PROBLEM

SCIENCE { FUNCTION } ANALYSIS

FORMULA

SCIENCE { } ANALYSIS

SCIENCE { X } ANALYSIS

$$\text{SCIENCE} \left\{ \begin{array}{l} \text{INDIVIDUAL} \\ \text{GENERAL} \\ \text{UNIVERSAL} \end{array} \right\} \text{ANALYSIS}$$

BY

GEORGE ASHTON BLACK, PH.D.

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SCIENCE { FUNCTION } ANALYSIS

Man gewinnt dadurch schon sehr viel, wenn man eine Menge von Untersuchungen unter die Formel einer einzigen Aufgabe bringen kann. Denn dadurch erleichtert man sich nicht allein selbst sein eigenes Geschäft, indem man es sich genau bestimmt, sondern auch jedem anderen, der es prüfen will, das Urtheil, ob wir unserem Vorhaben ein Genüge gethan haben oder nicht.—*Kant.*

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SCIENCE {FUNCTION} ANALYSIS

SCIENCE { } ANALYSIS
SCIENCE { X } ANALYSIS

$$\text{SCIENCE} \left\{ \begin{array}{c} \text{INDIVIDUAL} \\ \text{GENERAL} \\ \text{UNIVERSAL} \end{array} \right\} \text{ANALYSIS}$$

PROPÆDEUTIC TO
SCIENCE {FUNCTION} ANALYSIS

I   Resolution of all cases of the hitherto unrecognized general problem, Differential Coefficient = Function.

$$\text{Dif. coef.} \left\{ \begin{array}{l} \text{imag.} \left\{ \right\} \\[3em] \text{real} \left\{ \begin{array}{l} \text{individual} \\ \text{general} \\ \text{universal} \end{array} \right\} \quad \text{x} \end{array} \right\} \text{Function}$$

where differential coefficient is either imaginary or real according as function applies either to any imaginary variable sufficiently indicated by   referred to the logical determination of imaginary, or to any real variable sufficiently indicated by x referred to the logical determination of real; and where the first complete determination of function by itself constitutes the only variety necessary and sufficient whether to differentiate the identity of function in my Science {function} Analysis, or to integrate the difference of function in Kant's enumeration of all moments of a single cognition.

II   Determination of the relation of Science {function} Analysis to Logic.

On reflection, the primitive phrase, a single cognition, is found to lead to the complete determination of the formula

a single cognition	{	a single cognition of any kind	concept	}	thought
		a single necessary and universal cognition	judgment		
		a single necessary { cognition } universal	syllogism		

where the derivative phrases determine the primitive phrase in relation to all and only the fundamental distinctions of thought, that is to say, the fundamental logical principles of the agreement of thought with itself; and where the variable recognized in the primitive can be replaced by its limit recognized according to a different mode in every single derivative. This primitive logic, as the formula deserves to be called, demonstrates that the accepted logical determination of thought is not a logical division but a logical transformation, and renders necessary, at least as a problem, the invention or discovery of a series of three derivative logics which shall by degrees extend the application of every single differential moment of the primitive logic as far as possible, that is to say, over the whole domain whether of a single cognition or of thought. From the fact that the primitive application of the third differential moment appears in the deduced formula of Science {function} Analysis as the differentiation of the identity of function in an integrated equation, I infer that the rest of the third derivative logic will appear in the deduction of the corresponding work as the integration of the difference of function in a series of differential equations; and from the nature and position of the third derivative moment I conclude that this third derivative logic, considered as if it had all appeared, is the only logic that deserves to be called definitive.

GEORGE ASHTON BLACK

New York, 621 W. 113th Street
April 28, 1905

DEDUCTION OF PROBLEM AND FORMULA

DEFINITION

Science = necessary {cognition} universal = the resolution of all cases of a general problem = Analysis.

Hence

Science { function } Analysis

Hence

Science{ }Analysis

Science{ x }Analysis

$$\text{Science} \left\{ \begin{array}{c} \text{individual} \\ \text{general} \\ \text{universal} \end{array} \right\} \text{Analysis}$$

which satisfies the definition whether by resolving the problem into the singular case marked by the only imaginary differential coefficient { } and the general case marked by any real differential coefficient { x } where x is individual general universal through all moments of the logical determination

$$\text{real} \left\{ \begin{array}{c} \text{individual} \\ \text{general} \\ \text{universal} \end{array} \right\} \text{x}$$

or by determining the problem in relation to all moments of a single necessary { cognition } universal according to Kant's classic enumeration of them in their proper order

7

and connection; for the only three fundamentally distinct moments of the formula differ whether as intuition concept idea according to the rule ideal—or as synthesis analysis dialectic according to the rule method—of Science { function } Analysis.

