Polish astrophysics:
Stars & Inter-stellar medium

The first 50 years
1923-1973

Sławek Ruciński
Toronto, Canada

Toruń 2023

1923 - 1973

1920: The great Galaxy Debate: Milky Way = Universe?
1923: Edwin Hubble: Cepheids in M31

Astronomical problems of that half-century:

Stars:
Structure of stars? Energy sources? Evolution? Atmospheres? Abundances?
Variable stars as tools: pulsations, binarity, rotation.

Interstellar matter:
Properties of dust? Grains: the size distribution? the chemical composition?
Interaction with magnetic fields?

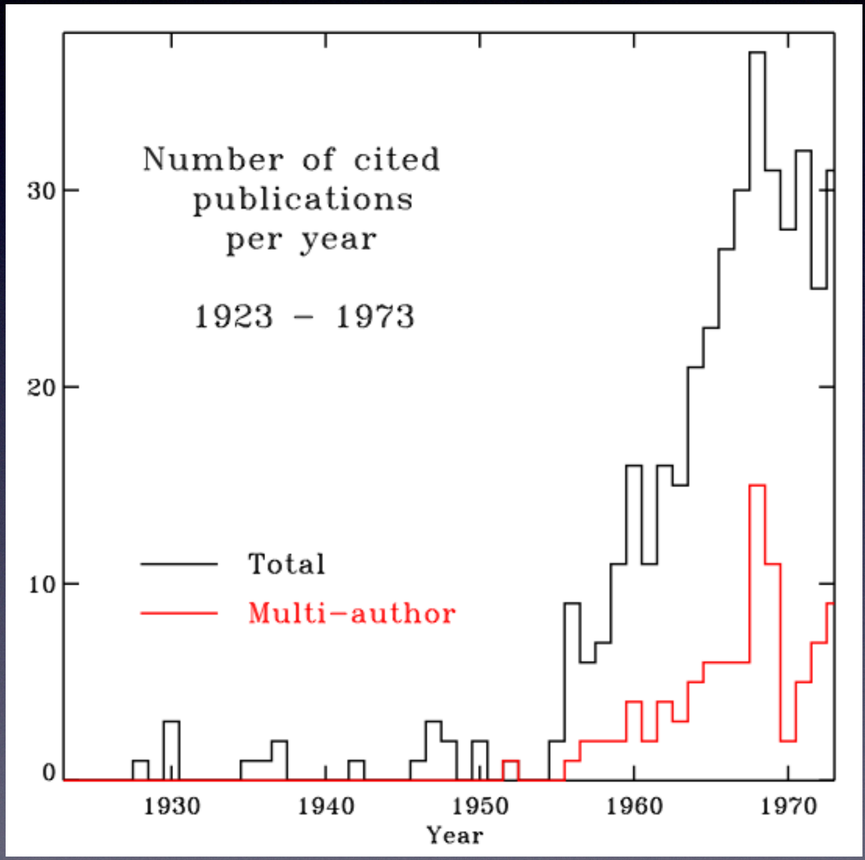
1923 - 1973

Normalized citations: c_{ij}/n_{ij}

Author	a_1			a_2	a_3	
Papers	p_{11}	p_{12}	p_{13}	p_{21}	p_{31}	p_{32}
Citations	c_{11}	c_{12}	c_{13}	c_{21}	c_{31}	c_{32}
N-coauth.	n_{11}	1	n_{13}	n_{21}	1	n_{32}
Normalized	c_{11}/n_{11}	c_{12}	c_{13}/n_{13}	c_{21}/n_{21}	c_{31}	c_{32}/n_{32}

- Only authors of cited papers considered; many important names absent
- ADS database as of June 2023
- 396 papers by 59 authors resulting in 452 individual citations
- After 1958 some papers appear jointly with foreign authors
- Majority of papers by single authors

