

# The Pharmacopoeia Mathematica

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with contributions from

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## Abstract

This article contains a list of 18 herbs, acids and serums which have traditionally been used to treat the maladies suffered by mathematicians as a result of pursuing their dangerous inquiries. Those who take any of it seriously need treatment from the herbs listed here.

1. **Asymptotica Floribundiae**: A new gas has been discovered by Prof Andrew Fowler who has isolated it by filtering the dank air of Mathematics Departments through Guinness. He has named this colourless, odourless, tasteless gas *Sobolev Dioxide*. If inhaled in modest quantities it reportedly helps with the regularity of the digestive tract. If inhaled further, its effect is to induce rigour in the neck muscles making the recipient stand upright with their nose in the air. It also imbues a sense of virtue, with a withdrawal from normal mathematical social discourse. If inhaled in even greater quantities it may cause the recipient to fall into a semi-catatonic state. Some relief may be gained by reclining in a darkened room, with an inhalation of the herb Asymptotica Floribundiae together with a regime of exercises prescribed in the text *Mathematica Industrialis*. However, in the long term, recovery may be slow. The patient is likely to be nervous and prone to suffer from anxiety over boundary conditions. In extreme cases there is no known cure. In the final state before death the patient will often babble about the size and nature of constants and may have to be forcibly restrained.
2. **Financia Bankseae**: The main symptom of what is conventionally known as *Black Scholes disease* is that the sufferer walks backwards while losing money. Moreover, the interest of the sufferer declines and he/she becomes highly volatile. Secondary symptoms are black spots on the hands known as the Bones-Silver Syndrome, first observed by Stevenson. However, a single *Black Spot*<sup>2</sup> renders the sufferer hysterical. There is no known full cure but the plant *Financia Bankseae* finely chopped into food in extremely expensive restaurants will alleviate the main symptoms in the long term.
3. **Asymptotica Expansionis**<sup>3</sup>: Sufferers of the well-known syndrome *Aero-Acoustica Dysphoria* reach this state by working on too many matched asymptotic expansions. They become confused, wandering the corridors of their respective Departments in a dazed state, bumping into doors and windows and falling down stairs. Those in whom the syndrome is more advanced imagine that they have an invisible collaborator to whom they sing<sup>4</sup>

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<sup>2</sup>Those who read the novel ‘Treasure Island’ by Robert Louis Stevenson in their youth will recognize that the pirate who receives the Black Spot knows that it is a death sentence from his shipmates.

<sup>3</sup>This is dedicated to Professor David Abrahams, Director of the Isaac Newton Institute in Cambridge, who is reputed to have a substantial secret store of the herbal spirit *Asymptotica Expansionis* in one of his offices.

<sup>4</sup>“Let’s call the whole thing off!” was written by George and Ira Gershwin, 1937.

*You say outer and I say inner;  
I say outer and you say inner,  
Outer, inner, inner, outer,  
Let's call the whole thing off!*

The only remedy is for colleagues to carry them off to a bar, ply them copiously with the herbal spirit *Asymptotica Expansionis*, and then put them to bed. In the morning they awake refreshed, with no memory of these incidents.

4. **Hypergeometrica Manifoliae:** The fragrant scent of this ancient herb is well known to recover patients suffering from either *Torpor Algebraisis* or *Analytica Maledicta*, and restore them to consciousness. Symptoms of overdosage are flickering visions of ancient runic symbols such as \$, \*, & or even #. According to the J. of Beanological<sup>5</sup> Medicine this is the first stage in the perception of dimensions higher than three, although other authorities have challenged this interpretation. Extreme dosages render the patient liable to delusions, such as mirror images of black holes, alien beings and other worlds.
5. **Stochastica Rubacea:** Although endemic in the population for centuries the recent global epidemic of the malady *Mathematica Stochastica* has seen its sufferers obsessively exploring the roughest paths of rocky ground, even to the extent of searching out mountain screens. The most alarming symptoms are to be found among those wandering in a dazed state on the roughest screens sweeping down from the peaks of the English Lakeland's Scafell Pike and Great Gable or those close to the Norwegian Fjords. Normally, a severe dowsing in the icy lake of Wastwater or the Arctic Ocean and a rubbing application of the herb *Stochastica Rubacea* shocks the sufferer back to reality although he/she may be prone to random relapses.
6. **Digitalis Plantaginaceae:** The main function of this herb is to reduce the over-excitement and erratic heart-rate caused by the continuing study of huge, meaningless, data-sets. An alternative recommended treatment is for the sufferer to take a course of Algebra.
7. **Hydrodynamica Stabilis:** A feverish obsession with numbers like 2100 and 1708 is the main symptom of this complex quartan ague known as *Couette's syndrome*: an alternative name is *Poiseuille's Disease*. The patient goes through various stages of transition as the disease develops but little progress has been made in its understanding. A weakly brewed potion of the anti-phlogistical herb *Hydrodynamica Stabilis* may retard onset for a while.
8. **Morpheus Algebraicus:** A small pinch of this most powerful of soporifics has been known to render a patient unconscious for weeks. In some cases the patient never fully recovers, with permanent damage to the personality which can be so extreme that he/she is rendered incapable of differentiation.
9. **Oceanographia Circularis:** The global cartel of distributors and users of this dangerous drug, taken in liquid form, all show alarming symptoms of the condition *Potentia Vortica* by turning slowly in circles while talking rapidly. Moreover, they all acknowledge as their leader a mysterious man of great stature called Large Eddie. However, when questioned over his identity and location they dissimulate by greeting all and sundry with short waves.

