Brouillons qui semblent apparentés à:

19-1

Abstraction from Matter I - III

et à Reckoning with the Computers ~~dans~~ in

The Hollow Universe

of a standard agreed upon, like the meter. And if he may claim to know anything about what lies beyond the immediate reach of our senses — way out there, or even far within our very organs of sensation — he must make this basic assumption: that the numbers, magnitudes and quantitative modes that lie beyond the scope of sensation are yet one in nature with those we can actually sense.

We sometimes fail to realize the extent to which the measure-numbers of physics are inseparable from a basic standard of length, from scales, clocks, thermometers, and so on; they are not gathered freely like the numbers and magnitudes of mathematics. More than that, they are not really definitions (in the strict sense of definition), for no measure-numbers of physics — not even length, the simplest of them all — can be made known except by designating some sensible this, here and now. To convey meaning by designation is to define the name or the symbol, as distinguished from expressing what that which we mean is? Webster shows what the term 'meter' signifies, in the following, adequate way: "The meter as now defined ..... elsewhere." Different kinds of measure-numbers are inseparable from the different kinds of contrivances and operations we perform to obtain them, to each of which the standard of length will be basic.

In other words, the measure-numbers of physics comprise a background, not merely like the one implied

It seems that
if secondary qualities were inherent in
this whole universe of ours, ~~would if not~~
~~below that~~ else, would be allowed ~~towards~~ preposterous questions,
~~like~~ in terms of ~~the~~ proper sensibles, like:
What would the universe as a whole feel like?
Hard or soft, warm or cold, ~~wavy~~ dry or wet?
And what would be its hue? ~~But we do not~~
~~have to go to such limits~~ ~~There is no need to~~
~~go that far to realize~~ The limitation to be put
on 'sensible qualities' when applied to the whole
of nature is sufficiently borne out by more
appropriate questions like: "What is the weight
of the sun? What is the temperature at ~~the~~ its
~~the~~ center? The answer will be given in terms
of measure.

We err most frequently with regard to what is sensible per accidens only, viz. the subject to which we attribute quality or quantity.

First in point of quality, like when we confuse honey and bile because of their resemblance in colour; but this can be corrected by perception of some other quality, like odour, or taste. What bile is, or what honey is, can never be described except in terms of per se sensible objects, proper or common.

Second, in respect of what is incidentally sensed in connection with common sensibles, like when we are lead to believe that the line drawn on the blackboard is an uninterrupted continuum; or water a solid homogeneous body like the three dimensional continuum of geometry; or that top of a polished desk appears to be a plane surface lying evenly on itself. Our judgment is correct when confined to stating that these objects provide us with the appearance of continuity and solidity. We err when we go on to judge that the surface is a plane, or the desk a solid, like the ones we consider in abstraction

That the subject is a contin. . . . .

of the object seen or touched

Duplex error here. First should be treated above circa error in comm. sens.

Here import. of sens. matter! C.S. are not pure quantities. The parts are neither sheet points nor solid masses.

Sensus intellectui comparatus res quaedam: sic falsus et verus sicut res:

Si (a) ut res quaedam, quo modo falsitas in sensu intellectui comparato, quia eo modo quo ut res disponitur, sc. hoc dispos. ad intellectui demonstrat.

Non possunt omnino annuntiare nisi affectionem suam.

(b) Si comparatus ad intell. secundum quod sensus est indicativus alterius rei:

- Sic potest esse falsus, in quo natus est facere falsam existimationem in intellectu, quamvis non necessario, quia intell., sicut judicat de rebus, ita et de his quae a sensibus offeruntur.

Unde: intellectui comparatus semper facit veram existimationem in intellectu de dispositione propria, sed non de dispositione rerum.

Si sensus comparatus ad res, hinc in sensu est falsitas et veritas per modum quo in intellectu.

Perception of surface:

The surface of a polished stone is seen and felt as wholly even, without any interruption whatsoever, so that unless warned by experience, we ~~A polished surface gives us a sensation of evenness and~~ we immediately pass on to judge that it is even like a geometrical the plane surface of geometry. So far as we can, the stone is quite solid, and ~~the direct sensation~~ would my eyes cannot see it as a swarm of widely spaced particles ~~in a gas~~ and – the desk mainly a void.

an unbroken continuum lying evenly on itself.

If means only that this object is ~~firmly~~ perceived ~~in an apparently~~ as something uniformly resisting my touch

Mathematical abstraction goes on continually while we sense. We immediately separate surface from sensed surface. We cannot get back to the latter from the former. What I consider in abstraction is guaranteed to exist ~~in fact~~ only in the sense of time.

Sensible substance becomes like a geometrical solid.

de la les formes a priori de Kant.

Drawn rep. parts which of parts, and body parts ... in three dimensions of space, but what the parts are ...

If defining with sensible matter implies that whatever is so defined must be actually sensible, then – apart from assuming that the actuality of being sensed is inherent to the sensed – our knowledge of nature would be confined to the narrow range of what can actually be ~~sensed by the senses / perceived~~ ~~viz. to what is per se sensible~~ sensed as a per se object of the sense-faculties, thus excluding from the study of nature even the subject and principles of what there is per se sensation of.

Moreover, that way of understanding sensible matter actually denies it, for sensible matter is not something per se sensible at all. The hardness of the bone, is its resistance to touch, is not the bone, and the colour of the flesh to sight is not the flesh, ~~the subject of these qualities is not sensible per se, but only incidentally so~~ We know these qualities as 'of something'. Now their subject itself is not per se sensible at all, but only incidentally so.

nor is the surface seen as coloured, the flesh.

~~It is with regard to~~ this kind of
incidentally sensible object [illegible]
is the occasion of many errors. Our
imagination soon ~~[illegible]~~ clouds the very
notion of substance, burdening ~~to burden~~ it with
all kinds of properties that really
have nothing to do with ~~[illegible]~~ substance
~~[illegible] like 'to be solid',~~ such as
*to be one like the ~~an~~ undivided volume of
geometry, ~~to have its parts~~
such as being underneath the sensible
qualities as the house is underneath
its roof
Always try to express it in terms
of per se sensibles.
~~Let me see one in the way I see colour.~~
Or in the universe all by itself, without — To be in itself = to be all by itself, or independence of Leibniz.
support of earth — the earth needs
no elephant to rest on.
Try to manifest something obscure ~~explain the obscurity~~ in terms of something else nobody else. ~~of the other~~. Like the early phil who said that substance is water
Or does not change in the sense in
which a size may remain the same
for a time.

1° in terms of per se sensibles.
2° .... something equally obscure in point of what it is to be substantial.
Like subst. is water, so that to be a substance, and to be water id.

To be sensed, the thing must have an actuality, but this actuality that it has is not the actuality of being sensed: this actuality is produced on the part of the knower, and can in no way be attributed to the thing sensed.

— and because of which it can act upon the sense

— of what is sensible in act

"Now the view that [if there would be faculty of sense] neither the sensible qualities ..... no less the case.

Hence, the division of sensible in act and sensible in potency is one that is taken from the sense itself and remains extrinsic to the thing sensed. The thing in itself is never more than sensible in potency.

"It is a paradox that the actuality of
the material should be stressed in mod. math.
For what is somehow 'out there' is already
divided. The operation is merely following
up what is 'done'.

That is why $a+b = b+a$.

There is a assumption here, nl. that $2+2=4$ is the
same as $2+2=2+2$.

Actually, if $2+2$ equals 4, there is no equality.
2 is divided from 2, where is 4 is only divisible.

The calculator does not divide the number. His
division merely shifts what is already divided.
Otherwise he would have to see that, though not
divided, it is divisible.

