
Suppression of Scientific Research: *Bahramdipity* and *Nulltiple* Scientific Discoveries¹

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Autoritätsdusel ist der größte Feind der Wahrheit. – Albert Einstein, 1901^{2, a}

He said that before there was biotech. – Anonymous, 1997

ABSTRACT: *The fairy tale The Three Princes of Serendip can be taken to be allegorical of not only chance discovery (serendipity) but of other aspects of scientific discovery as well. Just as Horace Walpole coined serendipity, so can the term bahramdipity be derived from the tale and defined as the cruel suppression of a serendipitous discovery. Suppressed, unpublished discoveries are designated nulltuples. Several examples are presented to make the case that bahramdipity is an existent aspect of scientific discovery. Other examples of non-ideal scientific research and discovery are provided in order to contrast and clarify the meaning and use of bahramdipity. Additional allegories of scientific discovery are taken from the tale and a hope for the strengthening of scientific integrity is expressed.*

a. “The stupor of authority is the greatest enemy of truth.”

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1. INTRODUCTION

Serendipity has been a popular theme in the literature of science.³⁻¹² Many important scientific discoveries have been made *serendipitously* or, in the terminology of Roberts,³ *pseudoserendipitously*. Serendip is the ancient name for Ceylon (Sri Lanka) and was the homeland of the Three Princes whose adventures are told in the fairy tale *The Three Princes of Serendip*. Horace Walpole came upon a translation of the tale and it inspired him to coin the term *serendipity* in a letter to Sir Horace Mann in 1754.

The Three Princes of Serendip is based on the life of Bahram V Gur, King of Persia (ca. 420-440 A.D.)^{13, b} as described in Firdausi's epic *Shahnamah* (ca. 1010 A.D.)¹⁴ and derivative works.^c

Rereading *The Three Princes of Serendip* in any of several more complete modern English translations gives one a better understanding of the Princes' accomplishments within extreme circumstances as well as the misfortunes of others less well known and not as lucky as they.^{19-24, d} These other characters, rarely if ever mentioned in previous discussions of serendipity, are themselves inspiring; inspiring to the point of suggesting that a new term be coined to describe another phenomenon of scientific discovery, very well known but little discussed. Although the phenomenon that we name here *bahramdipity* (defined below) is surely transcendent, this introduction is primarily concerned with examples from science.

A summary of the first and most widely told adventure of the Three Princes serves to characterize Bahram, King of Persia, their "host" upon their arrival there. While wandering in the desert, a merchant asks the Princes if they have seen his missing camel. Although they insist that they have not, they describe the camel so precisely that the merchant suspects them of camel theft. When they arrive in Persia, he has them arrested and they are brought before the king. When Bahram inquires if the merchant's tale is true they proudly acknowledge their cleverness to have identified the missing camel without ever having seen it. Without further inquiry, Bahram finds them guilty as charged and sentences them to death for camel theft with no opportunity for

b. Various transliterations as Beramo, Behramo, Vahram and others, Bahram was the name of several ancient Persian kings who, in their time, were each referred to as the "king of kings". Cammann reports that, according to the German scholar Theodor Benfey, Bahram "must surely be Bahram Gur, the Sasanian king Varhran V, who reigned from A.D. 420 to 440".^{13-p. 233}

c. The *Shahnamah* was revised and adapted by others, most famously by Nizami in his *Haft Paykar* (1197 A.D.).¹⁵ It appears that the Three Princes were not incorporated until the poet Khusrau, a Turk living in India, wrote his variation, the *Hasht Bihisht* (1302 A.D.), and embellished it with Indo-Persian folktales. Khusrau may have been influenced by *The Book of Sindbad*,¹⁶ the *Arabian Nights*¹⁷ or other folklore¹⁸ that had been popular in India for hundreds of years.

d. References 19-21 are partial English translations of Khusrau's *Hasht Bihisht*. Remer²² provides historical background and an original and complete English translation of the 1557 Italian original: *Peregrinaggio di tre giovani figliuoli del re di Serendippo; tradotto dalla lingua persiana in lingua italiana da M. Christoforo Armeno*. Cammann¹³ severely criticizes Remer's historical and linguistic scholarship but only provides brief synopses of some of the tales. Because we are more interested in the stories and personalities as allegories of scientific discovery, we quote from Remer herein.

appeal or protestation. Then Bahram explains, “Although I am inclined more toward clemency than severity, nevertheless I have decided to let you die shamefully if you are unable to produce the camel.”^{22-p. 62} Some contemporary scientific investigators are also generally given to such generous and forgiving self-characterization and to give such dispensations if their associates are “unable to produce the [desired results]”. While being marched through the streets to receive their unjust due, a citizen calls out to the camel merchant that he has seen the missing camel wandering lost in the desert. Suddenly aware of the innocence and truthfulness of the Three Princes, the merchant intercedes to prevent their execution and seek their pardon.

The Three Princes found salvation by the chance appearance of the citizen who stepped forward, completely unaware of their plight. Later, they gain even greater unsought (serendipitous) rewards from the king of kings who is now enamored of their sagacity.

Another incident in the court of Bahram further demonstrates his dogmatic, impatient, cruel and egomaniacal manner. Bahram has fallen in love with Diliramma, a slave girl he purchased from a traveling merchant. One day while hunting, Bahram offers to demonstrate his skill and Diliramma asks him to do so by shooting a deer in the hoof and ear with but one arrow shot. He uses a slingshot to braise the deer’s ear and then shoots his arrow while the deer is scratching its ear with its hoof. Although his court of sycophants praise his cleverness and skill, Diliramma criticizes Bahram for having resorted to trickery.

In his anger, the king has her bound and left in the woods as food for the wild animals.^e Ultimately, she is rescued from her plight and, after more adventures, is reunited with Bahram. Subsequently, she explains, “I challenged him to do what I was able to do, namely with a single shot to pierce both the foot and the ear of a deer. Because I was not considerate enough and dared to question his skill as a hunter, he decided that with my boldness I had insulted his honor.”^{22-p. 161} Diliramma’s method is never disclosed and, presumably, is left as an exercise for the reader.^f As many associate scientists are aware, it can be dangerous to question the skill or knowledge of a principal investigator (PI) bahram, even when they have discovered alternative solutions to problems and have them at hand.