Thus the formula lays down the Science as well as the Analysis of my original problem in the shape of a series of derivative problems, the demanded resolution of which, in the order and connection prescribed by the formula, is developed in the sequel into an organon, yet to be a complete system, of Science { universal } Analysis.

NOTE. The isolated variety

$$\{ \quad \}$$
$$\{ \ x \ \}$$
$$\left\{ \begin{array}{c} \text{individual} \\ \text{general} \\ \text{universal} \end{array} \right\}$$

is necessary and sufficient to integrate or satisfy the isolated differential equation

$$\text{ideal} \left\{ \begin{array}{l} \text{intuition} \\ \text{concept} \\ \text{idea} \end{array} \right. \qquad \left. \begin{array}{l} \text{synthesis} \\ \text{analysis} \\ \text{dialectic} \end{array} \right\} \text{method}$$

to which Kant's enumeration leads through the recognition of the enumeration in two equivalent formulas. Witness my

$$\text{ideal} \left\{ \begin{array}{lll} \text{intuition} & \{ \quad \} & \text{synthesis} \\ \text{concept} & \{ \ x \ \} & \text{analysis} \\ \text{idea} & \left\{ \begin{array}{c} \text{individual} \\ \text{general} \\ \text{universal} \end{array} \right\} & \text{dialectic} \end{array} \right\} \text{method}$$

8

DEDUCTION OF
WORK DEMANDED BY FORMULA

POSTULATE

I

$\triangle$ = a plane equilateral triangle the internal determination of which is only imaginary = the geometrical construction whether of the concept Science or of the concept Analysis referred to the vacant place of any correlative concept = the solution of one case of the general problem, Science { } Analysis;

II

$\triangle$ = a plane equilateral triangle the internal determination of which is real in respect of only the middle point of the altitude = the geometrical construction whether of the concept Science or of the concept Analysis referred to the concept individual = the solution of one case of the general problem, Science {individual} Analysis.

III

Resolution of all cases of Science {individual} Analysis = solution of one case of Science {general} Analysis.
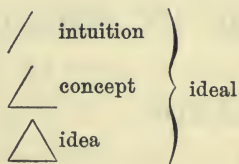
IV

Resolution of all cases of Science { general } Analysis = solution of one case of Science { universal } Analysis.
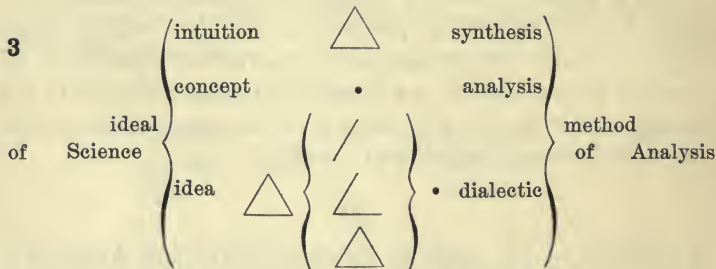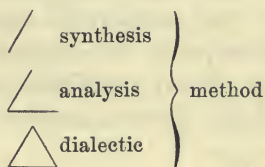
HENCE

the work by corresponding stages, as follows.

I   Resolution of all cases of Science ⟩   ⟨ Analysis achieved
in and through the integration of a simple differential
equation derived from the solution of one case.

1

2   of Science ⟩   ⟨ Analysis

3

where the imaginary term, derived from the imaginary dif-
ferential coefficient in **2**, and posited in the shape of a blank
space before Science and likewise before Analysis, should
not be overlooked; for it is necessary and sufficient in that
place to indicate the singular case of my original problem,
evidently the simplest case possible, which is alone in ques-
tion now.

NOTE. **2** arises from distinction of successive stages in the reproduction of **1** by degrees according to a constant rule referred to Science { } Analysis in relation to which the whole of **1** was postulated. Thus the stages in question ╱ ╱_ ╱\ given Kant's terminology, are found to differ whether as intuition concept idea according to the rule ideal — or as synthesis analysis dialectic according to the rule method — of Science { } Analysis.

3 arises from reference, in one to one correspondence, of the successive moments of two equivalent formulas obtained from **2** to the same whole of possible Science { } Analysis, which is thereby perfectly differentiated a priori; followed by the integration of the resulting differential equation. The second moment of the integral represents the necessary identity in all the variety presented by the first moment. For the first moment may be conceived to undergo a gradual shortening of unit line until all difference in the variety line angle surface vanishes, and nothing is left but the identity in the same, in the image of a point. So conceived the first moment stands to the second in the relation of variable to limit. The third moment of the integral represents the necessary reference of all the variety presented by the first moment, to the representation whether of the variable or limit in question.