The assume more, viz. that division is made,
and less, nl. that there nothing to be divided,
except in the operational sense, which soon
turns out to be an activity that is not mental.

Then, what is to be made known is not known or defined
except by this operation. And so there is nothing
at either end: not an absolute notion of number
apart from or consid., and no consider. apart from
the operation performable by the machine.

It is in ~~the~~ an order of activity like

This may be what is meant in saying that modern logic has attained to a rigour and detachment hitherto unknown to man. Lord Russell, for instance, as well as every modern logician of repute, has denounced the Aristotelian doctrines of logic as "wholly false, with the exception of the formal theory of the syllogism, which is unimportant." (202)

.....

Philos. should be much relieved by exodus of so many now devoting themselves to this useful activity. The relief would be complete if they could spend all of their time instead of wasting so much breath telling the "philosophers" that they are silly when Russell performed this kind of purge upon Leibniz. it. We have even heard of people who thought they could disprove the existence of God from within this kind of logic. This type of operation may have had its compensation in the head of the mathematician. But that could only have been in as much as it was associated with elements foreign to the formal structure contained and working along in the machine.

The modern log. or math., then, is concerned with deductions made in terms of the kind of operation that can be performed by a machine.

All doors closed, but the house so full of emptiness that there would be no room anyway

Can't step into my imagination like into a room.

Rigour in sc. and rig. in calcul. are two things.

Not possible without objects.

We certainly can no longer define circle ....

because that would imply that we know 'what it is to be a circle'. Like trying to come back to rational animal once we have decided that he can be no more than a bundle of events.

Should not be disturbed when he says that all we hold is false, as can be seen from what he says of 'false'.

To generalize a line is a fiction - helpful, though.

Russell treats a man much like an Insur. Ag. does (not the agent).

Why? Like the Agency prese. from the agents. (The Agency must otherwise be unreliable. Special kind of responsibility.

Emotional reason for intersection of circle. (Actually they are on a plane and it seems they must cut.)

~~Explication~~

It has been made very clear to us that the interpretation of the time-symbol t is not even a nominal definition of the name 'time' as it was and is still used without specific reference to the way of measuring it. And the same holds for the very name 'physics', meaning the 'science of nature'. The mathematical physicist does not, and would not define what the word 'nature' means in terms of measure-numbers although these may somehow refer to what the word is used to mean. He realizes that the 'world of experience' is essential to what he seeks to know, and that "all knowledge about reality begins with experience and terminates in it," for meaning that "conclusions obtained by purely rational processes are, so far as Reality is concerned, entirely empty."

Because ~~basically~~ quantity is ~~xxxxxx~~ basically ~~xxxxx~~ repetition of the same, giving rise to new kinds of unity, like 1+1=2, 2+1=3, etc.; and line is seen to ~~xxxx~~ be divisible into an indefinite number of lines, and by construction we reveal new types of quality in quantity. Nothing new has to be brought in from outside that is not reducible to number & magnitude. The forms ~~xxxx~~ of number ~~and magnitude~~ (like ~~xxxxx xxxxxxx~~ two-ness) and of magnitude (like straightness) are revealed by construction, as inherent to quantity ~~to abstractible by reason~~ which by reason of its priority with respect to what is sensible, can be abstracted in that way.

this is not true of reality, but it doesn't matter: unconditionally

You can always have more of the same.

To have more readers of a given shade you need more room — a greater surface.

to the repetition of one, the n. of n. ; to the other, the principle of magnitude.

This leads us to the subject peculiar to quantity: intelligible matter.

The notion of intelligible matter.

Then, what would the quality be qualify? It must not be the quality of what is incidentally sensible, for there must be of other too sensible matter - of what, then?

17. What is meant by abstraction from movement.

It was said that there can be science only insofar as there is abstraction from individual sensible matter — namely because of the unspecifiable repetitions implicitly involved in material individuation. It is likewise added that science must also abstract from movement, inasmuch as there can be science only of what is necessary, while ~~what implies a potency to be and not to be~~ movement is opposed to the necessary inasmuch as it involves a ~~potency simultaneously potency of opposites~~ potentiality which is simultaneously a potency of opposites. Where one and the same thing is at the same time in potency to be and not to be.

no definition

no always of what it is.

Socrates a man only so long as he exists. While he exists he can cease to be. Then, like if triangle ceased to have its angles.... or the diag ceased to be incommensurable

~~MT implies constant otherness~~

17. What is meant by abstraction from movement?*

It was said that there can be science only insofar as there is abstraction from individual sensible matter, the reason being that there can be no definition of individuals that are an inexhaustible repetition of the same. It is also said that science must likewise abstract from movement; and the reason here is that on the one hand science is about what is necessarily true, whereas whatever is in movement implies the possibility of being other than it is. If science had to conform to the thing that changes, then, science would have to change with the thing as it changes, like in the case of sensation. Hence any universal statement about the changing subject would be false. For that 'Socrates is walking' is true only so long as he is actually walking; and if there were a science of Socrates' walking, it would cease to be a science when he stops. Geometry would be destroyed if the triangle ceased to have its three angles equal to two right angles, or if the diagonal became commensurate with its side. Science would be the same as sensation. So far as the senses are concerned the object ceases to be when it is no longer sensed.

necessary, and hence necessarily true,

at the same time

to remain true, then its truth would necessarily be turned into error

For the senses, to be true, must change along with the object. For the senses change along with the object as it changes.

And if we thought as we did until quite recently that universal notions and propositions are readily plucked from nature like cherries from a tree, we can do no more than put it down to the animal who spends most of his time in errors beginning in sensation. It remains important to realize however that even here it is still the value of sensation which ultimately leads to its own correction, somewhat like when sight corrects the impression of roundness conveyed by touch when two fingers are crossed over a single marble.

In what sense the definitions of physics are definitions.

In showing that the mathematical physicist defines with sensible matter we have actually done more than that – we have found that he must always refer to the particular standard of length. And this is not like when in reply to the question "What does 'man' mean?" we point out any man who happens along. It is as if we always had to refer to this particular man called Socrates, and if any other man were referred to it would be valid only insofar as that other man would be a reasonably faithful instance not of man but of Socrates. If we take the meter as the standard of length, we interpret the name by referring to the particular extension in one direction of a certain platinum-iridium metal bar kept in Paris, when its temperature is 0 C°; or if we take the 'yard', we mean ....

not to any standard. It is as if when speaking of man we always had to refer not to any man who happens along, but to this particular one Socrates.

In his famous ~~example~~ illustration of how the physicist treats the elephant sliding down a grassy hillside, Eddington points out that the math. physicist is concerned only with the pointer-readings obtained by the measurements applied to the elephant. Now the weighing-machine is quite indifferent to what it is that is being weighed. Enough coal will provide the same measure number of two tons. By the time the physicist gets through with him the elephant has faded out of the picture, and the thing that really did descend the hill can only be described as a bundle of pointer readings. "It is this "connectivity of pointer-readings, expressed by physical laws, which supplies the continuous background that any realistic problem [in physics] demands." p. 255. And so "We have dismissed all preconception as to the background of our pointer-readings, and for the most part we can discover nothing of its nature." p. 259.