The Princes gain further rewards from the king of kings when they help to reveal a plot against his life. A Counselor whose son had been put to death for “treason” (given Bahram’s capricious use of his power, the actual crimes may have been as legitimate as the Princes’ camel theft) plotted revenge. The plan to expose the Counselor involves the same sort of lies, infidelity and deception that Bahram is trying to eliminate. In this and other matters, Bahram seems to enjoy great success in obtaining the sorts of cooperation and confessions he wants to hear by threat of death. “So [Bahram] warned him that if he would not be sincere he would be forced to die.”^{22-p. 67} Often, research

e. In a variation of the hunting story, Bahram Gur knocks the maiden Azada (in some accounts the maiden is called Fitna¹⁵) to the ground and tramples her to death with his camel.^{14-Vol. 6, pp. 382-4, 25- p. 300}

f. Consider, for example, shooting *down* at the deer from a tree. At the correct angle, an arrow might pass through the deer’s ear and then the hoof. This author welcomes other suggestions.

associates feel that they must produce or report results that the head of the research project, the PI, is expecting. If the PI does not hear what s/he wants to hear, the consequences may be career ending for the associate. It is extremely rare that an established PI is even challenged about a possible impropriety in her or his laboratories. The counterexamples are so extraordinary that those that are not silently crushed become front page news.²⁶

To acquire his throne, Bahram Gur, backed up by an army of fierce Arab warriors, threatens the Persian nobles that he “will pound the life out of your chosen king of kings and slice off your heads” if they do not agree to his method for selecting the new king of kings. His method is a lop-sided trial of courage and strength against the elderly nobleman Khosrau to which the nobles agree and that Bahram Gur wins in due course.^{25-p. 303} For a scientific analogy, consider the plight of junior faculty (nobles) whose fear of tenure review inhibits their free expression of a scientific opinion.²⁷

Wearied while out hunting under the blazing sun, Bahram Gur is described as being in “ill-humour, being heated and desirous to rest himself in [a verdant hamlet].”^{25-pp.304-305} When the people there, perhaps not allowed by the king of kings to be wearied in *their* labors under the blazing sun, failed to properly salute him, he “became enraged” and instructed his counselor, “Let this ill-starred place become the resort of wild beasts and may the water in its stream turn to pitch.” The counselor implemented a clever plan and within a very short time this “flourishing town” was turned into a place of desolation. Passing by one year later, Bahram Gur felt sorrow and said to his counselor, “How sad that so pleasant a village should have become a desert. Quickly set about restoring it; spend money so that they shall no further suffer misery.” The king of kings appears to be oblivious to the fates of the people that he caused to perish or to flee from the village.

According to other sources,²⁸ the historical Bahram Gur continued the practice of his father, Yazdegerd the Sinner (also translated as “the Wicked”²⁹) to persecute religious sects in his realm. Bahram Gur does have some leadership traits and redeeming accomplishments in matters of state as a despotic ruler of ancient Iran, but the personal character of the historical Bahram is certainly consistent with the definition of *bahramdipity* proposed herein.^g

g. The historical Bahram Gur is said to have gone through three stages in his life: (1) rambunctious, carefree, spoiled youth (2) cruel despotic leadership (3) “enlightened” leadership. His enlightened leadership was still very cruel and despotic, but the scene is ancient Persia where it was the norm to trample a maiden to death if she spoke out of turn.^{30-p. 435, 31-pp. 199-236} This is to make the point that “once a bahram, not always a bahram”. We also know from our experiences that some may be bahrams to some associates but angels of mercy to others. “Part bahram, but not 100% bahram” may also be true. We are all human; we all go through stages; and we all defy complete characterization by a single simple term.

Incidents such as these that reveal the character of the all powerful Bahram suggest another eponymous term to supplement and, in some ways, complement serendipity: *bahramdipity*.^h A formal definition is proposed:

bah·ram·dip·ity (bă' rōm dip' ə tē) *noun*. 1. The suppression of a discovery, sometimes a serendipitous discovery, by a more powerful individual (bahram) who does cruelly punish, not merely disdain, a person (or persons) of lesser power and little renown who demonstrates sagacity, perspicacity and truthfulness to the bahram. 2. The self-serving promotion of an often unreliable discovery and its discoverer by a more powerful individual (bahram). [From Bahram of Persia, as characterized in the fairytale *The Three Princes of Serendip*. cf., serendipity.]

2. A WIDE RANGE OF EXAMPLES

Examples should clarify the concept of bahramdipity to people in all walks of life, not just those in science, and enable them to recognize the intended usage of this term. Actual instances of bahramdipity are certain to be difficult to fully document due to the paradoxical nature of true suppression and the nature of scientific discourse. This author condemns conspiracy theorists, quackery, cargo cult scienceⁱ and other forms of fringe or pseudoscience. *Bahramdipity should not be used to describe the suppression of non-verifiable, certifiably false claims of misguided or deliberately deceptive researchers.* There are many accounts of such works.³³⁻³⁷

Occasionally, while trying to suppress legitimate works with one hand, various bahrams in their fields have endorsed and promoted the incompetent, the false and the fraudulent with the other, usually when it serves their own purpose. There are many well known scientific cases: the endorsement of Summerlin's patchwork mouse as a spectacular breakthrough at Sloan-Kettering, Efraim Racker's paternalistic embrace of Mark Spector at Cornell, and John Long's rapid rise through the ranks at the Massachusetts General Hospital were all shown to be without merit.³⁸

It is important to keep in mind that there are many examples of pseudobahramdipity. We only know of them because the affected individuals ultimately escaped from a bahram's gallows and overcame banishment from their chosen fields or were otherwise exposed. We will never know of those that perished

h. Although the Serendip:serendip-ity derivation might suggest Bahram:bahram-ity as a more analogous term, this author feels that Bahram:bahramdipity more closely associates the construction with Walpole's inspirational source, sounds better alone, and makes for a more euphonic word pair. We thank Dr. Ann Haestier for entertaining discussions of this point.

i. The misguided practice of science through ritual rather than with real scientific understanding and complete integrity. See Feynman's essay.³²

because they lacked a more powerful patron^{39-46, j} or were not fortunate enough to have chance intervene on their behalf or have not yet been exposed.^k

So, is it also the case that in science, just as in business, the arts and other fields, that powerful individuals can suppress or even punish perspicacity, diligent attention to detail and truthful analysis and reporting of data? Of course so. Is science a rational, data driven pursuit devoid of ego and emotion? Of course not.^{52, 53} Bahrams of Science are no different than any others.

In his highly cited paper, Bernard Barber discussed some aspects of the resistance of scientists to new ideas.⁵⁴ Interestingly, he notes that this sort of resistance had not been systematically studied as of 1961 and, “If nowhere else we should find it in the writings of those scientists who have suffered from resistance on the part of other scientists.” His examples, however, were all giants of classical science (Helmholtz, Mendel, Ohm, Planck, Maxwell, etc.), every one of whom went on to achieve great fame.