1923 - 1973

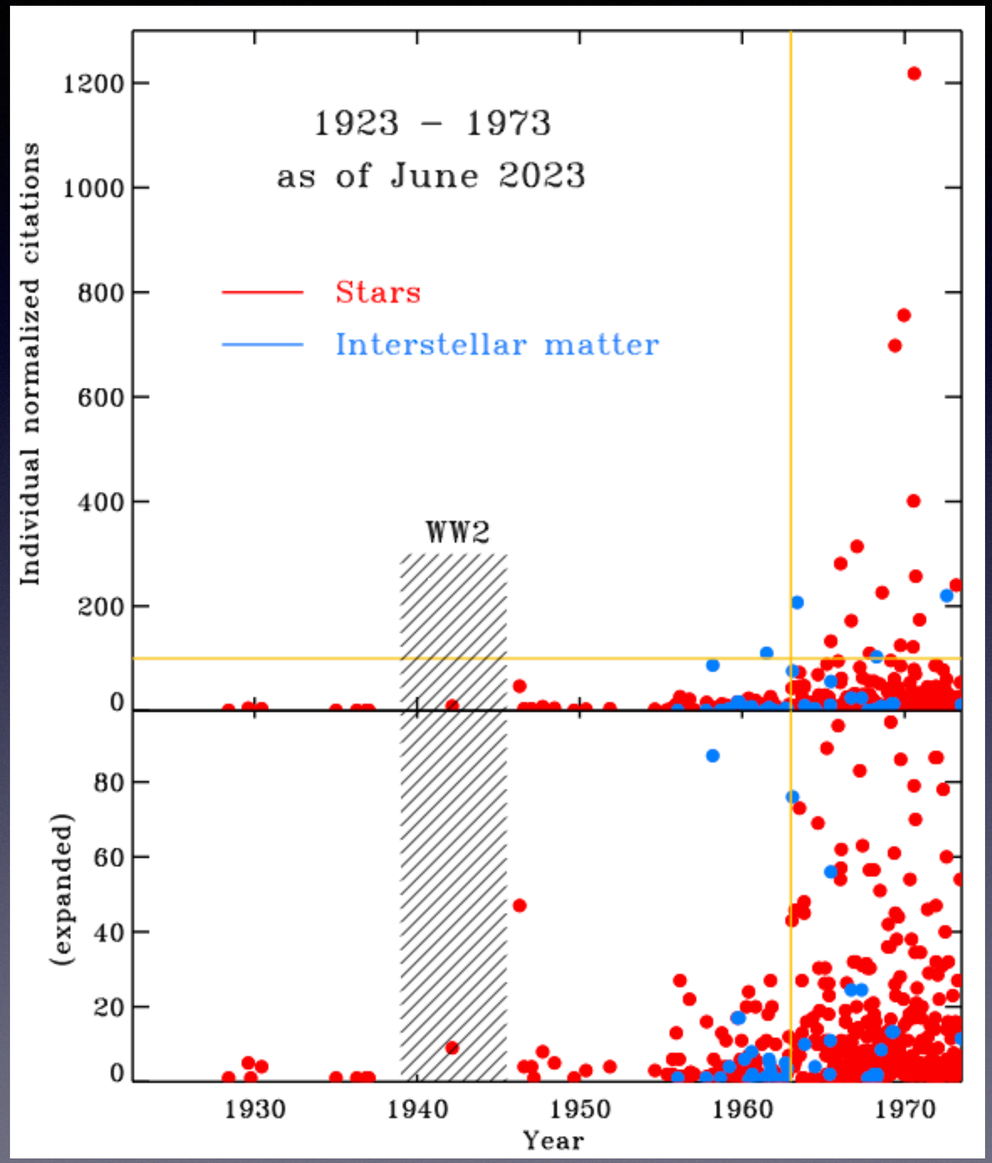


ADS database:
452 citations
396 publications
59 astronomers

Single-author publications dominate (exclusive <1952).