= the weight, bulk, time, friction,

Plainly, this kind of information does not [illegible] enlighten us on the nature of ~~the elephant~~ our elephant, but it does tell us that ~~happens~~ when something of a given weight and bulk slides down a slope of such a degree, it takes such a time to reach the bottom. The point is that no matter how indifferent is the specific nature of the things thus described, something is involved ~~what difference is there~~ Whether the physicist considers a curve, whether

that is not pointer-readings.

it is the curve of a sunbonnet or the curvature of the moon may be quite indifferent. But it must be the curvature of something or other. ~~[illegible]~~ The 'something or other,' if we try to picture it in the way we do an elephant, just as the elephant ~~[illegible]~~ would be obtrusive if his nature were ~~[illegible]~~ forced upon us by sheer ~~[illegible]~~ bulk and weight. But there is a background, expressed as 'sensible matter', whatever kind of subject it may be.

becomes indeed obtrusive ~~if~~ when

Background not behind the meas.-n. in the way the way the wall is behind Socrates, nor beneath like the ~~[illegible]~~ floor under the table.. It is "knowable to mind" i.m. knowable to mind, not per se to the senses.

What is the difference between the form of a ~~[illegible]~~ and a vaguely corresponding form in geometry? The reply does not have to be so committal as to state that the former is a form of a 'material mass' of something. But it must be the form of something sensible, even it cannot actually be sensed. Not matter in the sense in which the physicist intends it when he distinguishes matter from energy — and he does the same with body and wave.

liquid wave, we can only something designate as incidentally sensible.

Edd. refers this to consciousness — rightly, if he means ... knowability. This is conveniently vague enough, but still refers to knowledge and the kind obt. through the senses, in a way in which geometry is not.

That background is not properly expressed in the measurements, and Edd. is rightly careful to avoid this: what he knows of it as expressed by M.N's is not what it is whether an elephant — for it might be a rock. And the things it might be an innumerable. No can, it has bulk and registers weight.

~~[c] Errors with regard to the incidentally sensible.~~

Those who are disturbed by this ~~wariness towards immediate knowledge by the senses~~ by ~~the~~ ~~ ~~ this propensity to error in the spontaneous judgments that attend our sensations, and who feel ~~more~~ less at home with ~~appearance than with truth~~ the truth than with the appearance of it, ~~truth~~ by the insistence upon the distinction constantly to be made between appearance and truth should be reminded that it is precisely when we ~~[illegible]~~ are the appearance of truth and truth when we ~~yield too~~ readily ~~to our prop~~ yield to our propensity to take the appearance of truth for ~~truth itself~~

should be reminded that the original task of science is to dispell appearances, and that "error .... is time." (2) We should be made aware of the fact that there is a vast difference between ~~the~~ knowledge sufficient for practical ends and knowledge for the sake of knowing. ~~In ~~ ~~ the practical life we can ~~ ~~ manage fairly well with~~ the kind of certitude ~~about the things~~ ~~or opinions~~ about the things of nature for the purpose of making...

and the exigencies of certitude when we seek knowledge of nature for the sake of knowing, for here we must conform to what things are in themselves.

If every measure-number of length must always include reference to a contingent this-here-and-now — like the platinum-iridium bar in Paris, or a copy of it elsewhere, or at any rate to something equally designable, like the Imperial yard, viz. a certain bronze bar kept at the Standards Office of the Board of Trade, Westminster, England, or to some copy of it elsewhere, — we ought to realize that the department of natural science — to which, is the occasion of many of the difficulties brought to bear on the scientific status of sensible qualities — cannot even leave behind the wholly contingent qualitative sensible thing, viz. the conventional standard, and still claim to furnish knowledge of reality.

Lord Russell's Mr. Smith becomes a fiction.

He is deprived upon individ. sensible matter of the metre, the standard which is basic — necessarily a swarm of individuals — whatever that may mean in connection with the platinum-iridium bar in Paris.

is somewhat more comforting:

(1) La relatività...

What Aristotle says in Metaphysics II may help us in this predicament:

"The effect....... of nature has matter." (2

Concerning the notion of science as applied to mathematics we must appreciate two assumptions made by Aristotle and Euclid. First, that the art of calculation used in mathematical science is not the science itself. Plato called it logistikè. Calculation, no matter how rigorous, is not what they called demonstration, although mathematical demonstration uses it. Second, they assumed that ~~continuous and~~ continuous and discrete quantities are irreducible subjects, the latter essentially more rational than the former — ~~while~~ calculation applies to both, while ~~but~~ this cannot be used to distinguish them a priori.

, so that geometry cannot possess the exactness ~~of~~ of arithmetic. Yet the same art of

When we realize what Lord Russell means by mathematics, we can see why he should be so severe with Euclid. What Aristotle says about those who would have everything done accurately should not apply to Russell, seeing that ~~states,~~ after all, ~~appear~~ of accuracy

is to be found anywhere it ought to
be in Mathematics, as Aristotle held;
and that is after all what Euclid
is about. However, what Aristotle could
not appreciate is that one day the art of calculation
was to be identified with mathematics, that the mathematician would
no longer be concerned
with what lines, figures, or even numbers are
independently of the operational definitions we construct. without
We could foresee that this emancipation
of what Poincaré calls form we could not
have the valid physical theories of our time.

demonstration

Yet we fail to see how
Euclid's of the existence of the equilateral
triangle is weakened as a demonstration by the fact
that it cannot be resolved to the simplicity
and clarity of $A \equiv A$. (1) But once we

(1) If Lord Russell's view of the transcendent character of what he calls logic (which has nothing whatsoever with what A. called by this name) is valid, we should be allowed to define somewhat as follows: Logic is when we take the non-letter A to do with it all that one can without bringing in anything new, except, perhaps, non-A. Is about this

we may say that it is the subject in which we never know what we are talking about nor whether what we are saying is true.

make the name 'mathematic' signify the art of calculation,
Lord Russell, and we all agree with him hereafter,
must have his day. From then on the distinction between geometry
and arithmatic may be defined 'when one fails to see that
they should really be the same.' If then pedants insist that geometry
is worthless unless it can have the rigour of arithmatic, which

One might recall at this point that
the incidentally sensible subject Socrates
seems much the same as what ~~we~~ is named
'substance', and more particularly
'primary substance'. But 'substance'
has far too many meanings, most of
which are irrelevant to what we intend
here. We shall therefore avoid ~~the use of the term~~ using that term
~~of this term~~ until we meet a problem
that requires ~~a~~ verification ~~of the word 'substance'~~
The subject we have in mind here is
something sensible, though only incidentally
so, and ~~was~~ with regard to what is per se sensible it is proportionally
like the matter of the
bowling-pin

Lord Russell's 'I' stands for a mere bundle, like the pronoun 'we' in 'We, the Cricket Club;' so that if a house could talk—and of course some do—, expressing itself in a critical fashion, it ought to say 'We, the bricks, boards, nails, ...;' and each brick should say 'We, the molecules, ...' and so on, with nothing knowing where to stop. Non serviam, when (20) used by us, must be drained of its ego altogether, and the ego replaced by bundled non-egos. Any other kind of self would presumably arise from the transmigration of some dictator's soul.—On the other hand, man, in the order (21) operation, must renounce thought as something proper to him above all else in nature; he is lowered to the level of mere tool, and thus can do no more than serve, a tool, like any instrument, being of its nature movens motum. A rather unusual tool, at that: an instrument without a principal agent, like a sign that does not signify, or a relation adrift without terms; for the the tool-maker and agent is buried by the idea of one computer giving birth to another, especially since Lord Russell has shown something to the effect that we may have tools of tools and nothing but tools without end, so that everything may well be in the service of nothing. Non serviam appears to be a boomerang. It is admittedly difficult to think or talk about these things (which reminds one of a chapter in Mr. C.S. Lewis's That Hideous Strength).