Barber further states that, “Sometimes, when discoveries are made by scientists of lower standing, they are resisted by scientists of higher standing partly because of the authority the higher position provides.” This, of course, would seem to be obvious (especially to Helmholtz, et al.) and is one of the more general tenets (resistance to a paradigm shift) of Kuhn’s monumental work, *The Structure of Scientific Revolutions*, that now permeate our contemporary consciousness.⁵⁵ When resistance rises to abusive and destructive levels it is bahramdipitous. Modern scientific PIs should not have to be bahrams in order to protect their realms today ... or maybe our civilization hasn’t advanced as much as we’d like to think.

j. (a) During his training, Thierry Boon, eventually Head of Cancer Research at the Ludwig Institute, developed a reputation for defying his PIs. He also had the good luck to have been born into a family that was close friends with Nobelist Christian de Duve. Instead of being banished to obscurity, de Duve’s patronage helped him to land safely in the laboratory of Norman Zinder at Rockefeller University.^{47-p. 356.} (b) Molecular biologist Mark Ptashne, discoverer of the lambda repressor, clumsily destroyed equipment and experiments in his early laboratory experience. Fortunately for him, it was the laboratory of a family friend who did not throw him out and thus put an end to his scientific aspirations. At Harvard, his mentor and patron was James D. Watson.⁴⁸ (c) Nobelist P. B. Medawar said, “It was, indeed, Good’s patronage [...] that made it possible for Summerlin to have a career at all.”^{38-p. 156} (d) In a letter to his fiancée, Ernest Rutherford said, “If one gets a man like J. J. [J. J. Thompson, Cavendish Professor of Physics at Cambridge] to back one up, one is pretty safe to get any position.” Years later, when Rutherford was Head and wanted to throw J. D. Bernal out of the Cavendish Labs, it required the intervention of Bernal’s patron, Nobelist W. L. Bragg to save him.⁴⁹ (e) Nissani presents over 50 examples of the struggle for recognition or to publish. Several clearly involved the intervention of a patron.⁵⁰ (f) See also the example of Beatrix Potter in Section 3.2, below.

k. By drawing analogies from fantasy literature such as *The Three Princes of Serendip*, it is acknowledged that some are saved purely by chance or “fate”. In reality, many take action to overcome their circumstances; some succeed by dint of that effort alone; others remain mired in spite of it. For a fictional example, see reference 51.

3. EXAMPLES OF BAHRAMDIPITY—ACTUAL OR NEAR SUPPRESSION

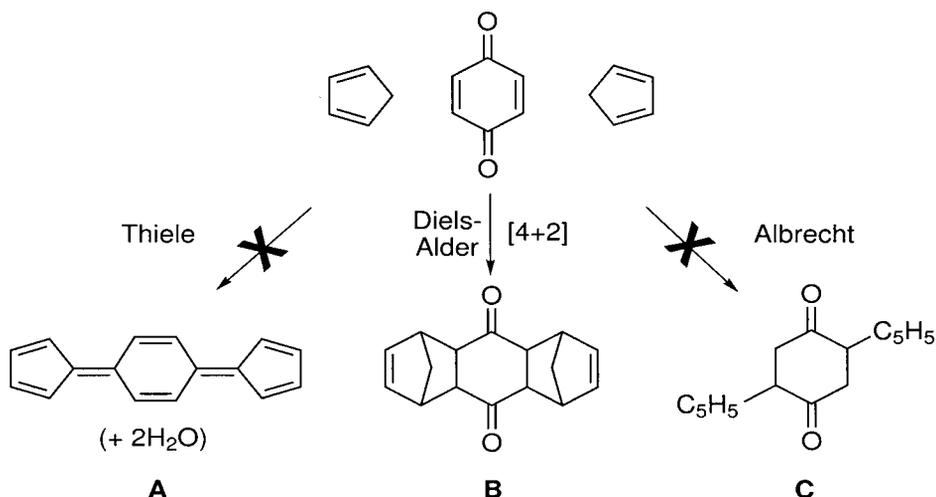
Documenting examples of bahramdipity is a difficult task. It is a category of Catch-22.¹ Yet, many individual scientists know of isolated cases. With the examples and discussion here, we hope to come close to the true meaning of bahramdipitous suppression and we hope that others will help to bring additional cases to light.

3.1 The Albrecht [4+2] Cycloaddition

Thanks to the historical researches of chemistry professor Jerome Berson, we are now more informed about the discovery of one of the most important reactions in synthetic organic chemistry, the Diels-Alder cycloaddition reaction.^{58, 59}

Near the turn of the 19th century, in the laboratories of Johannes Thiele at München, it seems that Walther Albrecht studied the double condensation of cyclopentadiene with quinones. In so doing, he appears to have properly collected and analyzed his data sufficiently to have undermined Thiele's hoped for double condensation product **A** (note the requirement for the loss of two molecules of water) (Figure 1). Albrecht is the sole author of the paper describing the work and Berson could not locate any other references to Albrecht in the ensuing ten years of *Chemical Abstracts*. It is as if Albrecht had died.

Figure 1: The Thiele-Albrecht Experiment



1. "A problematic situation for which the only solution is denied by a circumstance inherent in the problem."⁵⁶ If we know about a discovery, it is not suppressed, so it cannot be a case of bahramdipity: a type of paradox. From Joseph Heller's novel *Catch-22*.⁵⁷

Based on what Berson reports, one can speculate further about Albrecht's circumstances. If Albrecht did not die, is it possible that:

- rather than merely report what Thiele wanted to hear regarding the outcome of his reactions, Albrecht incurred Thiele's wrath and reported the truth? [The camel story.]
- Thiele cast out Albrecht for undermining his condensation theory? [The Counselor.]
- given more time to accumulate data, analyze or just ponder his results, Albrecht would have deduced the correct structure **B**?^m
- following the independent publication of his results, Albrecht was unable to continue in chemistry? [Diliramma.]
- Thiele was a bahram who sent Albrecht to the gallows of an aborted career? [The Counselor's son.]
- Albrecht was left bound and unprotected in the insular forest of chemistry professionals because he dared to challenge Thiele's skill and theories? [Diliramma.]
- Albrecht was perhaps given the chance to recant his blasphemy and tell Thiele the "truth" that he wanted to hear in support of his holy doctrine of condensation reactions and thus gain the admiration and support of Thiele? [The Counselor.]

The answers are, perhaps, yes.

Berson's article does in fact lend support to several of these possibilities. "It seems reasonable to speculate that Thiele was quite disappointed with the outcome of Albrecht's experiments."^{58-p. 10} Berson reached this conclusion based on the writings of Straus⁶⁰ and Willstätter.^{61, 62}

Quoting from Berson's translation of Willstätter's autobiography, "It seems to me that Thiele – in the style of the scientists after Baeyer – was more gifted to command than to listen. [...] [With Thiele as head of the department, m]ilitary discipline ruled."^{61,62} "A weakness of [Thiele's diene] work, which later led to some disillusionment, lay only in the generalization that these systems *must* [Willstätter's emphasis] add at the ends. In truth, the unsaturated system can add this way, but there exist other cases of addition at adjacent carbons."^{61, 62}

Berson, translating from Willstätter: "The ascent to the heights and the beginning of his decline came in the time of his nine years at Munich. Was the cause of his alteration that Thiele lacked the strength to correct his mistakes, or did the weakness of this strong man, that he could not admit error, bring about the early conclusion of his scientific development? Toward the end of his time in Munich, Thiele encountered important examples of additions that did not follow his rule of 1,4-addition and in fact contradicted his published experimental statements. These results were difficult for Thiele to bear."^{61,62}

Difficult for Thiele to bear!! And what consequences did Albrecht have to bear? How bahramdipitous!

m. Every PI will legitimately rebut, "How much time? How much more data?" and so on. Indeed, resources are usually not unlimited and difficult decisions about research projects often have to be made. Such decision-making in science and other disciplines is done best when based upon honest and accurate information.

Thanks to Berson's article, Albrecht has risen ever so slightly out of chemical obscurity. How many more "Albrechts" attempted to pass through Thiele's gauntlet but with even less notoriety than Albrecht? How many others working in other research groups for other PIs who, lacking the stature of a Galileo or Vavilov (v.i.), were subjected not to an actual Church mandated Inquisition or a State sanctioned execution but were merely unfairly banished to the scientific outlands because they had standards that would not be compromised?