II Resolution of all cases of Science {individual} Analysis achieved in and through the integration of a simple differential equation derived from the solution of one case.
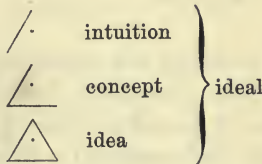
1

intuition
concept } ideal
idea

2   of Science {individual} Analysis

synthesis
analysis } method
dialectic

3

ideal of individual Science {

intuition   synthesis

concept   C
         D   analysis
      A   B

idea   AB
        ×
        CD   dialectic
        ‖
        ABC·D
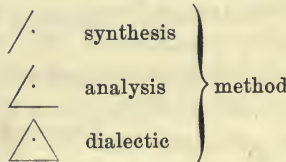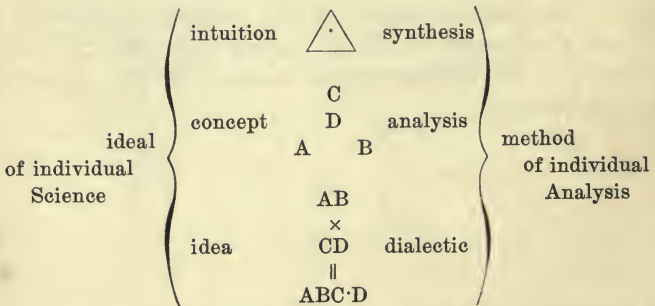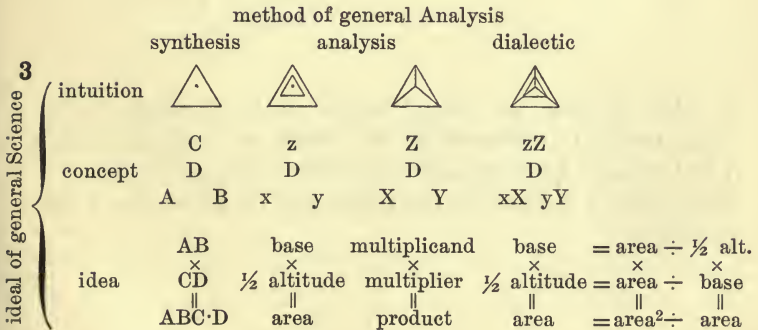
} method of individual Analysis

III   Resolution of all cases of Science { general } Analysis achieved in and through the integration of a complex differential equation derived from the solution of one case.

1

$$C$$
$$D$$
$$A \quad B$$

$$AB$$
$$\times$$
$$CD$$
$$\parallel$$
$$ABC{\cdot}D$$

2

$$\left. \begin{array}{l} \text{intuition} \\ \text{concept} \\ \text{idea} \end{array} \right\} \text{ideal}$$

of Science { general } Analysis

$$\left. \begin{array}{l} \text{synthesis} \\ \text{analysis} \\ \text{dialectic} \end{array} \right\} \text{method}$$

3

ideal of general Science

method of general Analysis

	synthesis	analysis	dialectic
intuition			
concept	C D A B	z D x y	Z D X Y	zZ D xX yY
idea	AB × CD ∥ ABC·D	base × ½ altitude ∥ area	multiplicand × multiplier ∥ product	base × ½ altitude ∥ area	= area ÷ ½ alt. = area ÷ base = area²÷ area

NOTE.   The complex form of the differential equation in **3** is rendered necessary by the specialty of the particular Science { x } Analysis in question.   Only through the *cross* reference of the two equivalent formulas obtained from **2** could the same whole of possible Science { *general* } Analysis be perfectly differentiated a priori.

IV a Derivation from the solution of one case, of a compound differential equation demanding the resolution of all cases, of Science { universal } Analysis.

	C	z	Z	zZ
	D	D	D	D
	A B	x y	X Y	xX yY

1	AB	base	multiplicand	base	= area ÷ ½	altitude
	×	×	×	×	×	×
	CD	½ altitude	multiplier	½ altitude	= area ÷	base
	‖	‖	‖	‖	‖	‖
	ABC·D	area	product	area	= area²÷	area

single	manifold	restrictive	intuition	
definite	definable	definitive	concept	} ideal
individual	general	universal	idea	
2				of Science { universal } Analysis
synthetical	analytical	dialectical	synthesis	
"	"	"	analysis	} method
"	"	"	dialectic	

3 Here belong the empty tables A B C which follow. They perfectly differentiate the whole of possible Science { universal } Analysis, and constitute a compound differential equation demanding the resolution of all cases of that problem.

