Symphilosophie
International Journal of Philosophical Romanticism

Mathematical Fragments

(1798-1800)

Novalis

Translated and introduced by David W. Wood*

The following is a series of notebook entries from 1798-1800 containing the reflections of the romantic poet-philosopher Friedrich von Hardenberg (Novalis) on pure and applied mathematics. Although this selection is not exhaustive, it does try to collect together for the first time into English Novalis's most significant mathematical fragments. There has always been a fascination about Novalis's thoughts on mathematics. This is partly due to the fact that his most well-known definition of romanticizing is based on a mathematical operation – that of exponentiation, or raising an element to a higher power. Hence, to know more about Novalis's views on mathematics is to better understand his conception of romanticizing.

That said, because Novalis is primarily known as a romantic poet there exists a certain amount of scepticism about his mathematical knowledge. Dilthey notoriously stated in 1905 that Novalis's mathematical musings are more like "hymns to mathematics and ultimately unfruitful," rather than actual rational reflections.[1] Nevertheless, Novalis's notes generally arose from his studies of mathematics and the natural sciences at university and other higher institutes of learning, such as the Mining Academy in Freiberg. Research since Dilthey's time has not only presented Novalis's writings on this topic in more accurate and faithful German editions, but confirmed the true extent and competency of his mathematical understanding and training.[2]

* Dr. phil. (Ludwig-Maximilians-Universität, Munich / Université Paris-Sorbonne) – david_wilfred_wood@yahoo.com

[1] Wilhelm Dilthey, *Das Erlebnis und die Dichtung* (Leipzig: Reclam, reprint 1991), p. 251.
[2] Among others, see the recent studies by Franziska Bomski, *Die Mathematik im Denken und Dichten von Novalis* (Berlin: Akademie Verlag, 2014). David W. Wood, "The 'Mathematical' Wissenschaftslehre: On a Late Fichtean Reflection of Novalis," in: *The Relevance of*

Hopefully this small selection in English translation will further contribute to dispelling some of the misconceptions and ignorance. A number of the notebooks clearly show Novalis not wildly speculating out of the blue, but consulting and working his way through various contemporary textbooks on mathematics, and forming many of his poetic ideas in direct reaction to these works, as well as from his reading of philosophers like Immanuel Kant and J.G. Fichte. Here the reader can follow Novalis's reasoning and imagination oscillating from mathematics to poetics and back again.

The following notes are selected from seven different notebooks or texts. They may be classified into three main groups in which the idea of exponentiation could be taken as a unifying guiding thread:

a). Science: notes on textbooks. These concern the factual discipline of mathematics itself, mostly containing citations from works and textbooks of the period (see especially sections 2 and 5). As mentioned, Novalis read these writings and made observations on them, particularly noting specific mathematical procedures and operations, including that of exponentiation. Nevertheless, his thinking sometimes takes them in completely new directions. Some of the unchanged citations from the textbooks he consulted are also translated here, but reproduced in a smaller font size to distinguish them from Novalis's thoughts.

b). Art: here mathematical operations are transferred to the field of poetry and literature, with exponentiation forming again the basis for Novalis's main poetic method of romanticizing the world (see, for example, section 4: Logological Fragments II and Anecdotes). That is to say, an element from "ordinary" empirical life may be depicted in a more poetic or "higher" manner by means of a person's talent and imagination. Apart from some of the following fragments, this poeticization of the sciences and everyday life is perhaps most evident in Novalis's published texts, such as the 1798 fragment collection *Pollen* and the 1800 lyrical cycle *Hymns to the Night*, or in the two unfinished novels, *Henry of Ofterdingen* and *The Disciples of Saïs* (see James Reid's new translation of the first half of this latter text in the present issue of *Symphilosophie*).