3.2 Historical Examples

Thiele may not have been atypical of the old German school of scientific research.ⁿ Hans Krebs admired Otto Warburg's scientific genius but he also recognized Warburg's autocratic, egotistical and even malicious behavior. Although full details are lacking, Krebs reports, "[Warburg] once dismissed a research worker on the spot, when he thought the man had not shown him proper respect and courtesy." [recall Diliramma or the verdant hamlet].^{40-p. 33} What could have precipitated this impetuous expulsion? Warburg's work was subject to occasional heated controversy.⁶³ Could the researcher have dared to obtain an experimental result that did not support one of Warburg's theories or questioned Warburg on a scientific point? Could the researcher have defended his honesty and ability against some *ad hominem* attack but, lacking the stature of Willstätter or Wieland or an independent position of his own, found himself with no position at all?

In analyzing the discovery of somatostatin, Latour recounts that after obtaining a negative result, "Guillemin gives his [subordinate] collaborator, Paul Brazeau, who has done the experiment, a good dressing down. [Everything] is called into doubt, and the whole career of Brazeau, supposed to be a skilled and honest worker, is jeopardized."⁶⁴ Fortunately, events unfolded that allowed for vindication of Brazeau and a share of the Nobel Prize for Guillemin. Nevertheless, Guillemin is presented as a PI who would have bahramdipitously cast off Brazeau.

By his recklessness with data and with people, Nobelist Carlo Rubbia is said to have driven many young physicists out of science.⁶⁵ One co-worker likened Rubbia to a black hole "warping the universe around him".⁶⁵ During crucial periods of data analysis and interpretation Rubbia suppressed staff scientists and students who tried to present evidence that his proclamations about the discovery of supersymmetry were erroneous (as was the case). Rubbia is presented as a bahram with a powerful *bahramdational field* warping the integrity of scientific research within his sphere of influence.

As a young woman, Beatrix Potter, better known as the creator of Peter Rabbit et al., tried to present her insightful paper on lichens to the authorities of the Royal Gardens at Kew. About one of her encounters there she noted that, "I am afraid I contradicted him badly." It was only by the intervention of her influential uncle, the chemist Lord Henry E. Roscoe, that she was eventually able to have her paper

n. See also Abderhalden and Michealis in Section 4.4 below.

presented before the London Linnean Society.⁶⁶ Eventually, her correct analysis of lichen biology prevailed but she still could not penetrate the barriers to scientific society, perhaps to the benefit of millions of children around the world who have enjoyed reading the tales of her storybook society.

Cecilia Payne encountered bahramdipity but escaped banishment by compromising her integrity. She originally presented a thesis with her conclusions regarding the observed hydrogen abundance in stars. However, she had to rewrite those conclusions in order to get her thesis approved by astronomer Henry Norris Russell. Her original and correct analysis contradicted the theories of Sir Arthur Eddington and Russell. Although she changed her thesis under duress, privately she stuck to her own conclusions.^{67, o} Wynne might describe Payne's decision to knowingly write what she knew to be untrue to be a case of "situational adjustment".^{37, p} But didn't Summerlin, Long, Darsee and others later debunked as frauds³⁸ also hide behind the shield of "situational adjustment"?^q

Established researchers are – or should be – even more resistant to making such situational adjustments. An example of attempted suppression at Sloan-Kettering arose around Kanematsu Sugiura's laetrile research on mice in the 1970s.⁷¹ Sugiura, a dedicated researcher for more than 60 years, admirably stood by his limited claims regarding tumors in mice. In the face of institutional challenge, he declared, "I stick!"^{71-p. 154} and "I try my best. I report what I see."^{71-p. 176, r} Sugiura's career was already coming to a close. A junior researcher might have buckled or been banished. As it happened, Ralph Moss lost his position at Sloan-Kettering for his public statements regarding the suppression of Sugiura's results. Moss discusses other examples of cancer research, some of which may be bahramdipitous or pseudobahramdipitous, e.g., the early promotion of Summerlin's patchwork mouse.

Writing about Genetic Systems and the early days of biotech, Teitelman tells of an incident in which a senior scientist was making an important presentation about one of

o. We do not address questions of prematurity (Section 4.2) or whether or not suppression of Payne's results held back progress in cosmology.

p. For another treatment of the difficulty of "Saying What You Believe", see the work of G. Moran.^{68-pp. 89-100} The differences between Western and Soviet or Nazi science are too extreme for discussion in this context. In Nazi Germany, one adjusted or perished.⁴⁰ In the Stalinist U.S.S.R., one adjusted or died.⁶⁹ Soviet pseudo-science goes far beyond bahramdipity. (See Section 4.1.)

q. There are many "little tricks" or adjustments that researchers use to impress their PIs.⁷⁰ Among those reported by Hall are: (1) always leaving one overcoat in the lab to give the appearance that you are there, even if you've stepped out or gone home and (2) setting up phony experiments to give the appearance of doing more work than is otherwise possible. Two boggling aspects of these behaviors are that (1) very intelligent Ph.D. candidates actually believe that their PIs, who were themselves graduate students in very similar circumstances, do not know these tricks and will be fooled by them and (2) very intelligent PIs *are* fooled by these tricks and often look negatively on those students whose coats are gone and who appear to run fewer experiments than their peers.

r. Sugiura's laetrile results were eventually published amid the controversial counterclaims in the *Journal of Surgical Oncology*.⁷²

the company's products.⁷³ To allay her obvious concern, a company officer assured her that she should tell the truth but, "She then started telling me about how scared she was [to tell the truth]. [...] She got up and told the truth; the system wasn't working." The Scientific Director interrupted, took over the presentation and, "after the meeting, he took her aside and beat the hell out of her verbally. I began to realize then that that was his technique. You don't step out of line."^{73, s} The fate of the senior scientist is not disclosed, but it may have been bahramdipitous.



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One might further wonder if contemporary biotech hype is based on the honest reports of scientists or the inflated promises of those with vested interests.¹

A 1999 account of a senior investigator berating and striking a female subordinate and *her* subsequent dismissal is eerily reminiscent of Bahram's treatment of Diliramma.⁷⁵ Like Bahram Gur, the scientific bahram continued to thrive in his domain without professional repercussions.

s. Although a failure in many ways, Genetic Systems made its founders multimillionaires. Many years later, some of those involved faced criminal charges relating to fraudulent business practices.⁷⁴

t. A portion of a typical financial statement might read something like this:

Statements contained in this Report may constitute "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. For this purpose, any statements herein that are not statements of historical fact may be deemed to be forward-looking statements. For example, the words "believes", "anticipates", and similar expressions are intended to identify forward-looking statements. Such forward-looking statements are based *on management's* [emphasis added] current expectations and involve known and unknown risks, uncertainties, and other factors which may cause the actual results, performance or achievements of the Company to be materially different from any future results, performance, or achievements expressed or implied by such forward-looking statements. These forward looking statements are subject to a number of uncertainties and other factors, many of which are outside the Company's control, that could cause the Company's actual results to differ materially from those indicated by such statements. [...]