The last 16 years 1958 - 1973:
multi-author papers:
21% ± 3% (Poisson weighted)

1923 - 1973



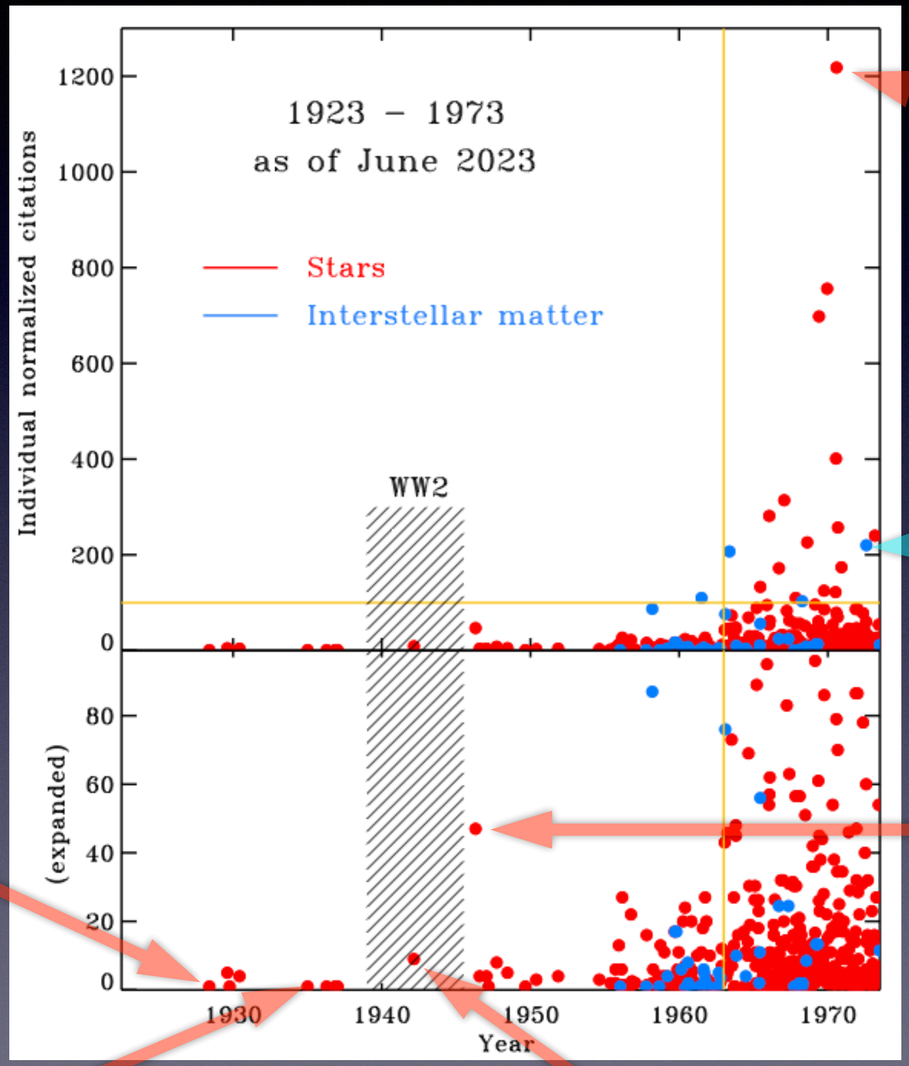
Individual citations: Each dot is a normalized citation of one paper.

Red: stars
Blue: interstellar medium

Small numbers to about 1956, then a rapid increase in
- numbers of cited papers
- numbers of citations per paper

Decade		Norm. citation		
	Papers	Median	Mean	Max
1929-1939	7	1	2	5
1946-1956	20	3	5	47
1963-1973	330	8.5	31	1218

1923 - 1973



Paczyński 1971
(1217)

Serkowski 1973
(220)

Szeligowski 1926
1st citation (1)

Wasiutyński 1946
1st modern theor.
(47)

