Lawvere   We think it is necessary to discuss these questions in a serious way.

People practicing   practice a position on this point, and are prisoners of reactionary philosophy if they don't.

One point that should be discussed further, points raised in my talk in Durham / Milano last summer, under " Log. of Math ⟷ Math. Logic."   Looking at notes people took.

Made some misformulation.
  Did not choose words well
  Difficulty of communication...
  Cultural distortion : formulations were changed.   ... more dogmatic
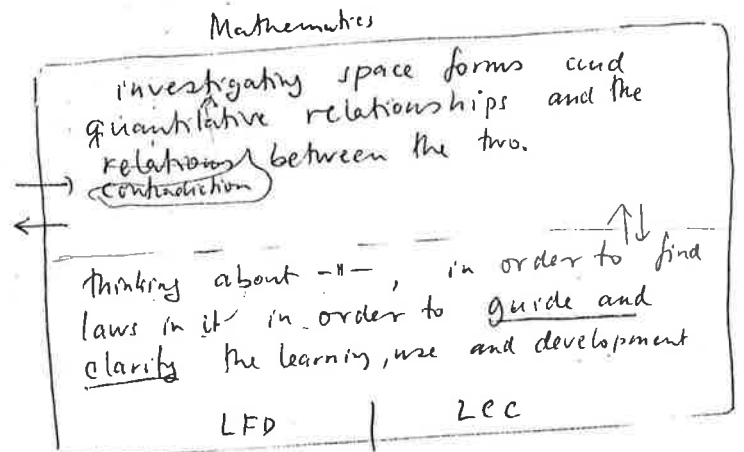 formulation, for two different reasons.

Leading idea in these talks :

There are certainly things that we are against.   On the other hand, we cannot arrive at judgement on basis of deduction from some formulation,   but only by sober....

We want to reject ⟩

  " thinking about thinking" as
  an end in itself *

  obscure writing
  use of symbols to hide
  concepts

Mathematics

investigating space forms and quantitative relationships and the relations between the two.
  (Contradiction)

thinking about —"—, in order to find laws in it in order to guide and clarify the learning, use and development

LFD | Lec

antagonistic
contradiction
(as trends).

Between these two
we have non- antagonistic contradiction,   but rather the contradiction leading to progress in science.

"Lower part" divides into

LFD . short for Logic of Formal Deduction
           or Science of Formal Deduction
              of truth of properties.

Lec   .   science of conceptual construction.

I referred to "upper part" as mathematics
or the object of mathem   (lower part then subject of
mathematics.*)   Nearly every piece of math involve ~~some~~ usuall.
an advance in both.

I listed subjects that to a large measure are
parts of subjects of math., not object of math.

Abstr. alg. ..
Gen. top ..
Cat. theory .-
Math Log. ..
Set theory ..
Funct anal. ...

They really should be _one_ subject.
The fragmentation ~~of~~ of these 6 should be eliminated.
At present time , cat. theory have subsumed these subjects
in so far as they belong to logic of math (not in so
far as they belong to math. in proper sense).

At same time, cat. theory is not identical with lower,
because .. may discover more principles.

Number theory?
[Ib Madsen : Yes: we use it to count space invariants.]

Unity, not an eclectic bag of tricks.

The science of thinking about math.   (=logic of math)
must address itself both to L_{FD} L_{CC}.

Mathematical logic is only L_{FD}.

Object to   Math. logic ~~being~~ the whole
only this thing in principle, but as it ~~exists~~, more.

Analysis of the enemy camp: ("counterpurpose")

* or "the logic of mathematics".

"Waving the flag of L$_{FD}$ in order to oppose

    1) L$_{cc}$, especially ...

    2) the <u>purpose</u> (= acting as a clarifying ...).

Springs from one sidedness. Could also imagine the other one-sidedness L$_{cc}$, but not the main danger at the moment).
Cat. theory is mainly L$_{cc}$.
[Tierney: much of it is in the reject column] FWL: Yes.

<u>In</u> Math Logic the concept seem to drop from the sky. (L$_{FD}$ one-sidedness). Cat. theor. viewpoint often sees the <u>truth</u> about ~~an object~~ a secondary this, the object / concept as primary.

The <u>existence</u> of Eucl. Geom. is more important than any specific Thm in it. ~~and~~ The fact that there must be a continuum is more important than the way you 'construct' it, or deduce ...
                      L$_{FD}$ $\rightleftharpoons$ L$_{cc}$

Still: L$_{FD}$ is overestimated, L$_{cc}$ underestimated, we still have to fight for that, fight to show its importance.

      Math. logic   vs.   Conceptual science

which is the leading aspect? In a certain way have to claim Conceptual science is the 'leading' aspect. There could be no discussion on 'truth' or 'falsity' of addition, integration, and other concepts.
Shown by the fact that cat. theory includes logic.
The 'theory' in the sense of cat. can be presented or represented by <u>axioms</u> and relations.

The contradiction . LFD $\rightleftharpoons$ LCC is a reflection of. Contradiction between math and logic of math.

     Sc. of deduction & calculation $\longleftarrow$
     Sc. of concept formation.

Theoretically . is more basic, but in the practice, it is

Logic of Math $\neq$ Math.

Allthough many people said they were equal (eg. Brouwer &, Bishop : space is nothing but nat. no's. i.e nothing but thoughts.).

In mathematics, the nat. no. does not exist as <u>an object</u> It exists in logic of math. I agree with Brouwer that IN is subjective, / in contrast to the continuum which is objective. Leads to "space filling curves" which do not exist. Cf. Arnal-Jensen paper. I agree with that position.

Space is here <u>now</u>
"All our possible future calculations are here" is not true.

Question of classifying 'deposes' : it objectifies the subjective.
Mistakes I made in a paper ... on quality and quantity.
Qualitative distinction between. _class of topos, and spatial topos.
Construction of it depens (till now) on NNO.

Guidelines to be drawn from this :
We should have the confidence that we can oppose obscure writing : have enough math knowledge and philosophical guidelines to get behind ..

Reflect the whole picture into **Lcc** by axioms ?
Space Quantity : Four kinds of relations

$$\circlearrowright S \rightleftarrows Q \circlearrowright$$
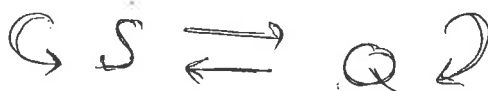
Have scheme for a category : these morphts / u define <u>commutative diagrams</u>
cat. So unify "synthetic" and analytic geom.
Should lead drastically to simplification of highschool math, without using any quantifiers. Entirely cartesian logic
Process of clarifying Euclid's axiom has by no means been finished. Deepen this to diff eq'ns ? Every object has a measure (length, area, ..) (non-measurable sets again only by IN).
Consistent : we cannot out of it construct IN

The integral exists in the real world. In $GS \rightleftarrows QS$ should be postulated (not defined by an approximation process). That integrals can be approximated is a meta-theorem.

Cat theory could serve directly in mathematics, without any reformulation via ...

Not only L_{cc} dominates over L_{FD}.

Dialectical logic will have to dominate over intuition

Thanks to Chris, we know that lattice of subtopos.. is dual of Heyting alg., so rather reject:

χ

$$a \wedge \neg a \;\; \cancel{\neq \phi} \; = 0$$

Dialectical logic dominates over intuitionistic.

[In dialectics $*$ is not valid]

Joyal: Finitistic methods in metamathematics.
But only formulae were really there.