For a more complete discussion of the factors that could cause actual results to differ materially from such forward looking statements, see the discussion thereof contained under the heading "*Management's* [emphasis added] Discussion and Analysis of Financial Condition and Results of Operations." [...]

A graduate student in France, facing threats and false accusations, was offered a chance by his supervisor to complete his studies in Germany.⁷⁶ After denying the accusations and refusing to go to Germany he was then turned out of his office. He was denied access to his two years of research results which were, according to the article, relegated “to oblivion”. The student pressed legal authorities for an investigation saying, “In France, there does not exist any possible recourse for a Ph.D. who finds himself in conflict with his supervisor.” The French embassy, the FBI and French police investigated the charges and have placed the professors involved under “formal investigation”.^u The case remains under investigation by French authorities.^v (See Note Added in Proof, page 98)

While trying to advance the interests of his private software company, there were allegations that a professor of computer science was forcing his students to do work for that enterprise.^{77, 78} The same professor became embroiled in a subsequent incident in which he was accused again of using coercion, this time to force students to do the work of striking staff. He warned them, “If you refuse to help in this regard, I am sure that there will come a time when the help you need may disappear as well.”^{79, 80} Might a bahram also say, “If you refuse to provide the desired results ...”?

Such threats, real or only implied by a bahramdipitous reputation, can influence a student’s ethical conduct in academic and professional matters or result in dire consequences should an undesired result be disclosed.

3.3 Anecdotal Examples

Historical examples of bahramdipity can be extremely difficult to document. Krebs and other biographers and historians did not set out to facilitate documentation of bahramdipity.⁵⁰ Based on knowledge of other cases and the experiences of others, one must reasonably speculate about the comparatively minor incidents touched upon within the larger context of those works. Further, if suppression was successful it follows that it shall remain suppressed! In addition to previously cited examples, bahram-like behaviors have been discussed in many other accounts.^w

Contemporary and immediate examples of bahramdipity should be easier to learn about but almost always only by anecdote. Many who know of examples will only share them in strict confidence out of fear of jeopardizing their own careers. This is not just a matter of the lack of protection for dissenters or “non-adjusters”. Sometimes, research associates who compromised their own integrity to ameliorate a wrathful

u. This indicates that the preliminary investigation has advanced to a “formal investigation” which seems to be just short of being formally charged under U.S. laws.

v. The substance of the dispute does not appear to be scientific but the ensuing actions and *academic* consequences reveal the measures that some authorities may take to suppress dissent of any sort.

w. For example, Almoth Wright at St. Mary’s, James Ewing at Sloan-Kettering and Robert Gallo of the National Institutes of Health (NIH), as discussed in *A Commotion in the Blood*.⁴⁷

bahram to protect or propel their own career cannot ever admit to their complicity without risking their current position or reputation.^x

Other examples of bahramdipity and related intemperate and boorish behaviors among scientists may be found in numerous works of science-in-fiction⁸⁵⁻⁹¹ and other literature.^{92,93} Some have acknowledged autobiographical or factual components in such works.^y

Sometimes, truth is stranger than fiction. In an incident that eventually led to his dismissal, a tenured chemistry professor at Rutgers University subjected several students to abuse and coercion outside the laboratory.⁹⁵⁻⁹⁷ No allegations of scientific misconduct surfaced but his enormous power over his students derived from the laboratory relationship which might also have been tainted by the students' sense of need to satisfy the bahram or face dismissal and deportation.

If real cases of bahramdipity can be brought to light contemporaneously with their occurrence it may help to diminish bahramdipity elsewhere. One mechanism to achieve this may be by the establishment of scientific ombudsmen.^{98, 99}

3.4 Bahramdipity and Nulltiple Scientific Discoveries

Bahramdipitous discoveries are frequently serendipitous to the researcher but undesirable to the PI, undermining, it would seem, the design of the PI's theories and experiments. As such, the confluence of circumstances that allow the discovery to be made may not ever be repeated elsewhere. This is in contrast to many rational discoveries that are often made independently by researchers disparate in time, place and intellectual and cultural milieu. The nature of such replicated discoveries, or multiples, has been described in detail by Merton.^{100-pp. 281-412}

Bahramdipitous discoveries are suppressed or not even allowed to be completed or verified.^z They are almost always not published in the normal peer reviewed literature

x. A noteworthy exception is that of Peter Seeburg, currently director of the Max Planck Institute for Medical Research in Heidelberg. During litigation in which the University of California, San Francisco (UCSF) sued Genentech for infringement of their human growth hormone (HGF) patents, Seeburg admitted that he took DNA samples from his former lab at UCSF while he was working at Genentech. He also admitted that the paper describing his HGF work at Genentech falsely described the origin of the materials. In an out of court settlement, Genentech agreed to pay UCSF \$200 million. Of that amount, Seeburg is expected to receive ca. \$17 million as a UCSF coinventor.⁸¹⁻⁸³ Following the settlement, the Max Planck Institute issued a formal censure of Seeburg for falsifying the paper, an action that basically has no professional repercussions whatsoever.⁸⁴

y. (a) The villains fictionalized in *The Tempter*⁹⁰ are A.T.&T. and Michael Pupin of Columbia University.⁹⁴ (b) Paul de Kruif lost his scientific research position at Rockefeller Institute after a disagreement with his superiors shortly before undertaking to advise and collaborate with Lewis on *Arrowsmith*.⁹¹

z. By "completed" we mean brought to a publishable or publicly defensible conclusion. A chemistry result might be *scientifically* conclusive (e.g., by proton nuclear magnetic resonance (NMR) spectroscopy) but many journals have requirements for full characterization (including proton NMR, carbon-13 NMR, infrared, ultraviolet, mass spectroscopic and elemental analyses) of

and remain undiscovered by others.^{aa} They are in a special class that we call *nulltuples* for multiples of zero.

null-tuple (nŭl'tə-pəl) noun. A scientific discovery published zero times.

Many successful scientists do not publish every research result. Merton notes Cavendish, Gauss and some others.¹⁰⁰ Berson adds the case of Oosterhoff who chose not to publish his own theories of orbital symmetry that explain the Diels-Alder and other reactions.^{58,59} Consequently, Oosterhoff missed sharing the preponderance of credit for that discovery.^{bb} These unpublished works either turn out to be multiples or are only uncovered during posthumous examination of papers *if the PI is famous enough to warrant such study*. Various non-bahramdipitous reasons why PIs choose not to publish a research result have been discussed by Merton¹⁰⁰ and others^{101, 102} and will not be discussed here.

