate scientific method. Kuhn effectively describes the manner of conduct of science in the USA and focused on management. Some consider science simply represent a means of promoting commercial development while the opposite view has science being an undirected expedition of discovery of the natural world. Science should be constrained to address the utilitarian considerations of mankind or should be completely unconstrained as any work could produce useful results.

I fail to find much that is philosophical in many views and can only advocate thought about the issue without becoming involved in dogma. Science would certainly fail if forced to adhere to any existing philosophy.

SURREAL RESEARCH

On several occasions I have provided answers to questions where I had no conscious awareness that the issue existed let alone that I knew the answer. The answers were right, I just had no idea of how I came to know them. Identifying that matter is composed of energy is an example. The trigger for developing awareness was being asked the right question.

While in CSIRO I used this attribute to advantage deciding that I already knew the answers to most problems of interest and focused on gaining access to the subconscious information. I achieved considerable progress over the next few years but the rate at which I could access such information declined.

Considerable thought went into deciding that my subconscious had determined that matter is composed of energy as by then I was aware of energetic life forms and their abilities in controlling thought.

Looking at ancient history it is obvious humans had information they did not develop or comprehend. The 'big bang' is an example but there are many more. In being linked to religion there is no doubt that such information came from energetic life. I similarly have no doubt that many social constructs derive from information received from energetic life.

While the occurrence of transfer of information is clear the historic details are not. I cannot determine which energetic life form was responsible for particular pieces of information. I can only speculate, where the main conclusion is that information on the nature of the universe derived from Gods but was generally transferred to humans by other energetic life forms.

I have firsthand experience of the current situation. I received specific information on the nature of things from God2 where that is almost inevitably unique, at least for the last few thousand years. I also received training by God2 where that involved constructing devices responsive to the perfield amongst other things.

Support was also received by way of guidance. The Editor in Chief in God2 had me retain a comment on population control by China. Through this review He also educated me that the failure of ancient Egyptian agriculture arose from the climate change produced by their agriculture rather than salinity: Salinity was largely just one of the symptoms. I had previously come to the conclusion that climate change arose through desertification caused mainly by agriculture.[3]

Electros often amuse themselves by getting humans to do stupid things. In doing so they test the limits of Energetic Law that requires non-interference in the lives of other intelligent life forms. Being Electros that testing extends to the point of complete disregard for The Law or those they affect.

Contact with Joe Booker made it clear that his developments derive from Electros. The uncertainty I have is the extent to which the developments depend on energy input from Electros to function. Two circumstances arise, one where the Electros supply energy to make a device function, the other where they expend energy to stop functioning. With my observations on the perfield Electros have used both to produce spurious results.

Existing observations identify some of the amazing things that are possible. However, the involvement of Electros means that none can be reliably reproduced because the constraints under which they function are unknown.

My current situation is interference by Electros, information from Spirits, and guidance from Gods.

[3] One is made aware of a fault and not allowed to finished until you have things correct. The guidance identifies further consideration is needed with additional benefit arising from knowing that one option is wrong.

CONCLUSIONS

When commencing this paper I thought it could result in the identification of a comprehensive suite of procedures that define the scientific method. That has not occurred. Indeed, I fail to identify a philosophy that characterises the scientific method. It can be seen as failure at the general and specific level.

My response is relief rather than disappointment as it provides the freedom needed when exploring the unknown. Any attempt to constrain activities based on existing perceptions can only be counterproductive when addressing the unknown. There is also appeal in not providing ammunition to those that attempt to assert superiority by claiming something is not scientific.

The paper does provide benefits in identifying the importance of testing to establish limits to reliability. Without such knowledge there can be no progress. Identification that testing relates to negation rather than proof is critical. That alone negates adverse comments on the scientific method by many philosophers.

The last point relates to the question, what is the truth? It can't be answered as, even if there is a truth, there is no means of identifying that it has been found. Science operates by establishing a floating reference that we regard as the truth until disproven by observations. The new observations allow updating the previous perceptions such that they better accord with reality. The reality of course is an artefact constructed by us.

My great disappointment with science is the dogma that arises from an inability to comprehend the scientific method and/or attempts to manipulate the system to personal advantage. The conduct of science is by no means free and open as often cited, where most such constraints arise from the actions of individual scientists rather than society.

The upshot is that science has become so strongly tied with commercial considerations that most activity serves to support what already exists. Developments contrary to existing perceptions are strongly suppressed because they reduce the status of established scientists and commercial interests. The nothing new applies, as with Galileo having to recant and accept incarceration to remain alive, but it is highly counterproductive to society and science. It is also no fun being on the receiving end so any I criticise should only be surprised at the mildness of my comments.