Romanticism: Essays on German Romantic Philosophy, ed. Dalia Nassar (Oxford: Oxford University Press, 2014), 258-274. Howard Pollack-Milgate, "'Gott ist bald $1 \cdot \infty$ – bald $1/\infty$ – bald 0": The Mathematical Infinite and the Absolute in Novalis," *Seminar: A Journal of Germanic Studies* 51/1 (2015): 50-70; and Lucia Perrone Capano, "Matematica e poesia in Novalis," in: *Parole, formule, emozioni. Tra matematica e letteratura*, eds. P. Maroscia, C. Toffalori, F.S. Tortoriello, G. Vincenzi (Turin: Utet, 2018), 227-244.

c). Religion: these are the so-called "hymns to mathematics" (see section 1 & above all the final section 7). Similar to the sphere of poetry, Novalis perceives how various mathematical operations share affinities with the domain of religion, the hierarchies, and *prisca theologia*. These fragments remain rational enough, as soon as one sees his emphasis on mathematical *activity* as such or hears that his historical references include Orphism, Pythagoreanism, Judaism, Christianity, and the Greek, Egyptian, and Indian religions.

Philosophically, therefore, it could be argued that these mathematical fragments organically belong in the Platonic and Neo-Platonic tradition, extending back to older works like Plato's *Meno* and *Timaeus* on the one hand, and down to contemporary texts like Hemsterhuis's *Simon* and *Aristée* on the other.

A number of these translations have earlier appeared in print, but all have been revised for this issue of *Symphilosophie*. Some have never appeared in their entirety in English before, such as section five on "Universal Arithmetic (*arithmetica universalis*)," which is originally from the 1798/99 *Freiberg Natural Scientific Writings*. The idea of a universal arithmetic is related to a universal science, or a *mathesis universalis*. It is a key component of what Novalis named "encyclopedistics," a modern form of universal knowledge *par excellence*,[3] and again should be viewed at the crossroads of science, art and religion, i.e. as an astronomical, musical, and Orphic variation on his romantic philosophy of "magical idealism."[4]

The original German texts can be found in many of the earliest editions of Novalis's works. To aid reference, I will simply cite the standard edition of Novalis, *Schriften – Historische Kritische Ausgabe* (HKA) (Stuttgart: Kohlhammer, 1960ff.), eds. R. Samuel, H.-J. Mähl, G. Schulz, *et al*.

[3] For recent perspectives of Novalis's life and work in this regard, see Olivier Schefer, *Novalis* (Paris: Éditions du Félin, 2011), and Jean-Christophe Bailly, *La Légende dispersée* (Paris: Bourgois, 2014).

[4] On the philosophy of "magical idealism", see Laure Cahen-Maurel, "Novalis's Magical Idealism: A Threefold Philosophy of the Imagination, Love, and Medicine," *Symphilosophie: International Journal of Philosophical Romanticism* 1 (2019): 129-165.

1. Mathematical Notebook, 23 June [1798][1]

The study of *machines* educates the mechanist – and accustoms the spirit to skilful discoveries and combinations.

(The forces are inversely related, like their velocities).

Mechanics is the mathematics *of forces*. Geometry is the mathematics of *forms*. Optics is the mathematics of *light*. *Basso continuo* is the *mathematics* of *acoustics*. Perspective – the mathematics of *vision*.

Is mathematics the art of finding and determining from *data* or *facts*, other *dependent* and *connected* data and facts – simply general *analysis* and synthesis?

Numerical system of nomenclature in arithmetic.

All sciences should become *mathematics*. Mathematics up to now has merely been the first and simplest expression or revelation of true scientific spirit.

The numerical system is the *model* for a genuine system of linguistic signs – The letters of our alphabet should become numbers, our language, arithmetic.

What did the Pythagoreans really understand by the forces of numbers?

Poetics of mathematics.
Grammar of mathematics.
Physics of mathematics.
Philosophy of mathematics.
History of mathematics.
Mathematics of *philosophy*.
Mathematics of *Nature*.
Mathematics of *poesy*.

[1] Selections. The original German text of this section is entitled "Mathematischer Heft. 23 Junius [1798]," and can be found in Novalis, HKA III: 50-53. An earlier English translation is in Novalis, *Notes for a Romantic Encyclopaedia: Das Allgemeine Brouillon*, edited and translated by David W. Wood (Albany, NY: State University of New York Press, 2007), pp. 194-196.

Mathematics of *history*.
Mathematics of *mathematics*.

Spirit of mechanics – is surely the spirit of the whole, without any connection to the parts – or to the individuality.

