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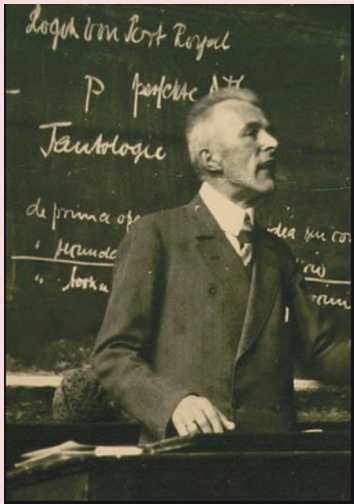


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# Collaboration of Polish Logicians with Heinrich Scholz and “Group from Münster” (1932-1956)



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of History of Science and Technology and Medicine.  
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# Motto:

- Es ist schön, dass es in der verworrenen Welt, in der wir zu existieren gezwungen sind, noch ein paar unverworrene Dinge gibt.
- It's nice that there are still a few unsettled things in the tangled world we are forced to exist in (Scholz-Tarski, 30.04.1948)

## Heinrich Scholz (1884–1956)

- Logician, philosopher and theologian, one of the most important German academics in 20th c.
- **1917-1928** - Schlesische Friedrich-Wilhelm-Universität zu Breslau and at Christian-Albrecht University of Kiel.
- **1921** – read Whitehead’s and Russell's *Principia Mathematica*, then dealt with mathematical logic.
- **1928–1952** - Westfälische Wilhelms-Universität (Münster, Germany), organized a group of academics working on mathematical logic there, called “**Group from Münster**” (K. Schröter, H. Hermes, G. Hasenjaeger).
- Before the Second World War had the scientific legacy of **Gottlob Frege** and **Ernst Schröder**. He wanted to be the first posthumous editor and publisher of Frege’s papers (Heitfeld-Rydzik 2020).
- During the war he substantially helped at least four Polish academics: Jan Łukasiewicz and his wife Regina, Alfred Tarski’s family, Jan Salamucha, a colleague from Cracow, Professor Kowalski.
- Included by Bocheński among top **analytical philosophers**, next to Quine, Austin, Tarski and Popper. Author of *Abriss der **Geschichte der Logik***, 1931, 1956.

# Heinrich Scholz's literary estate (**Nachlass Heinrich Scholz**)

Summer of 2018 - transferred from Institut für Mathematische Logik und Grundlagenforschung der Universität Münster (Germany) to Universitäts- und Landesbibliothek Münster.

There are many documents from the 1930s to 1950s that testify to the cooperation of the local university community interested in mathematical logic,

## **Heinrich Scholz and his Group from Münster,**

with the Polish logicians from Lvov-Warsaw School:

Kazimierz **Ajdukiewicz**, Józef. M. **Bocheński**, Tadeusz **Czeżowski**, Stanisław **Leśniewski**, Jan **Łukasiewicz**, Andrzej **Mostowski**, Jan **Salamucha**, Jerzy **Stupecki**, Bolesław **Sobociński**, Alfred **Tarski** and Mordchaj **Wajsberg**.