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<sup>5</sup>A classic comic from my generation's boyhood days is 'The Beano', now in its 80th year.

10. **Topologica Ruberata:** The chain store *Toyz*  $\mathbb{R}^4$  *Uz* sell this herb in large quantities. When taken as a syrup, it is highly effective in cajoling young mathematicians away from playing with rubber nursery toys and into a higher meaning of existence. Recommended bed-time reading is the volume of *Whitney's Weak and Strong Fairy Tales* containing stories about dragons, knights, witches, princes and maidens who change shape in  $\mathbb{R}^n$ .
11. **Cotangentia Bundlivia:** Just one tiny sheaf of this powerful drug magically translates the first page of Abraham and Marsden's book *Foundations of Mechanics* into the language of conventional classical mechanics without any grief. Withdrawal symptoms manifest themselves on waking the next morning in black despair as they find they cannot get past page 1, thereby making the drug highly addictive.
12. **Analyticus Redivivus:** A problem common in analysis seminar speakers is the disease known as *Monotonus Fraternitatus*. Audiences listening to speakers with this malady are prone to collapse into a face-down, unconsciousness state. A collective method of revival is to store the gas given off in a boiling of the herb Analyticus Redivivus. When fed into the A/C system the audience revives, although individuals may remain in a dazed state. As indicated above, individual doses of *Asymptotica Floribundiae* will normally restore each patient to normality. Many years of this weekly comatose cycle can endanger the health of the individual and lead to early retirement, although their absence in the Department may go un-noticed for some years.
13. **Colloquiatu Dormatitis:** This laboratory-engineered drug has been cleverly designed to act on multiple levels. The recipient places a micro-dot under their tongue as the Colloquium or Seminar Chairman introduces the speaker. The rapid effect on the recipient is to make them sit bolt upright with open eyes. Despite the slightly glazed expression the recipient nods wisely from time to time and even smiles occasionally while simultaneously falling into an altered state of consciousness in which they become mentally lost in the technicalities of a different problem. The cleverness of the drug design is manifest by the fact that their ears and eyes take in enough information from the speaker to enable them to craft just one intelligent question. After 55 mins the recipient wakes feeling refreshed, thus enabling them to deliver their question with a knowing look.
14. **Biomathematica Equanosis:** A small but growing subgroup of applied mathematicians suffer from the malady *Aequatione Deesse* the main symptom of which is an obsessive tendency to continually open drawers and cupboards searching for equations on which to work, while muttering responses like "No, those are only reaction-diffusion equations". Members of this community most exposed to danger are those who deal with raw Healthcare Data which leads to the disease *Assimilationis Databulis*. Difficulties with assimilation and the eventual solidification of the lungs can be helped by frequent brews of the herb Bio-mathematica Equanosis which clear the passages of any unassimilated data.
15. **Ridiculosum Turbulensis:** Like the Tories and Whigs of late 17th century England, the study of fluid turbulence is divided into those who support King Jean Leray (a weak king) and those who support his opponent, Earl Andrei Kolmogorov (probably a strong character). The former group require an existence proof of anything that moves while the latter are happy, on average, to support anything provided it is isotropic and homogeneous. When smoked in a peace-pipe tailored to a standard Kolmogorov length, the pungent herbal tobacco Ridiculosum Turbulensis temporarily reconciles the two sides. Over time

the Lerayites have migrated to their  $L^p$ -spaces in the French highlands, while the Kolmogorovites have fallen back on their fortified axioms in Russia and the Mediterranean heartlands. Each side has forgotten why they are at war.

16. **Asymptotic Acid**<sup>6</sup>: After the recent discovery of this acid, further work has now shown it to be present in the roots of *Asymptotica Floribundiae*. Ingested in small quantities, and often combined with ethanol, it can unblock many seemingly intractable problems, but progressively larger doses lead to an uncomfortable feeling of looseness and, in extreme cases, to uncontrollable waving of the hands; a short course of renormalisation has been known to help. When it is brought into contact with Sobolev Dioxide, the consequences range from highly exothermic production of large quantities of rigorous asymptoticide to an extraordinary and very unusual light-generating reaction which produces Asymptotic Estimate of great purity.
17. **Navierserum**: This serum, delivered on a sugar-lump and lasting a life-time, conjures a vision before the eyes of the recipient of a \$1 million banknote, thereby convincing them that their career has not been wasted by working on the 3D Navier-Stokes regularity problem. It takes 40 years to realise that the banknote has moved no closer and is just a mirage.
18. **Mathematica Economicacia**<sup>7</sup>: (subsp. *inutilia*) A fungus that flourishes in dismal places that harbour populations of economists. Inhalation of the spores leads to the development of mathematical models involving parameters representing aspects of human behaviour. The output of the models is sensitive to the values of these parameters whose accurate determination is impossible. Further inhalation leads to the sufferer entering a delusional state in which all participants in the economy are imbued with perfect knowledge and rationality of action. The most efficacious treatment is repeated plunging into a weak, icy solution of the herb *Frigus Difficile Res*. This induces a severe recession not predicted by economic modeling, ideally followed by a period of retrenchment.

**Acknowledgments**: Thanks are due to John Ockendon (Oxford) for provoking us into writing this article. Mathematicians of all types, although not necessarily of sane mind, are invited to send further contributions to The Pharmacopoeia (email: j.d.gibbon@ic.ac.uk).

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