(Living force – absolute force – relative force – effective force).
By means of *power* the body is forced out of its relations – into a freely living state. Life in turn is also – physical life, specific life – absolute life – *living life*. The expression 'absolute' is in turn relative. *Absolute absolute* or *absolute*^{2} is the highest and the ultimate.

Nature incessantly adds, subtracts, multiplies, raises to a higher power etc. The applied mathematical sciences show us nature as a mathematician. Physics is *real* mathematics.

General principles, which are already applied in universal arithmetic. Principles of general addition, subtraction – multiplication and division etc.

Velocity is the quotient of space: time.

Levels of fluidity. Treatment of the solid as a fluid – and of the fluid as a solid. Liquido-statics – liquido-mechanics. Solido-statics – solido-mechanics.

Friction is a mechanical secretion. Thrust is a *mechanical inflammation* or nourishment – a body in motion is a *mechanically living*, combustible body – There may exist several mechanical stimuli simultaneously in a body – Together they constitute a mixed stimulus. On their diverse mixtures – in opposed directions – their reciprocal expansions – and diminishments. (Brown and his adherents belong among the *mechanical* physiologists, just as humeral physiologists belong among the chemists).

2. Mathematical Studies on Bossut and Murhard (1798)[2]

[Charles Bossut,
Traités de calcul différentiel et de calcul intégral. Paris 1798]

A quantity can be *unknown* (*undetermined*) *and be constant or unknown (undetermined) and invariable*. [p. 1]

(Determined, variable, determined, constant).
(An unknown quantity can be absolutely unknown, like algebraic quantities in general – or relatively unknown or undetermined. – I prefer the latter word instead of 'unknown'.)

A *function* in general is every product of a mathematical *operation*. The *function in specie* of every product, which includes a variable quantity. [p. 3f.]

(A variable quantity = mathematical *life*).
(Function *in specie* = an organic or living quantity).

One has to be careful about confusing the exponential powers of the differentials with ordinary exponents. [p. 7f.]

Δx^2 is very different to $\Delta^2 x$.

(Quantities of quantities are quantities of the second power, or the power squared. Theory of the origin and classification of quantities.)

In order to simplify and reduce the elements belonging to the solution of a problem, and to indicate a well-ordered problem, we often study analytical operations, quantities, by means of an abstraction of their relations – however, these relations do not cease. [p. 91]

One transports, as it were, the whole into a part, in order to better understand the nature of the part, and then indirectly to understand better the nature of the whole. For example, the contemplation of the human being and his variations in the State and in an isolated environment – or *alone on an island*. This is merely done to simplify the solution of civil problems – It is the view

[2] This section contains excerpts from the notebook: "Mathematische Studien zu Bossut und Murhard;" that is to say, Novalis's reflections on mathematical texts by Bossut und Murhard. The texts in a smaller font size and with page numbers in square brackets are the texts and pagination from Bossut's and Murhard's works. The original German is to be found in: Novalis, HKA III: 115-124; An earlier English translation in Novalis, *Notes for a Romantic Encyclopaedia*, pp. 204-206.

of the *simplest States* – the molecules of the State, the principles for the education and development of a State).

Murhard
[*System der Elemente der allgemeinen Grössenlehre* (*System of Elements of the General Theory of Magnitudes*. Lemgo, 1798)]

Higher *mathesis* is also called analysis. It consists of higher arithmetic, geometry and trigonometry. Its *finite* (common) part includes algebra and its application, its infinite or higher (idealistic) part- includes differential and integral calculus and its application. [p. 8]
(Higher analysis is also at once higher synthesis – and hence it is the basis for the whole of mathematics. What comes at the end in teaching and empirically, comes at the *beginning* in pure science).