In the same Old Testament, to which A.M.Turing's instance of a theological argument refers, there is also question of one who declared Non serviam; Whereupon this person got himself involved in a multitudo negotationis(Eze.xxviii.16). St.Thomas explains, lapsing to the baroque, that "the activity of the Bearer-of-light, averted from the First One, was bent upon the many of inferior things, it being their primacy that he coveted"(QQ.Quodlibetales, qdl.5,a.7). Thought and action were turned towards the scattered multitudinous. The sophist, too, in his elaborate ratiocinations, unrestrained by truth, draws at will upon the infinite store of ens per accidens (including an infinity of logics), and thus contrives to make the worst appear the better reason and that which is the least to seem the most: whatever there is most of appears what more truly is, and nothing is but (17) what is not. For instance, of Mr.Smith, not to mention the events (18) composing him as a bundle, there are far more particles than men on earth. The choice will be simple enough: the many conveyed by 'a mere bundle' of fleeting 'occurrences' have far more the nature of sheer many than have the integral parts of a totum per se. Hence, to meet the new standard of being, what could be more suitable than to father the rational animal as a mere bundle of (19) occurrences rather than as a substance; for substance, as Lord Russell proclaims(with loud cheers from the gallery), is a "hopelessly muddle-headed notion". Still, seeing what the word 'substance' evokes in his mind(A History, pp.200-202), we must agree with the verdict. Accordingly, 'Mr.Smith' "is a collective name for a number of occurrences," somewhat as in the case of 'My name is Legion.'

(supra, p. , n.),

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formalized in such a way that

> one is able to see the structures of configurations of certain "strings"(or sequences)of "meaningless"signs,how they hang together,are syntactically combined,nest in one another and so on.
>
> A page covered with the "meaningless" marks of this calculus speaks for itself,as does a mosaic,an abstract design, a geometric diagram;...(1)

(1)Ernest Nagel and James R.Newman,Goedel's Proof,in The World of Mathematics,pp.1675-6.

What does'calculation'mean? The word comes from calculus,which originally meant 'pebble.' Long before the introduction of symbols,pebbles were used in counting, To calculate meant to make clear'how many'units there are were in a collection whose number was unknown,by comparing it with a collection of pebbles, ~~whose number was at hand~~ ~~The cardinal number of a collection was expressed in terms of a number of pebbles. Let the gateman drop a pebble in a bag for each person entering the amphitheatre; by adding up the pebbles he will know how many people have entered. The number of pebbles in the bag signifies the number of people.~~

~~Let the gateman use ten pebbles, putting one down for each person entering the amphitheatre, until his collection is exhausted; then mark to stand for ten pebbles,and so on. By adding up the , each standing for ten pebbles,plus the number of pebbles he used the last time,if it was less than ten), he will know how many people have entered. The number of strokes and pebbles signifies the number of people.~~ For when two or more classes are equal,we say that their number is the'same number',no matter what they may be the classes of— people,horses,or pebbles. To establish that two or more classes have the same number,is to achieve exactness or rigour. (x)

(x) A difficulty might arise here in connection with the notions equality, similitude, and sameness or identity. ~~We~~ said that the number of equal classes is the same number. E.g., if the number of a group of pebbles is ten, and equal to the number of letters in the name 'Washington,' the number of both classes is ~~identical~~ identical. But this does not mean that they are the same ten; one group are pebbles, and the other letters. Aristotle explains this in Physics IV, c.14, 224a2: "It is rightly said, too, ...and the other horses." (Oxford transl.) However, such distinctions and problems are irrelevant to the symbolic construction we are about to consider.

'Equal' is said of objects that are 'one in quantity;' 'similar' when they are 'one in quality;' ~~same~~ 'same,' in the sense of identical, when they are 'one in substance,' as in 'the man next door, and the one you saw at Mindy's, are the same man.' Now, we

(3) "David ~~Hilbert~~ Hilbert has in our day pursued the axiomatic method to

How can we show, in the light of a simple example, what symbolic construction means? In the case of counting with the fingers of one hand, to find the cardinal number of the letters in the word 'five,' 'five fingers' will signify the number of letters. But if instead of fingers we put down the symbol 5, the symbol itself can be used in counting, just as if the very symbol were the cardinal number of the class.

The cardinal number of the class C is thus seen to the symbol representing the set of all classes that can be put into one-to-one correspondence with C. For example, the number five is simply the name, or symbol, attached to the set of all classes, each of which can be put into one-to-one correspondence with the fingers of one hand.(1)

(1)Edward Kasner and James Newman, Mathematics and the Imagination, Simon and Schuster, New York 1949, p.31.

The reason why the arbitrary marks used in calculation are meant to "symbolize directly the thing talked about"(2), can be seen best in the case of large numbers. [illegible]

If, in performing the operations upon symbols we had to abstract from these symbols qua purely operational, and attend piecemeal to all the elements in the class, like in counting directly with pebbles, even 5 x 25 would be relatively involved; let alone 10^{10}, which, as a symbol, is perfectly clear, while no one can visualize such a number anymore than an infinite one. This means that in calculating we do not have to interpret the symbols in the operation itself; which is another way of saying that the operation is purely mechanical. If we had to keep in mind their meaning, as we ought to do when using words, we could get nowhere.(3) The interpretation of the symbols must remain quite extrinsic to the actual operations upon them; we must prescind from symbols as signs, divorcing them altogether from the order of representation, and commit ourselves to nothing that a machine could not do. In the

(2) James Newman, The world of Matematics, p.1852.

(3) "David Hilbert has in our day pursued the axiomatic method to its bitter end where all mathematical propositions, including the axioms, are turned into formulas and the game of deduction proceeds from the axioms by rules which take no account of the meaning of the formulas. The mathematical game is played in silence, without words, like a game of chess. Only the rules have to be explained and communicated in words, and of course any arguing about the possibilities of the game, for instance about its consistency, goes on the medium of words and appeals to evidence." Hermann Weyl, The Mathematical Way of Thinking, in The World of Mathematics, p.1848.

What should be noted at this point is that mathematics nowadays is held to be exactly the game with meaningless symbols played according to fixed rules,and that,as Poincare said,it is no more necessary for the mathematician than it is for these machines to know what he is doing. Like the symbols,the operations themselves are meaningless, until the non-mathematician interprets them.

What strikes us first of all in the new mathematics is its purely formal character. 'Imagine,' says Hilbert,'three kinds of things,

which we will call points, straight lines, and planes; let us agree that a straight line shall be determined by two points, and that, instead of saying that this straight line is determined by these two points, we may say that it passes through these two points, or that these two points are situated on the straight line." What these things are, not only do we not know, but we must not seek to know. It is unnecessary, and any one who had never seen either a point or a straight line or a plane could do geometry just as well as we can. In order that the words pass through or the words be situated on should not call up any image in our minds, the former is merely regarded as the synonym of be determined, and the latter of determine.

Thus it will be readily understood that, in order to demonstrate a theorem, it is not necessary or even useful to know what it means. We might replace geometry by the reasoning piano imagined by Stanley Jevons; or, if we prefer, we might imagine a machine where we would put in axioms at one end and take out theorems at the other, like that legendary machine in Chicago where pigs go in alive and come out transformed into hams and sausages. It is no more necessary for the mathematician than it is for these machines to know what he is doing."
-- Henri Poincare, Science and Method, trans. F. Maitland, Dover Publications, Inc.: New York, 1952, p.147

change in the meaning of words arises when their application is broadened because of a metaphorical extension of their meaning. Thus 'governor' originally meant a steersman on a boat, 'spirit' meant breath; a bend in a pipe is called an 'elbow,' the corresponding parts of a pipe-fitting are called 'male' and 'female,' and so on." (I do not know whether the authors imply that every extended meaning of a word from its original meaning is metaphorical. At any rate, we distinguish between metaphor, where the meaning of the word is not changed, as in 'the lion-hearted,' and analogy, in which a new meaning is imposed upon the word, as in 'the light of new evidence,' or 'the governor of the state.' In both examples (light, governor), the same word may be interpreted either as a metaphor, or as an analogous term, (Cf. St. Thomas, Q.D. de Potentia, .) The point we wish to make is that if all extended meanings were metaphorical, it follows that the proper sense of a word must be identified either with 'that whence the word was taken to signify,' as 'understand' from 'under' and 'stand;' or with 'that which the word was originally intended to mean,' as 'matter' for timber. Hence, if a man sees that 10^{10} is a large number though small compared to the infinite, 'to see' must be taken as a metaphor. No words like 'understand,' 'confer,' conclude,' and so on, could possibly signify anything proper to man.—

(M. Cohen and E. Nagel, op. cit p. 119.)

extended meaning

namely, when the first meaning is still the only one retained;

when a new, extended, meaning is established.