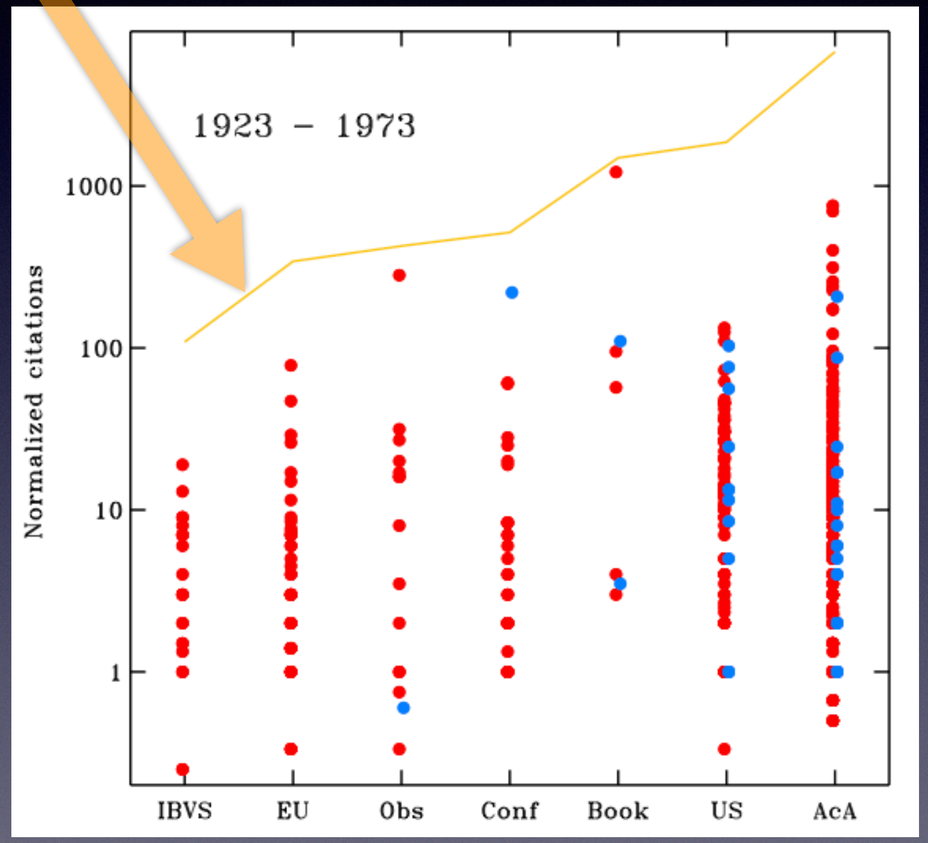
Iwanowska 1936
1st spectroscopic (1)

Banachiewicz 1942
Cracovians (7)