<https://www.ulb.uni-muenster.de/sammlungen/nachlaesse/nachlass-scholz.html>

# Until now, there have been published or described only a few letters of Scholz's literary estate

- Burdman-Feferman, A.B., Feferman S., *Alfred Tarski. Life and Logic*, Cambridge University Press 2004.
- Jadacki: J.J. *The Lvov-Warsaw School and Austro-German Philosophers. Two Cases*. In: *The Significance of the Lvov-Warsaw School* . Eds: A. Brożek, F. Stadler, J. Woleński. Springer 2017.
- PECKHAUS V. : *Heinrich Scholz*. In: *The Stanford Encyclopedia of Philosophy*. Fall 2018 Edition. Ed. E.N. ZALTA, <https://plato.stanford.edu/entries/scholz/> (access: 1.04.2019).
- SCHMIDT H.-Ch. AM BUSCH, K.F. WEHMEIER: *On the Relations between Heinrich Scholz and Jan Łukasiewicz*. „History and Philosophy of Logic” 2007, vol. 28, p. 67–68.
- Schreiber P.: *O związkach Heinricha Scholza z logikami polskimi*. In: *Matematyka Polska w stuleciu 1851-1950*. (Ed. St. Fudali) Uniwersytet Szczecin 1995.
- Schreiber P.: *Über Beziehungen zwischen Heinrich Scholz und polnischen Logikern*. In: *Mathematik im Wandel*, Bd. 1 (Hrsg. M. Toepell), Verlag Franzbecker, Hildesheim-Berlin 1998.

**My task is** to shed some light on topics omitted in the above publications. I focus on Scholz's correspondence with three famous Polish logicians from Lvov-Warsaw School: Alfred **Tarski**, Jan **Łukasiewicz**, and Józef **Bocheński**.

# The topics raised in the correspondence with Bocheński, Łukasiewicz, and Tarski:

1. Organization of a scientific environment, didactic activities, duties (academic and non-academic research), scientific trips.
2. Current research topics, prospects for post-war publications and future publishing plans.
3. How Scholz supported his Polish colleagues during the World War II.
4. Polish logicians who survived the war and their current place of work.
5. Exchange of information about Jan Łukasiewicz.
6. Personal matters, Scholz's health problems in particular.

# Alfred Tarski (1901, Poland–1983, USA)



- One of the greatest logicians of the 20th c.;
- *Semantic Conception of Truth* (1933, 1935, 1956);
- The outbreak of World War II found Tarski in the USA;
- "a mathematician (as well as a logician, and perhaps a philosopher of a sort)" (1944, p. 369).



Alfred Tarski – Scholz correspondence.  
Preserved and lost letters (six Tarski's, eight  
Scholz's, two lost, 16 documents altogether,  
1940-1953)

- 1940.10 or 11 Scholz – Tarski\*
- **1941.01.07 Tarski – Scholz**  
(excerpts published by Feferman)
- **1941.01.08 Tarski – Mostowski  
(and Scholz)**
- **1941.05.22 Tarski – Scholz**  
(estreat)
- Scholz – Tarski, July 1946\*
- **1946.10.21 Tarski – Scholz,**  
(excerpts published by Feferman,  
Schmidt, Wehmeier)
- 1947.05.09 Scholz – Tarski
- 1948.04.30 Scholz – Tarski
- 1948.08.21 Scholz – Tarski
- **1948.06.26 Tarski – Scholz**  
(excerpts published by  
Feferman)
- 1949.04.28 Scholz – Tarski
- **1949.10.24 Tarski – Scholz**
- 1949.10.31 Scholz – Tarski
- 1952.10.11 Scholz – Tarski
- 1953.10.21 Scholz – Tarski
- 1953.04.24 Scholz – Tarski
- **1953.07.15 Tarski – Scholz,**

## Two versions of Calculus of Relation

- A letter Tarski – Mostowski (and Scholz), 8.01.1941.
- A. Tarski, *On the Calculus of Relation*. "Journal of Symbolic Logic" 1941, vol. 6, no. 3, p. 73 – 89. Received 4.02.1941.

## Tarski – Mostowski (and Scholz), 8.01.1941; axioms

- I.  $R;(S;T) = (R;S);T$
- II.  $R;1' = 1';^1 R=R$
- III.  $R;1=1$  or  $1;^2 \bar{R}=1$
- IV.  $\check{R}^3=R$
- V.  $\bar{\bar{R}}; \bar{S} = \bar{S}; \bar{\bar{R}}$
- VI. If  $R;S \cdot \check{T} = 0$ , then  $S;T \cdot \check{\bar{R}} = 0$

Finally two definitions:

- VII.  $0' = \bar{1}'$
- VIII.  $R \dagger S = \bar{R}; \bar{S}$

## Tarski, *On the Calculus of Relation*. February 1941

Let me give here some examples of theorems of this calculus:

- I.  $(R = S \wedge R = T) \rightarrow S = T.$
- II.  $R = S \rightarrow (R \dagger T = S \dagger T \wedge R \cdot T = S \cdot T).$
- III.  $R \dagger S = S \dagger R \wedge R \cdot S = S \cdot R.$
- IV.  $(R \dagger S) \cdot T = (R \cdot T) \dagger (S \cdot T) \wedge (R \cdot S) \dagger T = (R \dagger T) \cdot (S \dagger T).$
- V.  $R \dagger 0 = R \wedge R \cdot 1 = R.$
- VI.  $R \dagger \bar{R} = 1 \wedge R \cdot \bar{\bar{R}} = 0.$
- VII.  $\sim 1 = 0.$
- VIII.  $\check{\check{R}} = R.$
- IX.  $\overbrace{R;S} = \check{S}; \check{\check{R}}.$
- X.  $R;(S;T) = (R;S);T.$
- XI.  $R;1' = R.$
- XII.  $R;1 = 1 \vee 1; \bar{R} = 1.$

# Scholz was invited by Tarski to USA:

- To participate in the **International Congress of Mathematicians**, held at Harvard University at the end of August 1950:

"You are to be invited to participate in the Section of Logic and Philosophy (of which I am the Chairman), and in fact to take a more prominent part than the average contributor; probably **to give a thirty-minute talk**. I hope though I am not sure, that this invitation will also contain an assurance that the Organizing Committee will cover a large part of your travelling expenses." (Tarski – Scholz, 24.10.1949)

- **as a visiting professor**

The other invitation is to be sent by the Department of Philosophy, University of California in Berkeley.

"You are to be asked to come here **for several months** as a visiting professor and lecture here during the spring term 1950, February through May, and in the first summer session, six weeks beginning about July first. " (Tarski – Scholz 24 10 1949)

## Tarski taught mathematical logic from Scholz's books

Scholz, *Vorlesungen über Grundzüge der mathematischen Logik*. Bds. 1, 2.

"Many thanks for the **two volumes of your lectures in mathematical logic**; the second volume has reached me just today. Beginning this year we have nowhere in Berkeley regular courses in mathematical logic and metamathematics, and your work will undoubtedly help us very much in our program." (Tarski – Scholz 24 10 1949)

# Tarski's stay in Europe in 1953

- In July Tarski participated an international conference "Wissenschaft und Freiheit", University of Hamburg.
- "[...] it will be a great day for me to see you after so many years. " (Tarski – Scholz, 15.07.1953).
- Tarski's lecture in Münster in July 29: *Über Anwendungen der Metamathematik auf die Mathematik* [On applications of metamathematics to mathematics.]

# Jan Łukasiewicz (1878 Lvov – 1956 Dublin)



- Pioneer of many-valued logics, author of so-called Polish notation;
- Co-founder of Lvov-Warsaw School
- 1938 Doctor Honoris Causa, WW University in Münster, delivered in Warsaw;
- 24.07.1944 Łukasiewicz and his wife Regina escaped from Warsaw to Münster;
- 1949–1956 lived and worked in Dublin.
- He published on induction before the World War II, but not later: *O indukcji jako inwersji dedukcji* [On induction as an inversion of deduction] 1903.