It is relatively easy and commonplace to study the impact of *published* papers using *Science Citation Index (SCI)*.¹⁰³ Highly cited authors are solicited to describe their experiences which sometimes include stories of how their most important works were initially rejected.^{cc} As explained by the drunk searching for his car keys in the classic joke, it is easiest to search where the light, *SCI*, shines best. Searching for the unpublished accounts of discoveries of scientists whose careers have been derailed can be more than difficult. No journal or index tracks *nulltuples*.⁵⁰

4. CLARIFYING BAHRAMDIPITY— OTHER ABERRATIONS OF SCIENTIFIC DISCOVERY

Not all of the examples in Section 3 are true bahramdipity, but most come close. It is intended that bahramdipity apply to situations that are: (1) Hierarchical (PI-subordinate), not Peer (author-referee); (2) Personal, not Institutional;^{dd} (3) Direct, not

compounds or repetition with a minimum number of examples in order to publish. Such experiments require time and resources.

aa. This assumes, as stated previously, that bahramdipity is not a widespread phenomenon and that the chance of a serendipitous discovery being made on multiple occasions and also being multiply suppressed is small.

bb. Roald Hoffmann and Kenichi Fukui shared the 1981 Nobel Prize in Chemistry for their description of orbital symmetry.

cc. See, for example, papers by Campanario.¹⁰⁴⁻¹⁰⁶ In a personal communication, Prof. Campanario notes that he is currently preparing further studies of recent Nobel laureates and has brought to our attention studies of initial rejection in economics by Sheperd.¹⁰⁷

dd. Ziman has pointed out that some of Moran's cases of alleged suppression are actually cases of *rejection* subsequent to exposure to and discussion among the scientific community.¹⁰⁸

Disguised; (4) *Ad hominem*, not Scientific; (5) Private, not Public; (6) Cases in which the subordinate is unknown or without an independent position or *relatively powerless*.

To discourage misuse of the term *bahramdipity*, some other aberrations of scientific discovery are presented for clarification.

4.1 Revolutions, Inquisitions and Lysenkoism

Galileo was an extraordinary scientific figure of his day and a lasting figure in history. His restatement of the heliocentric theory was insightful but enraged the “bahrams” of The Church. In 1633, Galileo was compelled by the threat of death at an Inquisition to recant his theory because The Church decreed it blasphemous to its own Truth. This sort of institutional attack on science is not bahramdipity.^{ee}

After Galileo, science grew at a rapid rate.¹¹⁰ It has become far less extraordinary to be a scientist in modern society. Usually, it is possible to do scientific research and maintain one’s integrity, except, perhaps, under bizarre or Kafkaesque circumstances.³⁸

In chemistry, consider the fate of Joseph Priestley who had to flee from his home in England because of his religious and political beliefs, not his scientific beliefs. He went to the United States and continued his research in seclusion. Antoine Lavoisier was a victim of the guillotine in 1796 because of his counter-revolutionary position as a tax collector for the deposed monarchy. The careers of these two great chemists were derailed for their actions and beliefs outside of science. Although tragic, this is *not* bahramdipity.

Examining the discovery of the relationship of *Helicobacter pylori* to peptic ulcer, Blum discusses the religious intolerance experienced by Jewish gastroenterologist Ismar Boas and says, “I have already discussed how belonging to a suppressed minority sharpens the perception for the extraordinary. *Yet, there are other, less painful approaches* [emphasis added].”^{12, ff}

One of the most insidious examples of unjust punishment for adherence to scientific principles is known by another eponymous term: Lysenkoism. Trofim Denisovich Lysenko, the bahram of Soviet Agriculture under Stalin and Kruschev, eliminated the opponents of his anti-science by imprisonment or death. Many dedicated Soviet scientists, chief among them N. Vavilov, were killed or exiled to the gulags.¹¹¹ *Lysenkoism is also too extreme to be considered bahramdipity.*

ee. Among Galileo’s patrons and protectors were Grand Duke Cosimo II de Medici and Pope Urban VIII. For one of many recent biographies, see Biagioli.¹⁰⁹

ff. Blum continues, “For example, the three princes were traveling when they made their chance discoveries in Serendip [sic]. Traveling, like pain and anguish, improves our perception of the extraordinary. Humor, the ability to recognize the funny aspect of one’s failures, may prevent the vicious circle of ‘giving up – given up’. [...] The most important attitude is to refuse strict methodological rules and to maintain a solitary view of science.”¹² In the less institutionalized, more personal cases of bahramdipity, it would also be welcome if bahrams could employ “less painful approaches” to stimulate their subordinates’ perception and creativity. Or, in those cases where bahrams would rather *suppress* perception and creativity, they could use less painful ways to do this or even redirect it more productively.

Let Lysenkoism and inquisitions continue to refer to such incontrovertibly heinous actions. It is the intention that bahramdipity apply to serious but less severe cases of purely egomaniacal behaviors that dot the modern scientific landscape. *Perhaps bahramdipity is but one step down the path to Lysenkoism.*

4.2 Premature Discovery

Gerhard Stent introduced and others have elaborated upon the idea of *premature discovery*.¹¹² A frequently cited example of premature discovery is Oswald Avery's proof that DNA is the substance of genetic inheritance.

Ludwik Gross was an established researcher at Memorial Hospital (now Sloan-Kettering) when he showed that a filterable component from the organs of cancerous mice would cause cancers to form when injected into immature cancer-free mice. Gross's results met with considerable resistance, typical of prematurity, but also considerable *ad hominem* attacks on his integrity, characteristic of bahramdipity (but for his already established scientific reputation and career).¹¹³

Eventually, his results were validated by the careful experiments of others. Ultimately, because of the work of Gross and others the viral origins of some cancers gained acceptance and Peyton Rous, who had first proposed the idea in 1911, received the Nobel Prize.

As a physics graduate student, Subramanyan Chandrasekhar predicted the limit of stability of cold stars (the *Chandrasekhar Limit*), a result that eventually led others to be able to predict the existence of black holes. For this he received the Nobel Prize in 1983. However, "[t]he hostility of other scientists, particularly Eddington, his former teacher and leading authority on the structure of stars, persuaded Chandrasekhar to abandon this line of work ..."¹¹⁴

Avery already had a career and respectable reputation but was deprived, some say, of a Nobel Prize. After taking up research more to the liking of Eddington, Chandrasekhar went on to have a highly distinguished career. Chandrasekhar encountered prematurity but escaped bahramdipity.

4.3 Post-mature Discovery

Post-mature discovery, as described by Zuckerman and Lederberg, would not seem to be the result of deviant behavior.¹¹⁵

An example may be the discovery of the disease fighting utility of antibiotics.¹¹⁶ There were numerous independent evidences of the bacteriocidal properties of various cultures long before Fleming's more noted observations and conclusions regarding penicillin in 1929. Some consider that gramicidin (developed by René Dubos) should take precedence over penicillin.¹¹⁷

However, decades before Chain, Florey or Dubos, the therapeutic effectiveness of *Penicillium* mold extracts against staph and other infections in rabbits and guinea pigs had been reported by Vincenzo Tiberio.^{118, 119} Based on those documents, it seems that penicillin was the first antibiotic with demonstrated therapeutic (Tiberio) and clinical

(Chain and Florey) utility. No doubt, the enormity of the antibiotic record will continue to accommodate considerable dispute over primacy and the sharing of credit.