Cf., in the next issue of Laval théologique et philosophique (vol. , n. 2, 1956), our notes on Abstraction from matter.

Symbols are directly what we are talking about....
That is why Russell can put down:

1, 2, 3, 4, ...
2, 4, 6, 8, ...

and say that the two rows are equal, in that there are only as many symbols in the top row as in the lower lower.

Thus a logical construction, starting from anything or nothing, can start from a symbol to build up all of logic or mathematics.

When we say $x = x$, we mean that ... we are talking the same symbol over again; not that we are not saying that one is the other

Or, $x \equiv x$, provided x_a is exactly identical with x_b.

In the same Old Testament, to which [redacted] A.M.Turing's instance of a theological argument refers, there is also question of one who declared: Non serviam! & Whereupon this person got himself involved in a multitudo negotiationis (Eze.xxviii.16). St.Thomas, in a mood of baroque scholasticism, explains that "the [redacted] activity of the Bearer-of-light, averted from the First One, was bent upon the many of inferior things, and it was their primacy that he coveted" (QQ. Quodlibetales, qdl.5, a.7) Thought and action were turned towards the [redacted] mere multitudinous and the scattered, for their own sake. Now the sophist, too, in his elaborate ratiocinations, unrestrained by truth, draws at will upon the infinite store of ens per accidens (including an infinity of logics), thus contriving to make the worst appear the better reason and make to seem the least that which is most; ~~so that~~ / whatever there is most of appears what more truly is, and nothing is but what is not. / Hence,

→ For instance, of Mr.Smith, not to mention the events composing the bundle, there are far more particles than men on earth. The choice will therefore be simple, seeing that the many conveyed by 'a mere bundle' of fleeting 'occurrences' have far more the nature of sheer many than have the integral parts of a totum per se. Hence, to meet the new standard of being, what could be more suitable than to father the rational animal as a mere bundle of occurrences rather than as a substance, ~~for~~ for substance, as Lord Russell once decreed, rousing [redacted] loud cheers from the gallery, is a "hopelessly muddle-headed notion [redacted] what he has in mind as he uses that word, we might ~~be~~ agree with him). Accordingly, [redacted] 'Mr.Smith' becomes a collective term, as in 'My name is Legion.' On the other hand, man, in the order of operation, is lowered to the level of a mere tool, and thus can do no more than serve; a tool, like any instrument, being of its nature movens motum. (A rather strange tool, at that; an instrument without a principal agent, ~~like~~ like a sign that does not signify, or a relation adrift, without terms; for the maker and agent is buried when one tool gives birth to another, seeing Russell has shown ~~that~~ something to the effect that we may have tools of tools and nothing but tools without end, so that everything may well be in the service of nothing.)--Whether or not we believe in Sacred Doctrine is not at present to the point. The plain fact remains that the literature to which Turing refers sets forth a strophe for which we have provided an antistrophe: we have echoed the non serviam & ~~and~~ the attending desire of primacy for the sheerest many; not in the romantic way of Karl Marx quoting Aeschyles's Prometheus, nor by merely enslaving "some of these infernal machines" (as E.T.Bell calls them) to do the repulsive drudgery; but in identifying science with the mechanical process itself, making what goes on in the computer to be one and the same with the highest form of life, namely, thought. And it is worthy of note that the keenest joy is expressed when such reductions are made. Similarly, the scattering thought finds an entitative counter-part in the mere bundles that are Mr.Smith, Earl Russell, etc.; a dispersio that should be carried on and extended to the universe as a whole— the supreme heap of bundles that outbundles them all. Russell has said that we may one day blow up the universe, and he is appalled at the horrible [redacted] prospect. Yet, it being by nature already so much out of joint, one can hardly see what there is of the universe to explode, or that it could make much difference; nor why any one should really care, seeing that, to whatever there is in the universe it will be as if it had never been. Besides, it would all happen ~~most legally~~ / according to law.

We sincerely wonder why some so-called Thomists have found Lord Russell's criticism ~~unfair~~ of the conception, ~~he aimed to explain~~ as he himself explains them, is unfair. On the contrary, Earl Russell, I think, even when he says that it is all nonsense, is unreasonably on the timid side.

More generally, we can safely say that, if Russell's presentation of Aristotle is fair, the 'Philosopher' was a kind of hypostasis of asininity — a very dangerous one, at that.

quodquideratense

We can safely say, more generally, that if, in A History Lord Russell's presentation of Aristotle is ~~fair~~, a fair one, then the 'Philosopher' was playing a hypostasis of the quodquideratense called 'asininity' — a very dangerous one, at that.

Taking into account what modern ~~authors~~ critics have in mind when they use the word 'soul,' the aristotelean, whether averroist or thomist, may safely say that he has no such thing ~~nor~~ ever dreamt of having one; and they ought to shudder at the prospect of being caught dead with an 'immortal' one. Actually, Lord Russell's meaning of that term is ~~farther removed from~~ much farther ~~more remote~~ from Aristotle's than the exhaust of an engine,X ~~and we fully can understand his squeamishness at being denied such immortality. If 'immortal soul' means We can certain Surely we can do without any kind of undying exhaust and we can do without it just~~ No reason why Mr. Russell's dissolution should be trailed by an undying exhaust

and a man can do as well without it as he can without what Russell ~~has~~ means by the name 'substance'.

~~If a person may view with equanimity the dissolution of his self as being no more than — why get so excited about the dissolution of a bundle of such bundles?~~

Dr. George Pelletier
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Armour
Recons.
Scientist

WI 637

The computer as a friend.

Complete ~~dis~~ disintegr. of ~~human~~ intell. and no one is aware of it.

'asks' appears to be an understatement.

Of Thinking-machines and bundles of events.

Our newly made friends, the

The late A. M. Turing, an outstanding modern logician

A Baroque Speculation on Thinking machines and bundles of events

Turing, in a passage quoted earlier in this issue,

Our newly made friends, the computers.

In earlier papers we ~~off~~ quoted from A. M. Turing's *Can a Machine Think?* In the same O. T., to which

This question, too, has been answered.

It seems that if we knew just what to do to, we would be robbed of the spirit of adventure. People who want to be certain of something — even if only of nothing — have no place in our time.

There is always a danger when a reader offers suggestions about a ~~asm~~ sample of writing. Under the rubric of correctness (which often is a very pallid thing indeed), the reader makes remarks whose ~~effect~~ would be to rob the writing of all of its 'style' - the mind as approximately embodied in turns of phrase, and in the order and rhythm of parts within the paragraph and within the sentence itself. I am not in favor of the tampering with whole sentences by another. Therefore, at present, I have limited myself to suggestions that may involve an addition of a word or a short phrase, rather than interfering with the very march of the phrases themselves.