TABLE A		SINGLE	MANIFOLD	RESTRICTIVE	INTUITION OF UNIVERSAL SCIENCE
METHOD OF UNIVERSAL ANALYSIS	syn.				
	an.				
	dia.				
	synth.				
	syn.				
	an.				
	dia.				
	anal.				
	syn.				
	an.				
	dia.				
	dial.				

15

TABLE B															DEFINITE	DEFINABLE	DEFINITIVE	CONCEPT OF UNIVERSAL SCIENCE

METHOD OF UNIVERSAL ANALYSIS

dial.	dia.	an.	syn.	anal.	dia.	an.	syn.	synth.	dia.	an.	syn.

16

TABLE C

METHOD OF UNIVERSAL ANALYSIS

	INDIVIDUAL	GENERAL	UNIVERSAL	IDEA OF UNIVERSAL SCIENCE
syn. an. dia. synth.				
syn. an. dia. anal.				
syn. an. dia. dial.				

17

IV **b**   Essay to refer recognized moments of the demanded
resolution of all cases of Science {universal} Analysis each
to its proper place in the formula demanding the resolution.

On the supposition that pure reason, constant as the
faculty of Science {function} Analysis in all rationals of all
times, but varied through all moments of a maximum dif-
ferentiation and integration of that function in different
rationals of different times, has somewhere in some context
already cognized every step in the solution of every case of
Science {universal} Analysis, but has not yet recognized
every step in the solution of every case in its proper place in
the resolution of all cases ; I propose to search out all and only
the cognitions that are the content of that resolution, and
arrange them each in that proper place as fixed for it a
priori by Tables A B C.   To be sure the task is not for
only one rational, but for every one interested in the
development as much as possible in himself of the same
faculty that aforetime made the cognitions, and is now in
his person called upon to recognize what it has itself in other
persons already produced according to a fixed and ascertained
formula.   My own discovery of the required cognitions and
reference of them to this or that place in the formula is sure
and complete as regards the solution of only one case of the
general problem in question ; but all that is wanting to the
perfection of the demanded resolution will undoubtedly be
found, if able men, and such as are acquainted with what is
classic in the use of pure reason, will endeavor to recognize
the missing cognitions by the general but sufficient marks
that relegate them to one or another place in the formula
in correlation with one or another moment of the singular
solution.

	SINGLE	MANIFOLD	RESTRICTIVE	INTUITION OF UNIVERSAL SCIENCE
dial.	$\dfrac{\text{base} \times \frac{1}{2}\text{altitude}}{} = \text{area} \div \frac{1}{2}\text{altitude}$			
dia.	$\frac{1}{2}\text{altitude} = \text{area} \div \dfrac{\text{base}}{}$			
an.	$\text{area} = \text{area}^2 \div \text{area}$			
syn.	multiplicand × multiplier = pr.			
anal.	base × ½ altitude = area			
dia.				
an.				
syn.	AB × CD = ABC·D			
synth.	$\begin{array}{c} zZ \\ D \\ xX\ yY \end{array}$			
dia.	$\begin{array}{c} Z \\ D\ \ Y \\ X \end{array}$			
an.	$\begin{array}{c} z\ \ \ y \\ D \\ x\ \ \ y \end{array}$			
syn.	$\begin{array}{c} C \\ D\ \ B \\ A \end{array}$			
syn.	◁			
dia.	◁			
an.	◁			
syn.	◁			

METHOD OF UNIVERSAL ANALYSIS

TABLE B — CONCEPT OF UNIVERSAL SCIENCE

TABLE B	DEFINITE	DEFINABLE	DEFINITIVE	CONCEPT OF UNIVERSAL SCIENCE
dial.				
dia.				
an.				
syn.				
anal.				
dia.				
an.				
syn.				
synth.	intuition concept idea $\Big\}$ ideal	synthesis analysis dialectic $\Big\}$ method	negation reality limitation $\Big\}$ quality	science $\Big\}$ analysis science $\Big\}$ x $\Big\}$ analysis science (individual) general (universal) $\Big\}$ analysis $\bigg\}$ science {function} analysis
dia.				
an.	number function extension $\Big\}$ limit	discrete discursive continuous $\Big\}$ magnitude	unity plurality totality $\Big\}$ quantity	arithmetic algebra geometry $\Big\}$ differential calculus {integral

METHOD OF UNIVERSAL ANALYSIS