With regard to the *essential, individual character* of the mathematical method, Kant maintains that the mathematician is not discursive like the philosopher – but proceeds *intuitively* – he doesn't *infer* from *concepts*, but constructs his concepts – presents them in a *sensible* manner – yet actively sensible – or forms pure intuitions. [p. 28]
(Here too I believe that the mathematician's procedure is not unique. He sculpts the concepts in order to fix them, and thereby to be able to take a clearly designated and secure *course* and *return course*. Shouldn't the philosopher do likewise – or even every scientific expert? – In every science one should self-actively sculpt. The sculptural method is the genuine experimental method. We shouldn't merely be active in One world – but be *simultaneously* active in both – not *think*, without also *reflecting*, not *reflect* without also *thinking*. The inverse method, the mathematical method, consists in the *construction of intuitions* (in contrast to concepts) – in the non-sensible, *immediate* presentation of intuitions – in *active* thinking – in the development of *pure thoughts* – in the fixing of *intuitions* (reflections) by means of thoughts – to also be capable of carrying out that secure progression and regression, that revision etc. The method of comprehending, or the cognitive method, is none other than the genuine
method of observation.

Figures etc. are necessary in the former – words etc., in the latter.

In the former, reason delineates and reflects upon (external senses) its inner motions etc. – and vice versa in the latter.

In the former, reason *reflects from without –in the latter, from within*.

Words and figures determine one another in constant alternation – audible and visible words are actually word figures – Word figures are the ideal figures of other figures – All figures etc. should become literal or linguistic figures – just as *figurative words* – are the inner images etc., the ideal words of other thoughts or words – they all should become inner images.

Therefore imagination, which fashions *figurative words*, especially deserves the predicate "genius".

That will be a Golden Age, when all words become – *figurative words* – myths – And all figures become – linguistic figures – hieroglyphs – When we learn to speak and write figures – and learn to perfectly sculpt and make music with words.

Both arts belong together, are indivisibly connected and will become simultaneously perfected).

3. Mathematical Fragments (1798)[3]

The *highest* and the *purest* is the most common and the most understandable. Hence, *elementary geometry* is higher than higher geometry. The more difficult and more intricate a science, the more derived, the more impure, and the more mixed.

The so-called physico-mathematical sciences are, like neutral salt or other chemical combinations, a mixture of physics and mathematics – that assume a new *Nature* – and which in another sense may be called *higher* Nature.

The former is the *elementary highest* – the latter is the *mixed highest*.

Two-fold path, from the latter to the former, or vice-versa.

Definitions are either *external* (characteristic records), or internal (elementary records), or a mixture. They are *formulae for constructions*. *Indirect definitions*

[3] Excerpts from "Mathematische Fragmente," Novalis, HKA III: 125-128; Earlier English translation in Novalis, *Notes for a Romantic Encyclopaedia*, pp. 206-207.

are prescriptions. Experimental instructions, or *descriptions*, belong to the prescriptions./ Positive and negative definitions./

Propositions should say something *new* – something that is not contained in the *definition*/ an indication of its own inherent nature./ Following the terminology, they must be synthetic.

/ Supplements, explanations, expositions, applications./

The greatest clarity – or repetition of this truth – fresh declarations of the same theme using different words – are to blame for the apparent obscurity and difficulty for the learner. The rigorous scientific path would be easier here.

Better *theses* /Definitions/ would render countless propositions superfluous.

A proof is an indirect construction – a mathematical experiment – a prescription.

(Most) mathematical propositions are all equal to the proposition a=a. Every mathematical proposition is an *equation*.

(/Determining the square of the volume by using its weight when investigating specific gravities./ Submerging a ball into water, and determining its volume using a cubic foot of water).
[…] The external is the common. The internal, is the particular./ The integration is much more difficult than the differentiation. *In relation to physics* and philosophy./

The science that joins and puts both into contact with one another – that instructs in deriving the particular from the common, and the inverse, as well as with the external and internal aspects – this science is the *connecting* – and *higher* science.

If the first is quantitative mathematics, and the second qualitative mathematics, then the third is relative mathematics – which appear in four systems of elements and in a single universal system.

/ Categories. Fichte's *Wissenschaftslehre*.

Concept of factor, quotient, sum, difference, potency, root, logarithm, function, series etc. fraction – exponential.

The smaller the curve of the section of the circle, the more it approaches a straight line – an infinitely small curve *is a straight line*. Here we can apply the Pythagorean theorem.

Even the *irregular* is lawful, like curves. The difference between rational and irrational quantities.

Pure algebra doesn't contain any numbers.