I just want to mention a consideration which you probably have reflected upon and judged. I mention it, not to criticize any of the sentences as such in the sample, but to alert you (as the New Englanders say) to a modern problem in style. The modern American has become accustomed, even in his school manuals, to a verysimple order within the sentence, which marches along almost unimpeded by modifying ~~le~~ clauses. In many of your sentences, there is a quasi-periodic structure in which the punch phrase comes ~~at~~ the last. To me this is admirable - but two factors should be noted. The modern reader, his taste in a puerile state fromthe impact of jet-propelled journalism, may feel entangled in a verbal thicket when he encounters subordinate clauses, especially if the matter is of any degree of difficulty. Thus, because of the irritation engendered in him ~~as~~ by his momentary panic in his progress through the sentence, he may fail to experience that glow of satisfaction when the illumination becomes full in the last clarifying phrase. Secondly: English has the defect of producing ambiguity and confusion in subordinate clauses becuase of its lack of identifying tag-endings on the words. Therefore, the modifiers of English clauses have to be as close as possible, and the antecedents of the opening words of a phrase must be clear.

I think that most of the time you escape the pitfalls admirably. I only want to suggest that sometimes the splitting of complex sentences into ~~two~~ or more sentences is the only graceful way of projecting a philosophic conception.

1. Will the reader understand the meaning of 'formalized' from the previous text?

2. Fowler might prefer 'as' instead of 'like' here; maybe: as our chips are used in playing poker. I suspect that 'used' should be inserted to maintain parallelism in structure in the two phrases.

3. Would it be necessary to say here: the <u>number of each</u>, or <u>their numbers</u> rather than <u>their number</u>? I just suggest it - I think that it is understandable as you have ~~in~~ it in the context.

4. Group is collective, I think. Perhaps could say ~~*~~ One group <u>is</u> composed of pebbles and the other of letters.

5. Fowler objects to 'the reason why'. Still, it is used widely in U.S. to-day. To avoid this use here would involve some intricate changing .

6. Is it possible that a reader ~~emy~~ may be confused by <u>qua</u> operational? e.g.- that the qua operational is the way the abstraction is made, rather than that from which the abstraction is made. True, the position you have given shows that qua purely operational modifies symbols. 'insofar as <u>they</u> are purely operational' may emphasize it.

7. 'let alone' is bothersome. I don't know if it is favored in writing, although you hear it in speech.

8. The last phrase gives at present an awkward relation to the rest of the sentence. Perhaps could say after 'outside the mind' and thus, no less than the symbols, drained of any meaning whatsoever.

9. I am of the opinion that expressions like this "inversely proportional to such and such" throws the ordinary reader. He usually has to stop and figure it out.

10. 'goes on in' is awkward in English and ambiguous. Also, I think the in has to be repeated: what is in (or perhaps - what is present in) and what takes place in...

11. Perhaps more clear to say: in the same way in which the stuff that the marks are made of is there in the machine.

12. Perhaps : it should be noted at this point that... sounds better than what should be...

13. Some might not see that human machinery is being talked about . Perhaps insertion of one word might make absolutely clear.

14. What does the 'this' refer to precisely? In the last sentence, you talked of man's perversity, but Turing doesn't mention that aspect, but rather refuses to make any distinction between man and machine, which is in the background of your previous paragraph.
Could you insert 'attitude' or 'view' - such as this attitude appears to stand out ; insertion might prevent wonderment about the antecedent of this. The when, which I suppose is a kind of introductory word to the quotation is too far removed ~~by the intervening~~ from that which it modifies by the intervening clauses. Or perhaps better simply drop the as. Also, the it here because of the relation to the this , becomes uncertain

15. that it is time to realize he is on a level with the wheelbarrow, though somewhat more involved, is likewise a refusal. I can't see the relation of the underlined to the rest of this part of the compound sentence. Perhaps something left out?

16. after old sense of 'thinking' - I think you have to insert something like - dominant in the period when. Otherwise, the when has no antecedent.

17. A small point - the they might be thought to refer back either to the ancients or todistinctions. Though I will admit, if you referred to the distinctions, the word these would have been used.

18. Here it might emphasize the importance of the contrast if the word meaning after single were underlined and also after many. Though perhaps the same emphasis could be gained by underlining the single and meany. Perhaps even underlining of meaning throughout would focus the attention of the reader onthis doctrine.

19. As matter for timber has the air of a pun in English. Perhaps - as matter meant timber .

20. The relation of : we had thought and named for reasons... is awkward. perhaps very clear: that which we had thought and that which we had named for reasons....
you see the we had thought is not given a clear relation to for reasons which...

Main reproach to Euclid. geometry: it is not natural, Gödel 49.

The Euclidean type of geometry fell from its pinnacle as a science in Aristotle's sense because it is not natural geometry. But was it ever intended to be so? Certainly not in Aristotle, nor is there any evidence for such a misunderstanding in Euclid. Geometry is one thing; its application to nature, quite another. (Cf. Aristotle, Physics II, c.2.) That Euclidean geometry is adequate to the study of nature, could never have been more than a hypothesis. Von Neumann's observation is very much to the point:

21. I wonder about the phrase save in the sense of wind. If the last part of the sentence is true, that there is no strictly scientific evidence for matter, how does the wind help us to talk about spirit.? Isn't the wind immaterial only by contrast to matter?

22. Perhaps you ought to specify further the word same here Perhaps same explanatory structure or some other substitute. As it is it sounds awkward.

23. Perhaps at end of this sentence add: which operates in mechanical fashion. In order to emphasize - else the sentence may end flatly and fail to impress its point.

24. I think that you have to repeat in latter part of sentence - and therefore man robbed or drained of his own nature. Perhaps the part in parenthesis is awkward unless add ~~which no longer~~ which then no longer exists except as an object of opporbrium.

and for thy guilt I must expell thee, guardian cherub as thou wert, from God's mountain; between the wheels of fire thou didst walk no longer. A heart made rpoud by its own beauty, wisdom ruined through its own dazzling brightness, down to earth I must cast thee, an example for kings to see. Great guilt of thine, all the sins of thy trafficking, have profaned thy sanctuaries; such a fire I will kindle in the heart of thee as shall be thy undoing, leave thee a heap of dust on the ground for all to gaze at. None on earth that recognizes thee but must be dismayed at the sight of thee; only ruin left of thee, for ever vanished and gone.(1)

(1) Knox transl.

St.Thomas explains, in a mood which some would call baroque, that "the activity of the Light-bearer, averted from the First One, was bent upon the many of inferior things, it being their primacy that he coveted."(2) Thought and action were turned toward the scattered and multitudinous, and the aim is to reduce everything to that! The sophist, too, in his elaborate traffickings, unrestrained by truth, draws at will upon the infinite store of ens per accidens (including an infinity of logics), and thus contrives to make the worst appear the better reason, and that which is the least to seem the most: whatever there is most of is purported to be what more truly is, and nothing is but what is not. What is Mr.Smith? A mere bundle of occurrences. The choice is a simple one: for the many convened by 'a mere bundle' of fleeting

(2) QQ.Quodlibetales, qdl.5, a.7, ad 1.