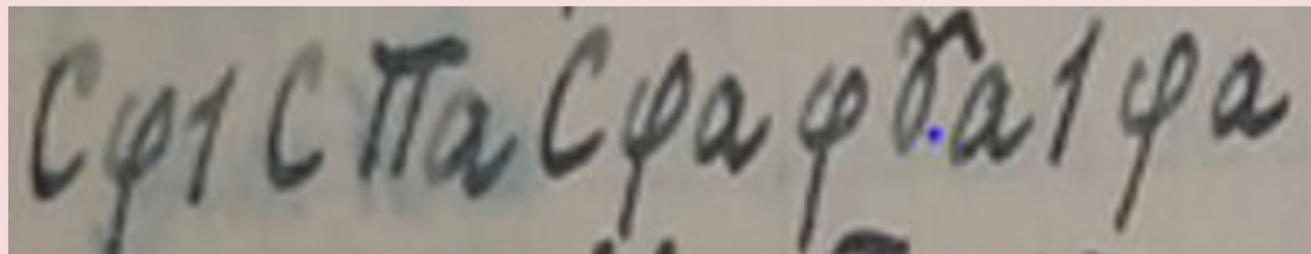


## **Preserved and lost letter (five Łukasiewicz's and seven Scholz's, three lost, 15 documents altogether, 1928-1954)**

- Scholz-Łukasiewicz, 13.08.1928\*
- Łukasiewicz – Scholz, 13.12.1943, Warsaw (partly published in German and Polish)
- Łukasiewicz – Scholz, 5.01.1944, Warsaw (partly published in German and Polish)
- Scholz – Łukasiewicz, before 14.01.1944\*
- Łukasiewicz – Scholz, 15.01.1944, Warsaw (partly published in German and Polish)
- Łukasiewicz – Scholz, 3.02.1944, Warsaw (partly published in German and Polish)
- Scholz-Łukasiewicz, 19.07.1946\*
- Scholz-Łukasiewicz, 6.09.1946
- Scholz-Łukasiewicz, 14.11.1950
- Scholz-Łukasiewicz, 6.03.1952
- Łukasiewicz – Scholz, 8.05.1953
- Scholz-Łukasiewicz, 30.06.1953
- Scholz-Łukasiewicz, 1.10. 1954

# Principle of Induction and Polish Notation

- It is a logical symbolism without parantheses;
- Łukasiewicz used signs: C, N, A, K, D, E standing respectively for: implication, negation, alternative, conjunction, disjunction, and equivalence.
- In this system connectives are written before the arguments, and quantifiers before connectives.
- Using this notation he presented a Principle of Induction in three letters to Scholz: 13.12.1943, 5.01.1944, 15.01.1944.
- It could be a topic of at least one Scholz's letter to Łukasiewicz, before 14.01.1944 (it is a lost letter).

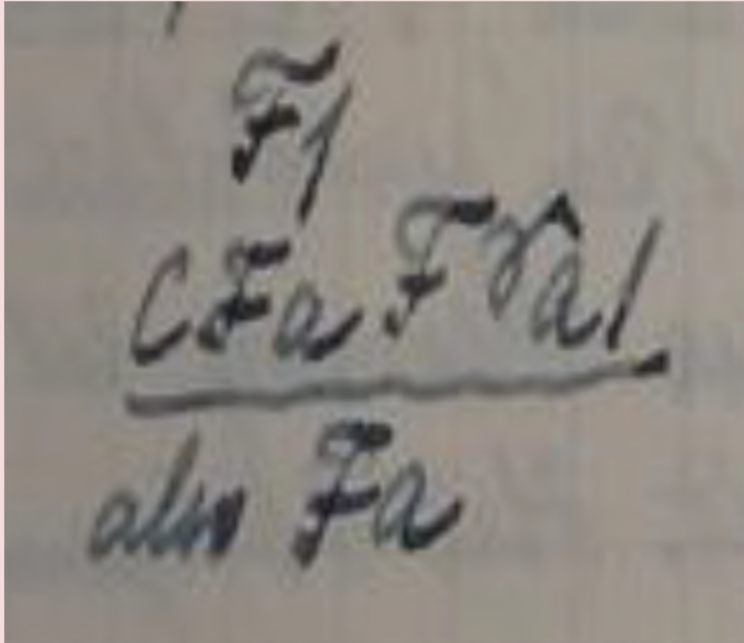


Where

- $\varphi$  – a connective from an individual argument
- $- \Gamma a+1$  - means  $a+1$
- $- \Pi a$  - for every  $a$

The Principle of Induction in modern logical language:  **$F1 \rightarrow [(Fa \rightarrow F \Gamma a+1) \rightarrow Fa]$**

## Principle of Induction as a **rule of inference** [*Schlussregel*]



In the letters he referred to

- P. Bachmann: *Niedere Zahlentheorie*. Vol. 1  
Leipzig, Teubner, 1902,  
p. 56.
- Fermat's principle  
(5.01.1944).