The combinatorial analysis of physics might be the indirect art of invention that was sought by Francis Bacon.

4. Logological Fragments II & Anecdotes (1798)[4]

Is there such a thing as beautiful *mathematics*? Mystical mathematics. Musical Mathematics. Does mathematics merely have a finite purpose? Isn't mathematics purely theoretical? Genuinely pure mathematics? Quantities are constructed through quantities.

—

The world must be romanticized. This yields again its original meaning. Romanticizing is nothing more than a qualitative exponentiation. In this operation, the lower self becomes identified with a better self. Just as we ourselves are an exponential series of this kind. This operation is still entirely unknown. By giving a higher sense to the ordinary, a mysterious semblance to the everyday, the dignity of the unknown to the known, and the appearance of the infinite to the finite – I romanticize it. For what is higher, unknown, mystical, infinite, ones uses the inverse operation – by means of this interconnection it becomes logarythmized. It receives a typical expression. Romantic philosophy. *Lingua romana*. Reciprocal raising and lowering.

—

[4] Cf. *Vorarbeiten*, nos. 95, 105, 308, 309 (HKA II: 543, 545, 593-594.)

Higher mathematics and *philosophy* / or the theory of ideas, of the infinite etc./ share lots of analogies. Series of *curves*. / *elements*. 3 axes.

Baader[5] is a *real psychologist* and speaks the genuine psychological language. Real psychology is also perhaps a field that could suit me.

3 invariable quantities and qualities or forces. If I am the one, then the others have to orient themselves in line with me.

—

Appearances are the differentials of ideas. It is very difficult to differentiate ideas and integrate appearances.

5. Universal Arithmetic (*arithmetica universalis*)[6]

Newton. Bezout. Burja. Vieth.
Mönch. Stahl. Kästner's Analysis
finitorum. Hindenburg's Writings
and others as well.
Schulzen's Mathematics.

Materials.
Klügel. From: Hindenburg's Polynomial Principle.

My Observations.

Counting is an analytic-synthetic operation. It is the unity of a group of elements. It is both a homogenising and heterogenising – both a *compre*-hending and *distinguishing* – and in alternation.

Calculating in general is likewise a composite action. An action that is solely composed of actions. The composition is only possible through the polarization of the elementary actions – for through this they first become *composable*.

Undetermined calculating – determined calculating.

[5] Franz Baader; see the translation of his "On the Pythagorean Square in Nature" by Carlos Zorrilla Piña in this issue of *Symphilosophie*.
[6] HKA 3: 167-169.

A mode of calculating is a *particular* manner of calculating – an individual modification of calculating in general.

There are no modifications in perfect calculating.

Imperfect *calculating* is calculating – where the elementary actions of calculating are separated – where the modification of an elementary action is not represented by the opposite, and vice versa – where one proceeds in an irregular – irrational way – where each analysis does not at the same time correspond to a synthesis, and inversely – where the elements work disproportionately and simultaneously.
Imperfect calculating partly cancels itself out – and disputes its own purpose.

If we *could* perfectly polarize imperfect calculating, then we could cancel out one error by means of another – and the two results would together yield a result in which the errors reciprocally destroy each other, and the *remainder* would be the pure, sought after, and intended goal of the two. This type of calculating could perhaps be called *indirect calculating*. An example is differentiation and integration.

The *proof* is the calculation, whose result is the proposition that is to be proven. Calculating and thinking are one and the same. There are as many cognitive actions and as many compositions of them, as there are modes of calculating. Only imperfect calculating is different from thinking in general – just as imperfect or particular thinking is different from thinking in general.

> (Imperfect and individual are one and the same – via an extremely long period – or until the imperfect or the individual become absolute.)

The question regarding the possibility of mathematics divides into two parts:

1). Is it possible? 2). How is it possible?

A well-ordered solution of the *task of mathematics* indirectly involves all the other mathematical tasks to be solved.

> (Kant's procedure with metaphysics – which is synonymous for him with mathematics. His famous question.) (It is the question concerning the possibility and method of construction of philosophical genius).

Fundamental problem of mathematics.

> (Is there a mathematical genius (life?) *How* is it possible? The solution to the first question furnishes the *proposition* – the second furnishes the *proof*, its *method of construction*.