'occurrences' have far more the nature of many as opposed to one than have the integral parts of a totum per se. Therefore, to meet the new standard of being; to [redacted] assert the [redacted] primacy desired, what could be more suitable than to father the rational animal as a mere bundle of occurrences, rather than as a substance. Of Mr.Smith, not to mention the multitudinous events composing the bundle, there are far more particles than men on earth. Besides, substance, as Lord Russell proclaims (loud cheers from the gallery), is "a hopelessly muddle-headed notion." Accordingly, 'Mr.Smith' "is a collective name for a number of occurrences," somewhat as in the case "My name is Legion." [redacted] Each and every one of us are a crowd of something or other. 'I' stands for a bundle, like the [redacted] pronoun 'we' in 'We, the Cricket Club.' If a house could talk--and of course some do--, expressing what lies behind linguistic convenience, it would have to se say something like 'We, the bricks, boards, nails, etc.;' and, each brick in turn, 'We, the molecules...' and so on, with nothing knowing just where to stop. Besides, ~~that~~ whether

it would then be as if it had never been, it is not at all clear why it, or they should really care. Once we have banished the role of 'good' together with the organismic view[1]

(1) Some ~~xxxxxx~~ writers on cybernetics--some, like

Some one is told that

"It is an old tale now, how thou didst break in pieces the yoke of my dominion, didst sever all the bonds between us, crying out, I will serve no more! (Jer. ii. 20)

"Such a fire I will kindle in the midst of thee as shall be thy undoing, leave thee a heap of dust for all to gaze at." (Ez. 28. 18

XXVIII

16. Not clear whether we are to observe in the light of computer-philosophy or whether what has happened, has actually happened in the light of computer-philosophy.

The possible conjunction of light and observe tends to produce this ambiguity.

17. I think that inserting ~~app~~ after the word appears in this sentence "to be" might make it more easy for the reader. Otherwise, it is necessary to go over that part of the sentence several times.

18. It is permissible to begin sentences with an of. But its connection with the part to which it is connected is interrupted by the phrase "not to mention the events composing him as a bundle,". Perhaps in this particular instance i t would be better to state simply -"for instance, there are far more particles in Mr. Smith than there are men on earth, even if we do not consider the events composing him as a bundle."
I only suggest this - I realize in this sentence it is difficult to retain all the factors that you want. Still, as presently stated, it seems to me to be awkward.

19. The use of the words "to father" in this sentence might be bothersome. A question might arise in the mind of the reader as to the effect that is gained by it here; especially since it is not part of an extended metaphor.

20. The word 'nothing' here seems to take on a hypostatic character. perhaps it would be better to say "not a thing knowing where to stop."

21. Several points in this sentence that seem bothersome.

The necessity of the image of viewed is not apparent. It seems to obstruct the sense. A passive voice is introduced in the middle of a sentence in the active voice. Perhaps better to simply omit and say -"man, in the order of operation," or "at the level of operation" or some such.

The relation of "proper to him" and "all else in nature" is obscure. If it is truly proper, then it seems it cannot belong to other things in nature. Is the comparison: among all the things proper to him, this factor above all; or rather is it this factor is more proper to him than to any other thing in nature?

I think the last phrase might be changed thus - since a tool, like any instrument, is of its nature movens motum.
Otherwise, the word tool seems to partake of ~~took~~ two functions simultaneously. 1. naming as a noun and thus #emphasizing) what is contained in the pharse "thus can do no more than serve," 2. is the subject of the subordinate clause that completes the sentence. I think this 'blinking' should be avoided.

22. The words "it being" seems awkward here. Is it better to say, "yet, since it is, scientifically speaking,.." I think that the participle being suspended as it is, seems more awkward than the straight indicative.

-- Whether or not we believe in Sacred Doctrine is not at
present to the point. The plain fact remains that the literature
to which Turing refers sets forth a strophe for which we
have provided an antistrophe. We have echoed the <u>non serviam</u>
as well as the attending desire of primacy for the sheerest
many. The first, not in the romantic way of Karl Marx
quoting Aeschylus's <u>Prometheus</u>; nor by merely enslaving
"some of these infernal machines" (as Mr. E.T. Bell calls them)
to do the more repulsive drudgery; but in identifying knowledge
and science with the mechanical process that may attend them; in declaring
xxxxxxxxx what goes on in the computer to be one and the same
with the highest form of life, namely, thought. Nor is it without
significance that keenest joy is expressed when such reductions
are made. As to the desire of primacy for the multitudinousness
of the inferior things, we have carried it to the order of the
negative many. For it is worth noting that Russell, in his remarks
on St. Thomas's "arguments professing to prove the existence
of God," should be caught in a 'logical fiction' in the kind
of infinity which draws its meaning from the art of calculation.
"All these [arguments], except the one from teleology in lifeless
things, depend upon the supposed impossibility of a series
having no first term. Every mathematician knows that there is
no such impossibility; the series of negative integers ending
with minus one is an instance to the contrary" (<u>op. cit.</u>, p. 462).
Further, the scattering thought finds an entitative counter-part
in the mere bundles that are Mr. Smith, Earl Russell, etc.;
xxxxxxxxxxx a <u>dispersio</u> that should be carried on and extended
to the universe as a whole--the supreme bundle of bundles outbundling
them all. Russell has said that we may one day blow up the universe,
and he is appalled at the prospect. ~~Yet, it being, scientifically~~ (22)
speaking, so much neither in nor out of joint, one can hardly see
what there is of the universe to explode in any significant sense;
nor is it at all clear why one should really care, seeing that to
whatever there is in the universe it will be as if it had never
been. Besides, it would all happen according to law. If Mr. Smith
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
can accept his incumbent dispersal as he can the dissolution of
a cricket club, why should the same not hold of the whole bundle
of humanity? At least no one will experience surprise, as Lord
Russell might point out. "Suppose you are walking in a thunderstorm,
and you say to yourself, 'I am not at all likely to be struck
by lightning.' The next moment you are struck, but you experience
no suprise, because you are dead. If one day the sun explodes,
as Sir James Jeans seems to expect, we shall all perish instantly,
and therefore not be suprised, but unless we expect the xxxxxxxxxx
catastrophe we shall x have been mistaken" (<u>op. cit.</u>, p. 822). We now
have sound human reasons for expecting some kind of sudden dissolution
of all human bundles, but why should we call it a catastrophe? Explosions
are going on in the universe right along, nor could we live without
them, and who cares about the sun being burnt? Perhaps the xxxxxxxxxx
distinction some people insist upon between the rational and the
irrational is really the xxxx revelation of a basic cruelty of
man towards all other creatures, especially towards the ones that,
presumably, cannot suffer.

, besides being sciences, they are also

The sciences of ~~Both~~ logic and mathematics are also called arts, "~~because they have only knowledge~~ "because, in them, there is not only knowledge, but also a work, that comes directly ~~immediately~~ from the reason itself; such ~~forming~~ as making a construction, a syllogism or a ~~[illegible]~~ phrase [oratio]; numbering, measuring, forming melodies and computing the course of the stars." | In Boethium STh de Trinitate, q. 5, a. 1, ad 3.

But the notion of construction, of measure, or of syllogism ....

We do not construct the equilateral ...
although ... by constructing an equil. line
and now. Comparable to [illegible]
of colors by [illegible] line and lines.

Civilisation du travail
How much the [illegible] of our time is a
mathematical [illegible] to the extremes.

To observe what is prism.
From the machine cannot demonstrate
to make, give another machine. Thus
[illegible] .... in a very natural way,

Then when he says: "But since the combination and the separation are in thought, etc."