# Józef M. Bocheński (1902, Poland- 1905, Fribourg)



- 1927 entered the Dominican Order
  - 1928 studied philosophy at the University of Fribourg, then worked there until his retirement in 1972.
  - Historian of logic and author of *Formale Logik*, München, Karl Alber 1956; *La Logique de Théophraste*. Fribourg, 1947
- G. Besler: *Józef M. Bocheński (1902–1995) and Heinrich Scholz (1946–1954)*. „Studies in East European Thought” 2021.

Preserved and lost letters (two Bocheński's, 13  
Scholz's, seven lost, 22 documents altogether,  
1946-1954)

- 1946.07.18, Scholz to Bocheński\*
- 1946.08.20, Scholz to Bocheński
- Before 29.01.1947, **Bocheński to Scholz\***
- 1947.01.29, Scholz to Bocheński
- **1947.02.11, Bocheński to Scholz**
- 1947.08.06, Scholz to Bocheński
- **1947.08.13, Bocheński to Scholz**
- 1947.10.20, Scholz to Bocheński
- 1949.04.14, Scholz to Bocheński
- 1949.12.22, Scholz to Bocheński
- Around 08.07.1951, **Bocheński to Scholz\***
- 1951.08.30, Scholz to Bocheński

- Between 1951.08.30 and 1951.09.08, **Bocheński to Scholz\***
- 1951.09.08, Scholz to Bocheński
- Between 1951.09.08 and 1951.10.22, **Bocheński to Scholz\***
- 1951.10.22, Scholz to Bocheński
- 1952.03.01, Scholz to Bocheński
- Between 1952.03.01 and 1952.08.09, **Bocheński to Scholz\***
- 1952.08.09, Scholz to Bocheński
- Between 1952.08.09 and 1954.03.10, **Bocheński to Scholz\***
- 1953.03.16, Scholz to Bocheński
- 1954.03.10, Scholz to Bocheński

# Scholz's teaching activity

- **Winter semester 1946/1947:**

1. A four-hour-long lecture on logic calculation [*Logik-Kalkül*] for a group consisted of more than 100 mathematicians/students. (Scholz – Bocheński, 27.01.1947)
2. Classes in topology,
3. A two-hour-long lecture on Kant and the contemporary situation in research on the foundations of mathematics and physics. (Scholz – Bocheński, 20.10.1947)

- **Summer semester 1946/1947:**

a four-hours-long lecture and a two-hour-long classes; the first time Scholz taught mathematical logic, part II and presented: Theory of Description's Axiomatisation, Theory of Identity, Boole's Algebra, elementary descriptions-free [*Kennzeichnungsfreier*] part of the theory of relations. (Scholz-Tarski, 9.05.1947; Scholz – Bocheński,, 06.08.1947)

- **Winter semester 1947/1948:**

lecture: The concept of order in mathematics. (Scholz – Bocheński, 20.10.1947)

- **Sommer semester 1947/1948**

Four-hour course on the fundamentals and logic of the theory of natural numbers.