Summed
norm. citations
stars & ISM

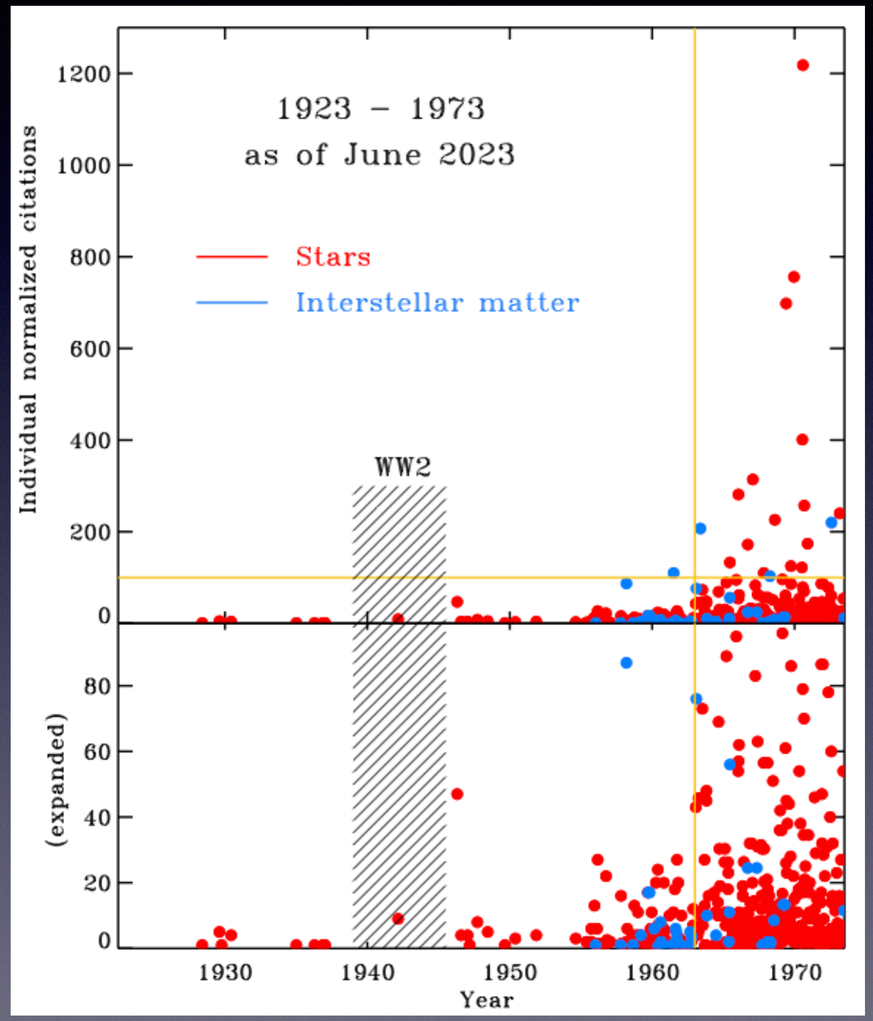
1923 - 1973

Main publications (98.7% of all)



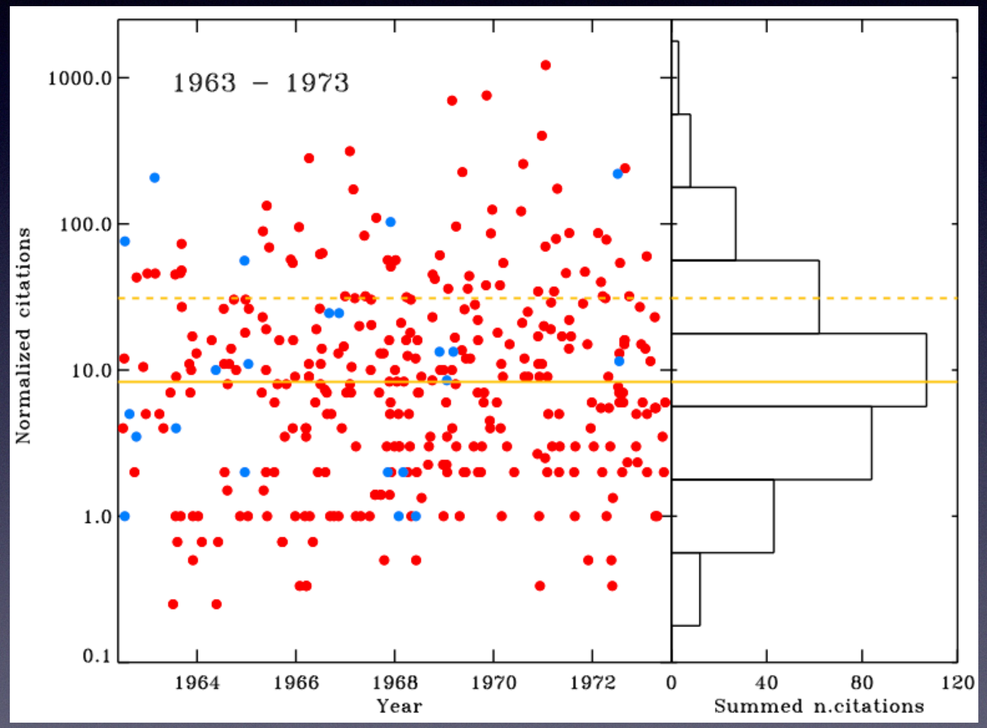
IBVS = Inf.Bull.Var.Stars, Budapest
EU = one of ~dozen European journals
Obs = observatory publication
Conf = invited review talk @ a conference
Book = review chapter in a book
US = AJ & ApJ
AcA = Acta Astronomica