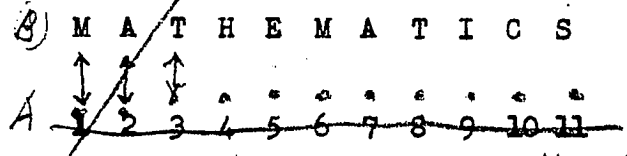
He eliminates being as true and being by accident from the principal consideration of this doctrine; saying that composition and division, in which the true and the false are, are in the mind, and not in things. There is, of course, a certain composition found in things, too; but this sort of composition produces one thing, which the intellect receives as one by a simple conception. But that composition or division by which the intellect conjoins or divides its own concepts is in the intellect only, not in things. For it consists in a certain comparison of two concepts; whether those two things are the same according to the thing, or diverse. For the intellect sometimes uses one thing as two in forming a composition; just as it is said: "Man is man": from this it is plain that this sort of composition is in the intellect only, not in things. And for this reason that which is being in such wise as the true which consists of this sort of composition is different from those things which are beings in the proper sense, which are things outside the mind, each and every one of which is "either 'what it is'," that is, substance, or of such sort, or so much, or some incomplex thing which the minds puts together or divides." -- In VI Metaphys., lect.4, #1241 (ed. Cathala)

Now, from this he further concludes that identity is unity or union; either by reason of the fact that those things which are called "the same" are many according to being and yet are called "the same" insofar as they agree in some one thing. Or because they are one according to being, but the intellect uses it as many to the end that it may understand a relationship. For a relationship cannot be understood except between two extremes. Just as when something is said to be "the same as itself". For then the intellect uses that which is one according to the thing as two. Otherwise it could not indicate the relationship of the same thing to itself. Hence it is plain that, if a relation always requires two extremes, and in relations of this sort there are not two extremes according to the thing but only according to the intellect, the relationship of identity will not be a real relationship, but only of reason, inasmuch as something is called "simply the same". It is otherwise, however, when any two things are said to be "the same" either in genus or in species. For, if the relation of identity were a thing bedsides that which is called "the same", the thing which is the relation, since it is the same as itself, would with equal reason also possess another relation which would be the same as itself, and so to infinity. Now, it is not possible to proceed to infinity in things. But in those things which are according to the intellect nothing prevents it. For since the intellect reflects upon its own act, it understands that it understands. And this very thing it can also understand, and so to infinity. -- In V Metaphys., lect. 11, #912 (ed. Cathala)

To appreciate the notion of symbolic construction it may be well to show how it circumvents the difficulties.

'Calculation' comes from calculus, which originally meant pebble. Before the introduction of symbols, pebbles were used in counting. To calculate meant to find out how many units there are in a collection (let it be B) at hand, by comparing it with a given collection of pebbles (let it be A), whose number is already known, and then to express the number of the collection to be counted, in terms of the number of pebbles used.

Of course, one might ignore the number of A, and establish nonetheless that B is equal to A, or not. If they are equal, then we can say that the two collections have exactly the same number. But 'the same number' does not answer the question: What is this number that is the same for both? What is the cardinal number of this particular collection of pebbles? or of the elements that make up the word mathematics? The following graphic device is offered:



But how did we get to know that from M to # is 4, and then from M to S is 11? 4, of course, does not refer to the element E, but to the collection of letters from M to E inclusive; that is:

M A T H E,

OR FOR THE PEBBLES . . . . .

Note Russell: Number is a way of bringing together —

Suppose we want to know, by ~~comparing~~ using pebbles, how many letters there are in the name 'Washington'? [Pebbles and letters are dissimilar things, but we can make a pebble correspond to a letter.] We will for the moment resist all attempts at abstraction, and stick ~~to~~ these pebbles, ~~and to the~~ letters of the name we are printing. We take one pebble for each letter, thus:

(A) W A S H I N G T O N
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
(B) • • • • • • • • • •

We now have equal collections, and we know that their number is the same number. But, to ~~[illegible]~~ set up one collection equal to another is not the same as to tell ~~how many~~ what is their number, i.e., how many elements there are in either class. There are of course ten in each. But how do we reach ~~to~~ ~~again~~ this number ten? Let us forget about the letters — which are a bit confusing, since they all differ in kind and each has been given a distinct name — and apply to the pebbles, so similar in size that we distinguish them only by position.

~~(B) [illegible]~~

The first thing to be noted is that, while ~~to~~ ~~call them~~ all are called pebbles, none of them has a distinct name; 'this pebble' is not a name. 'Socrates' is the name of an individual, but the expression 'this man' is not; nor is 'this Socrates'.

~~How let us see how we~~

Assuming that each pebble in our group is indistinguishable

from the next except by this one being here and that
one there, let us see how we can describe them.
We have set them in a row, ~~like this~~, assigning ~~a sign~~ a graphically different symbol to each, like this:

a b c d e f g h i j

Considering this particular row [untouched] we seem
to know what we mean when saying that the pebble a
comes first in the row; the 'next' is b. ~~then c, etc~~ Yet
the pebble b differs from a only in that it comes next
~~to~~ to a in this particular row. But notice how the
symbol b takes on a new meaning if we make it stand
for the pebble 'next to the first.' Let ~~b~~ b stand for
'the second pebble' in this row. Let 'second' (from sequor)
mean 'next to the first', or 'the first next'. ~~We say 'next'~~
'Next' is said of things which follow one upon the
other without an intermediary of the same kind. If
a fly settles between a and b, b will not cease
to be the pebble next to a (though it ceases to be the
next thing). Now, to have a ~~second~~ 'next' pebble, there
must be 'one and one' pebbles ~~this is what is necessarily~~
of the same kind, otherwise ~~the~~ ~~the next~~
~~second pebble~~ b would not be next to a. The fly
may be next to the pebble, but this does not
prevent b from being 'the next pebble'. As Aristotle
points out, ~~the~~ the cow grazing between two houses does not
~~prevent the house from~~ make ~~them~~ the houses cease to be next
to one another, although the next house is no
longer the next thing.(x)

consecutive

No thing is ~~next~~ 'next to' itself.

(x) Experience could never decide what is the 'next thing', if 'thing' is used of 'any thing of any kind.'

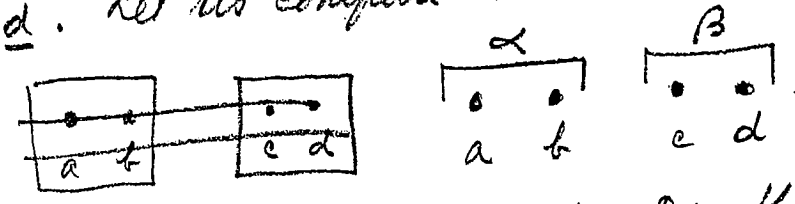
~~'Two' first means what is divisible into one and one similar unit~~

~~'Two' signifies the 'whole' of 'one and one'~~

~~'Two pebbles' signifies one-and-one pebble~~

'One-and-one' pebbles are called 'two', not absolutely, but 'two pebbles'. If they were so, purely and simply, 'what it is to be two', we could never have *two doses*, nor could there be any other two pebbles.

After a and b, there are two more pebbles, viz. c and d. Let us compare them:

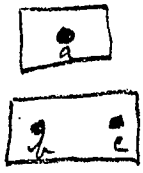


The two groups are equal; and we say that they are ~~they have the same number the same, identical, in number. But they are not the same number~~ two, otherwise

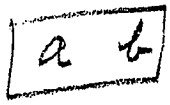
The two groups are equal. By equal we mean 'one in quantity.' And so they ~~have~~ are the 'same number'. In each group there are two pebbles. But they are not the same number two. For, if 'same' means 'identical', ~~namely 'substantially' not~~ as in 'the man next door, and the one you saw at Mindy's, are the same man' – the group α would be the group β.

Here we can see how the notion of absolute number arises. But let us still hold on to our pebbles. Consider a, the first, and b, the next, together. Together they are two. How does a compare to b? As one part to another of the whole a. Now, a is neither a nor b, but a and b, taken as the one whole. If we wanted to compare one pebble to two pebbles without any abstraction, would have to take, first, a; then b and c:

Then b and c, like this:



We cannot compare a to a and b, when we are talking about particular things: without any kind of abstraction. If we said that b is just like a, and so is c, and that, therefore, we may replace b by a, thus:



it would imply that a is the same as both of a and b, and we could never have a all by itself as a unit. We could not have one pebble, and therefore neither two.