## Scholz-Tarski, 30.04.1948

- Ich halte in diesem Sommer-Semester ein vierstündiges Kolleg über die Grundlagen und die Logik der Theorie der natürlichen Zahlen. Ich beginne mit einer ordnungstheoretischen Charakteristik und gehe dann zu Dedekind über. Ich zeige schliesslich, wie beide Charakteristiken so aufeinander abgestimmt werden können, dass sie dasselbe liefern. Es scheint mir, dass dieser Weg in pädagogischer Hinsicht den Vorzug verdient vor dem Dedekind'schen Verfahren, das auf den Anfänger im allgemeinen Falle wesentlich dogmatischer wirkt als die ordnungstheoretische Methode. In den Uebungen machen wir die Grundzüge der Theorie der transfiniten Kardinal- und Ordinalzahlen, die hier in der Regel ziemlich stiefmütterlich behandelt werden.
- This summer semester I am giving a four-hour course on the fundamentals and logic of the theory of natural numbers. I start with an order theoretical characteristic and then move on to Dedekind. Finally, I will show how both characteristics can be matched to one another in such a way that they deliver the same thing. It seems that from an educational point of view this method deserves preference over Dedekind's method, which generally has a much more dogmatic effect on beginners than the theoretical order method. In the exercises, we cover the basics of the theory of transfinite cardinal and ordinal numbers, which are generally neglected here.

# **Topics investigated in Scholz's school**

- **Scholz – Bocheński, 29.01.1947:**

New formalisation of theory of the calculation of descriptions [*Kennzeichnungskalküls*];  
Constitution [*Konstituierung*] and theory of the semantic inference concepts for the  
predicate calculus of the first level.

- **Scholz-Tarski, 9.05.1947; Scholz – Bocheński, 06.08.1947 :** Omega incompleteness  
models.

- **Scholz-Tarski, 30.04.1948:** Dirichlet's Box Principle [*Schubfachprinzip*]

- **Scholz – Bocheński, 14.04.1949:**

Theory of definable sets, based on Andrzej Mostowski's paper;

Translation of Mostowski's *Logika matematyczna*, the most crucial was the proof of  
Gödel's completeness and incompleteness theorems;

Quine's semiotic proof of the incompleteness theorem based on his last paper;

Hilbert-Bernays unsolved problem [Hilbert-Bernays paradox];

Jerzy Słupecki's papers on the axiomatization of Aristotelian logic;

Tarski's new, long-awaited work on the decision problem.

# Jan Łukasiewicz

## as a subject-matter of the letters

- Łukasiewicz is mentioned in almost every letter: by his whole name, only by capital letter L., mein Freund in Dublin, Herr L., Unser gemeinsamer guter Freund in Dublin, mein guter Jan.
- Scholz wanted Łukasiewicz to move to Münster, where he would be very welcome. He believed that Łukasiewicz had no chance of being employed in the USA. (Scholz – Bocheński, 29.01.1947)

# Scholz- Tarski 9.05.1947

Ich habe mich sehr darum bemüht, Herrn Łukasiewicz nach Münster ziehen. Er existiert jetzt mit seiner Frau in Dublin (Irland); aber er fühlt sich auf eine sehr begreifliche Art sehr vereinsamt und uninspiriert. Die materiellen Existenzbedingungen in D. sind jedoch so günstig für ihn, dass wir auch nicht in der ersten Näherung konkurrieren können. Wir werden also auf ihn verzichten müssen. Es trifft mich schwer.

**I've been trying very much to pull Mr. Łukasiewicz to Münster.** He now exists with his wife in Dublin (Ireland), but he feels very lonely in a very comprehensible way and uninspired. However, the material existence conditions in D. are so good for him that we cannot be able to compete in the first approximation. So we will have to do without him. It hits me hard.

It could be that Łukasiewicz finally decided to move to Münster, but at that time Scholz regretted that this was no longer possible. (Scholz-Bocheński, 10.03. 1954)

# Conclusion:

- Scholz, Tarski, Łukasiewicz, and Bocheński – they are definitely giants of logic.
- Scholz's and Polish logicians correspondence is preserved in the Universitäts- und Landesbibliothek Münster (Germany) and testifies to a successful international scholarly collaboration.
- So far, little is known about the subject since only a few letters have been published.
- More archival work is to be done.

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Thank you very much for your attention.  
If you have any questions, I will be happy  
to answer them.