1923-1973
452 citations



1963 - 1973

The "mature" decade



A quasi "log-normal" distribution

330 citations:

Median: 8.5
Mean: 31

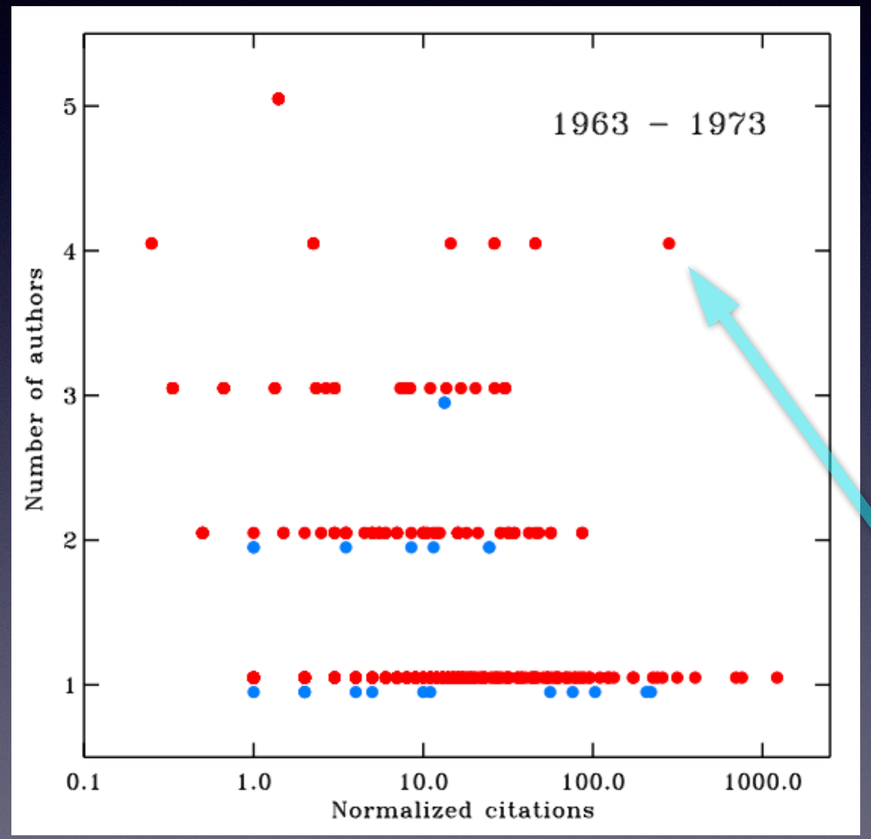
213 single-author:

Median: 9
Mean: 40

(med & mean in linear units)

The "mature" decade: 1963 - 1973

Was work in teams advantageous?



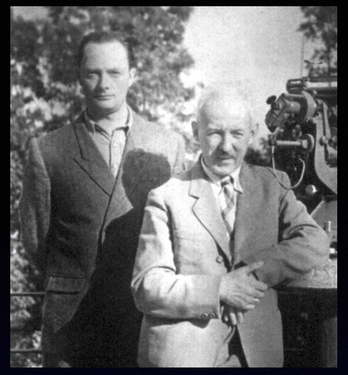
Authors	Mean n.-citation
1:	39.6
2:	15.0
3:	9.2
4:	40.6
5:	1.4

Participation of foreign authors: a decrease in normalized citations.