Genius is the synthesizing principle, the genius makes the impossible possible, and the possible impossible – the unknown known – and the known unknown etc. In short, it is the moralizing element – the *transubstanizing principle*. (Life and the inspired principle or genius are one and the same.) (Imperfect genius.).

Dividing – ordering – counting – distributing – calculating – subtracting and repeating *–writing*, are more or less synonyms.

> *Synthetic calculating*, e.g. adding and subtracting – adding and multiplying – adding and exponentializing – subtracting and multiplying – subtracting and dividing – adding and subtracting with multiplying – adding and subtracting with dividing – adding and subtracting with multiplying and dividing and so forth. Exhausting the types of calculating through the combinatory art. In order to carry this out in a proficient manner one has to first critically study the concepts of the individual calculations.

Ordinary arithmetic calculating on the whole is a combinatory adding etc. – a *distributed calculating* – a successive – partial calculating – actually a *synthesizing* calculating – from the elements to the whole. (The different meanings of the expression 'synthesis').

6. Mathematical Reflections from: *Das allgemeine Brouillon* (1798/99)[7]

MATHEMATICS. The exposition of mathematics must itself be mathematical. / Mathematics of mathematics.

—

[7] Entry nos. 42, 69, 238, 348, 487, 495, 719, 977, 1006, 1016, 1026, in: HKA III: 245, 251-252, 281, 303, 346-347, 349, 407, 453, 457-458, 459, 460-461; Cf. Novalis, *Notes for a Romantic Encyclopaedia: Das Allgemeine Brouillon,* pages 6, 11, 35, 52, 86, 87, 133, 170, 174, 175, 176.

MATHEMATICS. In the end, the whole of mathematics is certainly not a special science – but only a general scientific instrument – a beautiful instrument is a *contradiction in terms*. It is possibly nothing more than the soul-force of the intellect fashioned into an *exoteric*, external *object and organ* – a realized and objectified intellect. Isn't this perhaps also the case with many or even with all the forces of the soul – that through our efforts they should become external instruments? – Everything should be drawn out of us and rendered visible – our soul ought to become *representable*. – The *system of the sciences* should become the *symbolic body* (organ system) of our inner life. – Our soul ought to become a sense perceptible machine – not within us, but outside us.
/ Inverse task with the external world. /

—

MATHEMATICAL PHILOSOPHY. (GRAMMAR). The categories are the *alphabet cogitationum humanarum* [alphabet of human cognition] – in which each letter comprises an action – a philosophical operation – a higher (mathematical) calculus. – The philosophy of the categories is of the utmost importance.

—

MATHEMATICS. The inner living character of mathematics. *Magic of numbers*. Mystical doctrine of Pythagoras – Personification of 3 – of 4 etc.

—

PHILOSOPHICAL ENCYCLOPEDISTICS. The philosophy of a science arises through the self-*criticism* and self-*system* of the science. (A science becomes applied if it serves as the analogous model and stimulus for a *specific self-(post)* development of another science. Through the genuine raising to a higher power, every science can pass over into a higher philosophical science, since it is an element and function of a series.
In the end, mathematics is only *common, simple* philosophy, and philosophy, is higher mathematics in general.
In *particular*, higher *mathematics* connects common mathematics with the system of mathematics, while the latter borders on the philosophy of mathematics—or philosophical mathematics, just as systematic science is generally always the precursor and boundary of a higher degree of science—of the philosophical degree. (*Degrees of scientific character*. The highest degree of scientific character would be termed philosophy). The philosophical

degree again divides into 3 parts and immediately—passes over into the higher series, or into the higher degree of the philosophy of philosophy, and so on.
(Just as the man of nature passes over into the common and complex human being, so too pure science into the common and *higher*. Higher science is the transition to a system, just as the scholar, or complex man is the transition to the systematist).

—

MATHEMATICAL LOGIC. Application of mathematics to the theory of thought – *swiftness* – and *richness* of thinking – not merely strength of thinking. Degrees of thinking. Language is a thought-meter. Acute thinking – penetrating thinking.