To return to the more intensively studied case of Fleming, it may be argued whether his discovery was or was not post-mature, but it was certainly contra-bahramdipitous. Fleming did his work at St. Mary's Hospital in the department of Sir Almroth Wright. Wright would seem to have been a bahram, feared by many under his authority, few of whom dared to question his word or to incur his wrath, especially in the area of infectious disease where he was vehemently opposed to chemotherapy and in favor of vaccines. Fleming fortuitously side-stepped Wright's scientific wrongs and went on to great success.^{gg}

The identification of fullerenes by Smalley and Kroto at Rice University in Texas in 1985 is another post-mature discovery.^{120,121} The soccer ball structure of the C₆₀ carbon cluster had been discussed in the theoretical literature at least as early as 1971 by Eiji Osawa. Rohlfing's group at Exxon had observed the C₆₀ carbon clusters in their experimental work which predated the Texas group but, with many more even numbered clusters in their mass spectroscopic data, they postulated linear chains.^{hh}

The recognition of *H. pylori* as a cause of peptic ulcer¹² and proof of the random nature of mutation in the bacterial genome by Luria and Delbruck¹²² are two more examples of post-mature discovery.

4.4 Autoritätsdusel

Einstein's eminent scientific status and grand eloquence render his assessment that "The stupor of authority is the greatest enemy of truth," one of the more noteworthy expressions of that concept.² Many others, before and after, have expressed the same idea. Ziman says of Haberer's term " 'prudential acquiescence', besides being ignoble is disastrous."¹²³ On an almost daily basis, Scott Adams's syndicated cartoon strip *Dilbert* humorously suggests that management is in a stupor.

Leonor Michaelis encountered a variant of Autoritätsdusel (the stupor of authority) early in his career in Germany. Having published a paper undermining the reliability of Abderhalden's pregnancy test (which was itself established on data now regarded as

gg. Noteworthy quotes, from Kohn's *Fortune or Failure*¹¹⁶ : (a) "... [the hospital laboratory which Wright] directed in the spirit of enlightened despotism." (b) "[Wright] disliked those who did not support this view [of fighting infectious disease with immunization, not chemotherapy], and no member of the laboratory would dare to argue with this concept." (c) Chain himself wrote that, "in the Wright atmosphere of St. Mary's the mere thought of replacing immunotherapy by chemotherapy was considered absolute blasphemy. I think if this atmosphere could have been a little less despotic and people less prejudiced against the new concepts, Fleming" [might have investigated the curative power of his penicillin in infected animals.]

hh. Koruga, *et al.*,^{120-p. 16} say of the Exxon group, "Strong in the experimental realm but weak in theory and imagination, they lost primacy in this field." However, this judgment seems rather severe and undeserved. In fact, the Exxon group had the imagination and wherewithal to conceive of and implement the experiments to produce large carbon clusters before the Texas group and even helped to build the apparatus at Texas. The early Exxon data was not as clean as the Texas data and did not inspire *the same kinds* of imaginings as the Texas group.^{120, 121}

fraudulent) his academic career in Germany came to an end.¹²⁴ He later wrote, “In Germany one can succeed only when one presents practical, applied science, however bad it may be. Anyone who wants to work on pure science is regarded as a crank, and so he finally stops working.”¹²⁴ And also, “My position in Germany has suffered because of my opinion against [Abderhalden's] pregnancy test. There may be many who see through him, but nobody dares say anything against him.” (‘prudential acquiescence’).¹²⁴ After stints in Japan and at Johns Hopkins, Michaelis eventually ended up at the Rockefeller Institute. Although Abderhalden may have acted deliberately to promote his own unreliable methods, other authority figures in Germany must have been in a stupor (*dusel*) not to have questioned the method and to have suppressed Michaelis.

Another whose work was affected by *Autoritätsdusel* was scientist-philosopher Michael Polanyi. Long after his retirement, he reflected on the early suppression of his theory of adsorption, first published in 1916.^{125, ii} Although leading authorities of the day (among them, Langmuir, Haber and *even Einstein!!*) argued against his theories over the course of many years, Polanyi published several papers on this topic refuting and counter-refuting his critics.

Theories come and go but Polanyi’s observation that “the authority of current scientific opinion is indispensable to the discipline of scientific institutions; that its functions are invaluable, even though its dangers are an unceasing menace to scientific progress” would seem to be more everlasting. Equally so is his statement that, “dissent is fraught with grave risks to the dissenter. I demand a clear recognition of this situation for the sake of our intellectual honesty as scientists ...” *One of the purposes of naming and defining “bahramdipity” is to aid in that recognition.*

Polanyi claims suppression but his work was published in peer reviewed literature where it fomented great controversy for almost forty years. About publication of his early work, Polanyi himself admitted that, “I was lucky enough to profit by the relative ignorance of referees in 1916.” (Others have not been so fortunate.^{43, 104-106, 127, 128}) By the definition of *bahramdipity* in Section 1, Polanyi did not experience *bahramdipity*. *All bahramdipity is Autoritätsdusel but not all Autoritätsdusel is bahramdipity.*

4.5 Theft of Credit

Although theft of credit as an ethical aberration does not result in the suppression of a scientific discovery, it does, presumably, result in the suppression of a scientific career. Some famous examples illustrate this phenomenon.

As a graduate student, Élie Metchnikoff discovered the alternation of sexual and asexual reproduction in the life cycle of the nematode *Ascaris nigrovenosa*. His results were published by his mentor, Rudolf Leuckart, “with only a passing reference” to Metchnikoff.¹²⁹ Metchnikoff bitterly left Leuckart and left parasitology but it is

ii. Although the Langmuir adsorption isotherm is currently the most common and convenient description of adsorption, Polanyi’s potential theory still receives consideration in more advanced treatments, e.g., Adamson and Gast’s textbook *Physical Chemistry of Surfaces*.¹²⁶

perhaps only because he went on to win a Nobel Prize for his work in immunology that we know about this theft at all. Had Metchnikoff tried to pursue a career in parasitology, his story might never have been told.

The discovery of vaccines might be worthy enough of admiration but, among other short cuts, Pasteur seems to have used the methods of Toussaint to advance his own then inferior vaccine preparation system.¹³⁰ Other examples abound.^{131,132} More well known cases are sometimes disputed in the literature. Often, the injured parties are graduate students with independent conceptions, perspicacious insights into problems or sagacious interpretations of data. This is but another facet of graduate school stress.^{70, 89, 133-147}

Academe is not the only place where aberrations of scientific discovery occur. Industrial research also has its political-scientific power structure which can be highly corrupting of scientific integrity.⁹⁰ In general, industrial research is strongly protected by secrecy that also keeps details of the non-scientific aspects of discovery well hidden.^{jj} Thomas Alva Edison is credited with over 1,000 patents on work emanating from his various industrial research laboratories, but many of his assistants and co-workers may have been denied their fair shares of credit, fortune and more. Edison routinely surrounded himself with assistants who would not or could not challenge his penchant to co-opt their contributions.¹⁵³

Most, if not all, of these literature cases are known only because the work was published and one or more of the principals achieved sufficient fame to merit detailed historical re-examination of the record. It must be noted that there are many cases of PIs giving full credit to co-workers, helping to propel these colleagues to positions of fame in excess of their own, e.g., R. L. Mössbauer's Nobel Prize winning discovery of the Mössbauer Effect as a graduate student of H. M. Leibniz, and Pavel Cerenkov's Nobel Prize winning discovery of Cerenkov Radiation as a graduate student of S. Vavilov.¹⁵⁴ Nevertheless, how many others were denied fame, credit or even careers?

