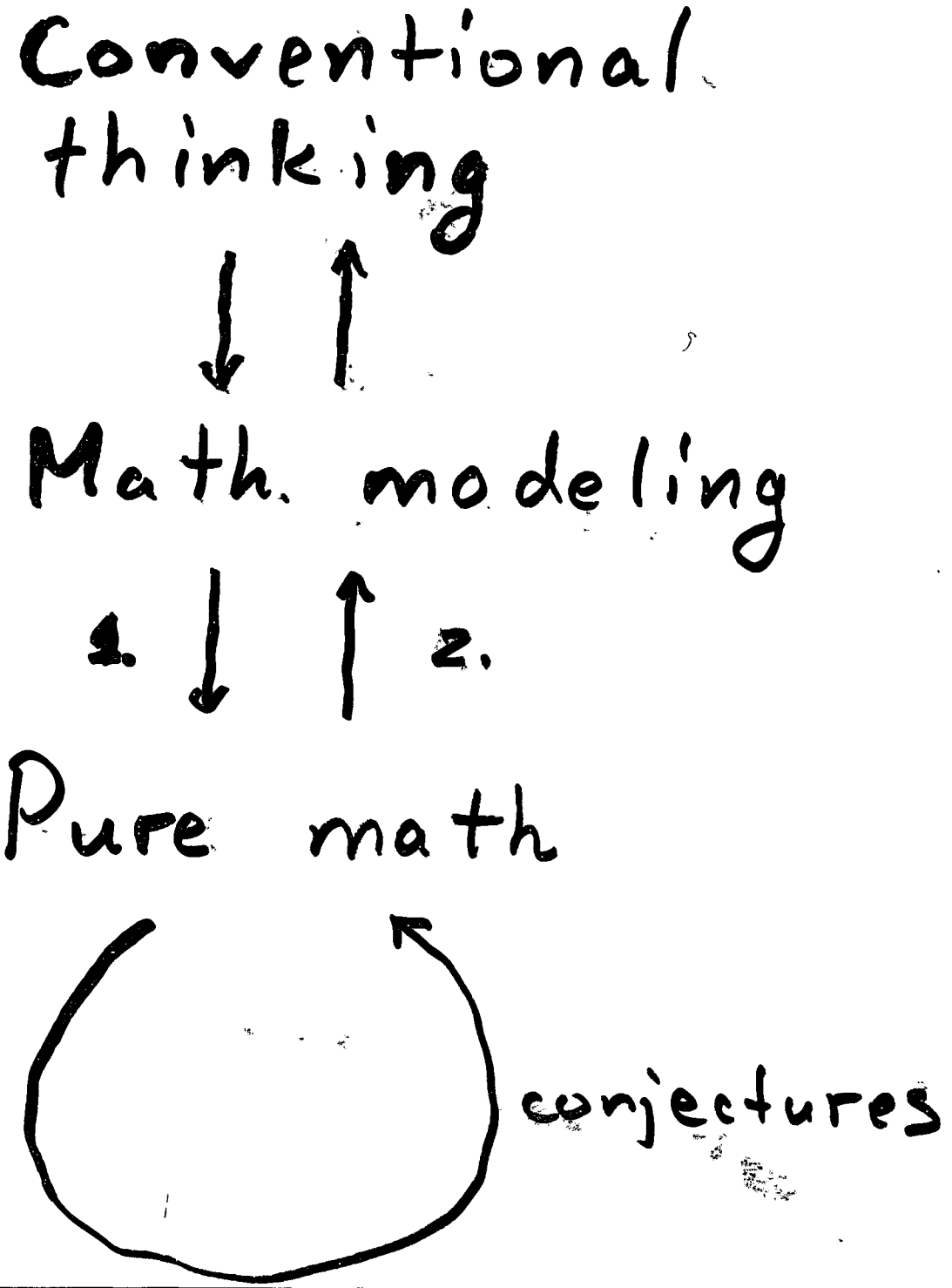
Mathematics and the outside world

Flow of problems and solutions:



- Math. grows by solving problems internal (conject.) as well as external (arrow 1.)
- We are paid by the society for providing solutions (arrow 2.)

Sometime also for:

- Providing solutions to internal problems
- Teaching old solutions to new generations

Over the last few decades the situation was getting more and more out of balance. Both ① and ② were weakening

- problems for internal development due to a weak ①
- problems with the support from the society due to a weak ②.

Four levels of math:

- elementary
- higher
- modern (a la Bourbaki)
- synthetic (last 50 years)

The last two levels remain essentially outside the 1/2 exchange

- no external problems formulated in the appropreiate language
- no solutions use the techniques

- Breakdown of (2) means eventually no salary

- Breakdown of (1) means eventually no new ideas

- Why are we in this situation?

- What can we do to change it?