—

[…] (Has philosophy originated from the contemplation of mathematics?) Philosophy is universal—or higher mathematics—the animating principle of mathematics—poetical mathematics—Or the substance, if mathematics is the form. Mathematics is merely objective philosophy—formal philosophy—and so- called philosophy—is merely subjective philosophy or mathematics—real philosophy. By combining them in a manner analogous to that of the combination of chemistry and mechanics—there arises substantial—synthetic—philosophy—or mathematics, or physics. Contrasted with philosophy, physics is mathematics— while contrasted with mathematics—it is philosophy.

—

All the *universal* sciences—e.g. physics and mathematics, etc., really resemble philosophy in one respect—they are Proteusses—universal *substances*—*indications* etc.

—

The mathematical method is the essence of mathematics. Whoever fully understands this method, is a mathematician.
As the *scientific method in general* it is extremely interesting, and perhaps supplies us with the most accurate model for the classification of knowledge, or for the *faculty of experience*.
Axioms and postulates denote the theoretical (*a*.) and practical (*b*.) cognitive faculty as such. Problems denote the desire. Solution and proof, the analytic (*ad a*.) and synthetic (*ad b*.) ability. Explanations and corollaries also have

their significance. This reveals that our desire for knowledge is the intelligence's *desire for life*, a play of intellectual forces.

—

All historical science aspires to be *mathematical*. The mathematical force is the *ordering* force. Every mathematical science strives in turn to be philosophical – to be *animated* or rationalized – then poetical – lastly moral – and ultimately: *religious*.

—

The calculus of *variable* quantities is a kind of *mechanics* – the theory of *con*figuration and *com*motion.
Mathematics is genuine science—because it contains *created knowledge*—the products of its own spiritual activity—and because it *methodically inspires*.
It is *art*, because it has fashioned inspired procedures into rules—because it teaches one to be a genius—and because it replaces *Nature with reason*.
Higher mathematics is concerned with the *spirit* of quantities—with their *political principle*—with the *world of quantities*.

7. Final Mathematical Fragments (1799/1800)[8]

The whole of mathematics is really, by and large, an *equation* for the other sciences.

Mathematics is to the other sciences, what logarithms are to it. The concept of mathematics is the concept of science in general.

Hence, all the sciences should become mathematics. Our current mathematics is little more than a special empirical *organon*.

Mathematics is a substitute for convenient reduction – an aid to thought.

Its complete applicability is a necessary postulate of its conception.

Mathematics is the most valid testament of the idealism of nature.

[8] "Mathematische Fragmente," Novalis, HKA III: 593-594.

The inner relationship, the sympathy of the universe, is the basis of mathematics.

Numbers are – like signs and words – appearances, representations *kat exoxin*.

The relationships of mathematics are world relationships. Pure mathematics is the conception of the intellect as a universe.

Miracles, as facts contrary to nature, are a-mathematical – yet there does not exist a miracle in this sense, and what is thus called is comprehensible precisely by means of mathematics, for nothing is a miracle to mathematics.

Genuine mathematics is the true element of the magician.

In music, mathematics appears formally, as revelation – as creative idealism. It legitimizes itself here, as a heavenly messenger, *kat anthropon*.

All enjoyment is musical, and therefore mathematical.

The highest life is mathematics.

There can be supremely ranked mathematicians who cannot calculate.

One could be a great calculator without having an inkling of mathematics. The true mathematician is an enthusiast *per se*. Without enthusiasm there is no mathematics.

The life of the Gods is mathematics. All divine messengers must be mathematicians.

Pure mathematics is religion.

One only advances to mathematics through a theophany. Mathematicians alone are fortunate. The mathematician knows all. He could know it, even if he did not already.

All activity ceases when knowledge enters. The state of knowledge is eudemony, the blessed peace of contemplation – heavenly quietism.

NOVALIS

True mathematics is at home in the East. In Europe it has degenerated into a purely technical science.

Whoever does not take hold of a mathematical book with devotion, and read it as the word of God, fails to understand it.

Every line is a world axis.

A formula is a mathematical prescription.
Numbers are the drugs.
Arithmetic is its pharmacy.
In the end, mathematics only contains *methods of abbreviation*.