4.6 Procrustean Science

Some, especially graduate students, may find that there is a striking resemblance between many giants of modern science and the mythical Greek giant Procrustes. Procrustes, a thief and a murderer, would capture unwary travelers (graduate students) and tie them to an iron bed (research bench). If they did not fit, they would either be stretched or have their limbs (ideas and opinions) cut off so that they would.

The analogy may take another form involving data that can also be shaped and formed to support a preconceived notion. There are many famous examples in the history of science, from ancient times to the present.¹⁵⁵ Kohn mentions some of the common terms that describe the manipulation of data, including cooking, trimming, fudging, and finagling. Kohn does not mention "procrusteating" or "dry labbing".

jj. It is usually only through legal mandates that such stories come out. Consider the recent disclosures about the tobacco industry consequent to U.S. Congressional investigations, the BRCA1 patent dispute¹⁴⁸ or the troubles of Perseptive Biosystems.^{149,150} For some entertaining and enlightening exceptions, see works by Max Gergel.^{151, 152}

dry lab-bing (drī lāb' ĩng) *verb.* Fraudulently writing up laboratory procedures and results without ever having performed the experiments or getting anything wet.

Many of these historical examples have only been discovered by the careful retrospective examination of data or the attempted reproduction of old experiments on authentically reproduced equipment. Examination of Millikan's actual notebooks revealed the Procrustean pruning of data to provide a rewarding picture of integral multiples of a unitary electron charge.^{155-pp. 57-62} A discussion of Millikan and his student Fletcher could also have been included in Section 4.5, "Theft of Credit", but more detailed studies provide a more balanced view.¹⁵⁶

There can be no doubt that there are many more examples of Procrustean Science but the cases escape scrutiny proportional to their *overall scientific insignificance*. This is not to say that publications resulting from Procrustean Science cannot significantly help a career, e.g., the case of Millikan vs. Felix Ehrenraft (Vienna) as discussed by Kohn.¹⁵⁵ The analogy to Procrustes' thieving ways is even more applicable to those that plagiarize results or steal ideas in order to publish or obtain funding.^{157, 158}

Subordinates who protest against the Procrustean treatment of their data often suffer bahramdipitous consequences.

5. FURTHER SCIENTIFIC ALLEGORIES FROM *The Three Princes of Serendip*

In some versions of *The Three Princes of Serendip*, the Princes were told by their father Jaiya,^{kk} ruler of Serendip that,

Ancients have said that once the mists of yesterday were marvelously distilled into a magic formula. This was written in one hundred lines of verse upon a single scroll. Named *Death to Dragons*, these lines contained the secret of a potent liquid which,

by paraphrase, could be of great benefit to the country and its people.^{24-pp. 9-16} As part of their regal grooming,^{ll} they are cast out from their homeland and sent in search of the valuable scroll and worthwhile adventures. Although stern, Jaiya, unlike Bahram, says to the Princes,

kk. Sometimes: Giaffa or Giaffar.

ll. To continue our mythical analogies, read "regal grooming" as "scientific training" or "graduate school training".

I command that in your travels you search out this magic poem that we may rid our shores of all the dragons that have plagued us for so long. Moreover, you are expressly charged not to return without my permission. Only if you acquit yourselves in a worthy^{mm} manner will you be allowed to walk once more in the land of Serendip.ⁿⁿ

Early in their search, from a wise sage they learn:

A hundred lines it has, but there is one and only one lone copy of the total formula in all the world. [...] It is possessed by a strange and ancient seer with eyes that dart like sudden flame. By some he is called Aphoenicius. So closely does he guard the scroll on which the formula is written, that he travels in a hundred guises, at times invisible. Rarely does he stay more than one day and night in a single place.

As for the verses, it is said that these are carried in a cylinder of silver closed tightly at both ends. Many kings have tried to buy its contents, but to all who ask Aphoenicius will only say, “*Death to Dragons* may not be sold. *Death to Dragons* may not be bought.”

Throughout their travels, the Princes catch brief glimpses of the elusive Aphoenicius. They are never able to catch him or otherwise secure the scroll.

Many scientists today seek out truth and knowledge as diligently and energetically as the Princes sought adventure, Aphoenicius and the mysterious scroll. Just as the Princes regaled in the pleasure of their sagacious discoveries, so do many scientists enjoy the fruits of their labor toward discovery. The Princes sought a lone scroll of a mere one hundred lines of verse; scientists through the ages have uncovered scroll upon scroll of knowledge with the hope that it be put to use for the benefit of all mankind by bringing “Death” to the “Dragons” that plague man and society.^{oo} And yet, Aphoenicius and the scroll remain as elusive as ever.

Many scientists have been mentored by the likes of Jaiya. They were given worthwhile and challenging problems and they learned to investigate them with integrity and report their results honestly. Can we call this *jaiyadipity* or is this simply *normal science*?

And what of those scientists who fell under the power of a bahram? How many were bereft of fame, credit or even careers? How have science and society been harmed

mm. A subjective term, what is “worthy” to Bahram may be anathema to Jaiya; what is worthy to Jaiya may bring death by Bahram.

nn. As quoted here from Hodges’ *Serendipity Tales*,²⁴ Jaiya commands the princes to “search ... in a worthy manner”; he does not require that they *find* the scroll nor does he pressure them into a position where they feel they must lie about finding it.

oo. Such motives are not universal but represent some of the ideals of some scientists. This discussion is not intended to contribute to the controversy over the motives⁵² or values^{159,160} or the rights and responsibilities¹⁶¹ of scientists.

by the premature termination of potentially spectacular research careers? Does a cure for cancer remain buried in the suppressed career of another Toussaint or Albrecht? Why were the unknown researchers relegated to Obscurity and not “allowed to walk once more in the land of Serendip”?

6. AFTERWORD

It is the intention of this presentation to shed more light on a phenomenon that is already well known and, by giving it a name, to make it easier to identify, discuss and, perhaps, eliminate or at least diminish. *Another more worrisome outcome* is that by highlighting a few well known cases of Nobel caliber and only beginning to expose less well known cases of scientists whose careers did suffer that scientists in training may actually abandon their ideals, weaken their resolve and become even more fearful of questioning other authorities of science.¹⁶²

In his 1974 commencement address to Cal Tech, Richard Feynman discussed and analyzed some examples of cargo cult science.³² He identified the common theme of these examples to be the lack of or loss of scientific integrity. Feynman concluded with a sentiment that has been highly motivating and that is echoed here:

So I have just one wish for you – the good luck to be somewhere where you are free to maintain the kind of integrity I have described, and where you do not feel forced by a need to maintain your position in the organization, or financial support, or so on, to lose your integrity. May you have that freedom.

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Note Added in Proof: The accused graduate student in France (page 88) was vindicated during the proceedings of a French tribunal that concluded by finding three senior department staff members guilty of invading the privacy of his e-mails. The underlying issues of the case were not subjects of the court ruling.^{163,164}

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