New flow chart:

Conventional thinking

↓ ↑

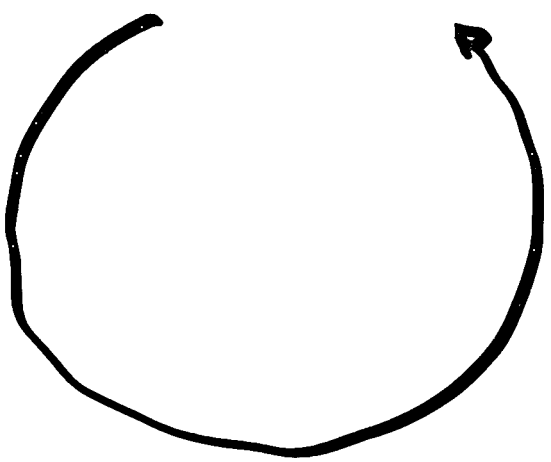
Computer modeling

↓ ↑

|| Math. modeling

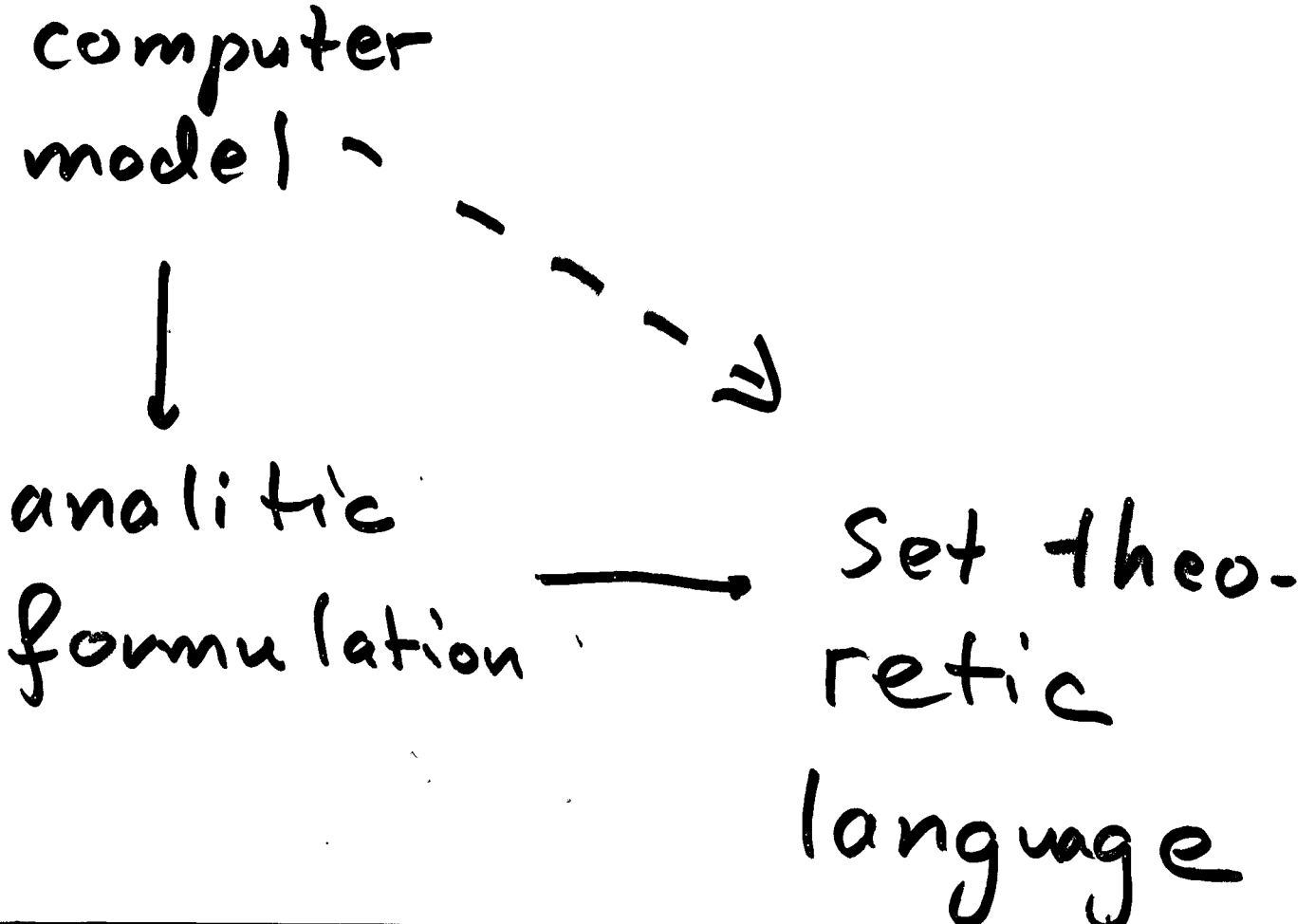
↓ ↑

Pure math



- "Math modeling" level now recieves less - hence filters less downstream
- Most of what gets through is in the old language (variables / funct.) While new pure math uses set-theoretical languge

At least some of the problems we get pass through Double Translation



Computer model

↓

Set theoretic model

↓ (sometimes)

Analytical model(s)

- Population biology / Demography
  - units are individuals
- Financial Math -
  - units are companies
- Political science -
  units are voters
- Particle physics -
  - particls
- Population genetics
  - genes

Less clear:

- Theoretical Chemistry - need to wait for experimental chemistry of individual molecules to develope.

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Conclusion: the layer Between computer modeling and pure math needs reorganization

- changes in education to underscore sequence

computer model → set theoretic model

↓

Analitic or other reformulation

Most important:

Produce examples demonstrating the effectiveness of this approach.

↑

A task for mathematicians