Johnson, Wiśniewski + 2
UBVRIJKL (1966):
c = 1125/4 (w/ co-authors)

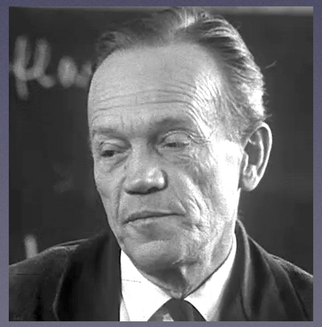
1923 - 1956 - 1973

Joining the world astrophysics...

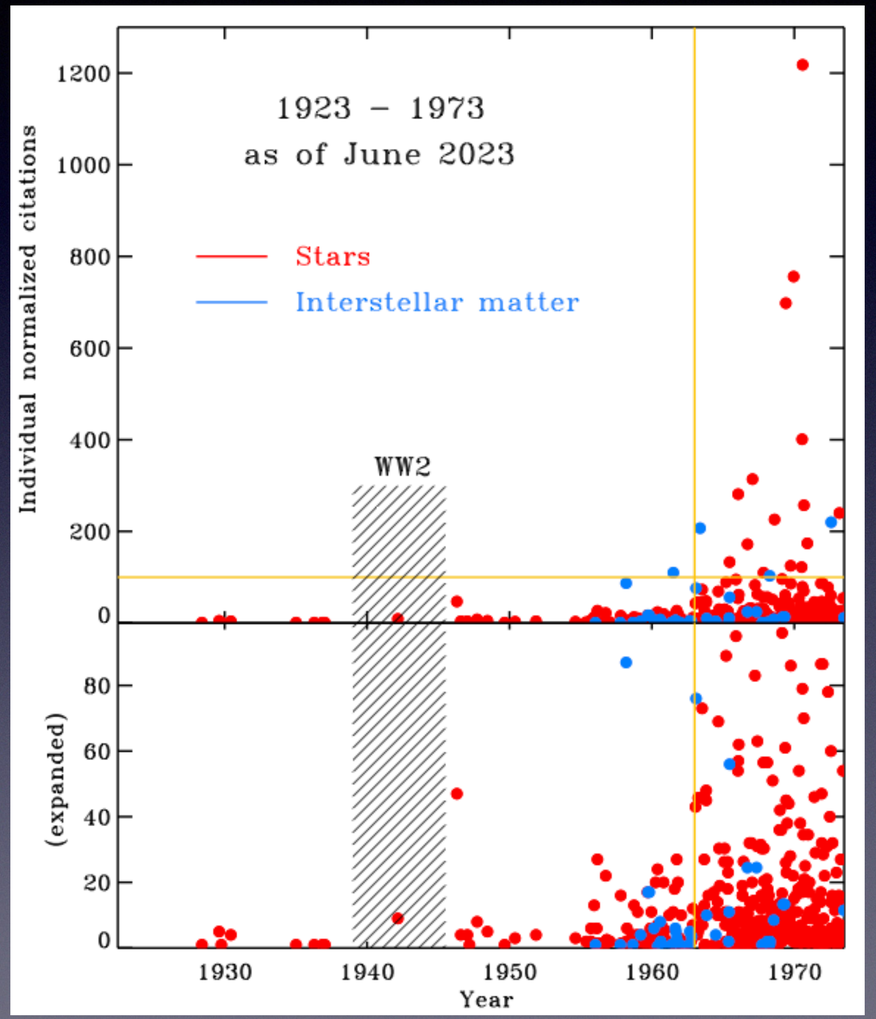


Antoni Opolski
Eugeniusz Rybka

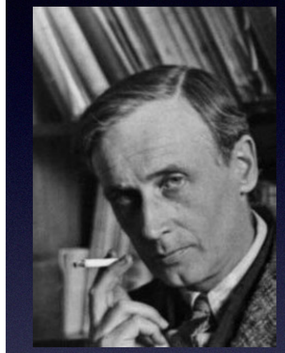
Wilhelmina
Iwanowska

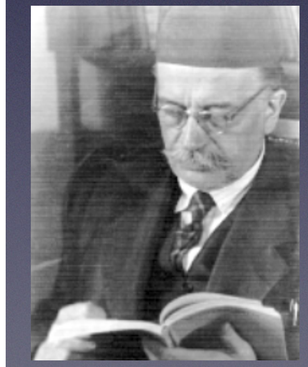


Włodzimierz Zonn

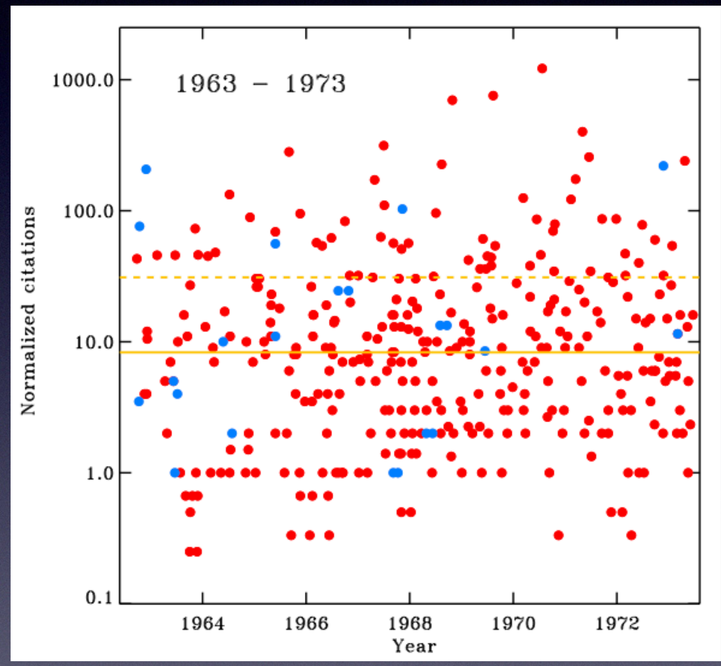


Stefan Piotrowski

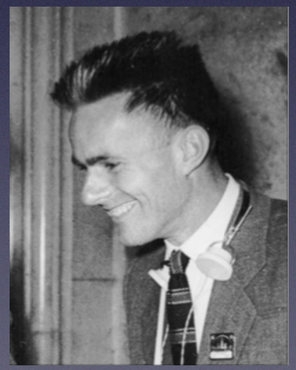




Tadeusz
Banachiewicz



Bohdan Paczyński



Krzysztof
Serkowski

- 33 papers/year
- median n.cit. 8.5
- mean n.cit. 31

Polish astrophysics: Stars & ISM

The first 50 years

Sławek Ruciński
Toronto, Canada

1923 - 1973

Editor Note - at the end of the paper:

Banachiewicz AJ, 50, 38 (1942)

Cracovians = Krakowiany

Submitted during the war...

normal equations gives the following residuals, in units of the fourth decimal place:

Bauschinger	+3	+2	−3	+4	0	+2,
Cracovian	0	0	−1	0	0	+1,
" (check)	−2	0	0	−2	0	+2.

The better representation by the cracovian solution was to be expected because of the smaller number of rounding-off errors.

Earlier papers by the author on this and related subjects were published in *Bull. Acad. Polonaise*, A, 1938, 134–135 and 393–412. (*Crac. Obs. Repr.* 22) and in *Acta Astronomica*, c, 3 and 4.

Editor's note: Difficulty of communication with the author has forced the editor to assume responsibility for abbreviations and minor modifications introduced in Professor BANACHIEWICZ's manuscript. Acknowledgments are due to Mr. BORIS GARFINKEL for aid in preparing the printer's copy.

The author was apparently not familiar with the method of solving normal equations by W. DE SITTER, *Ann. Cape Obs.* 12, part I, Appendix, 161–173, 1915. DE SITTER's scheme appears to be essentially as brief as BANACHIEWICZ's.

Cracow, Poland,
1941 *February.*