

**80th Birthday Celebration
in Honour of
Professor Johannes Ranft**

A Personal Appreciation

of his collaborations with
CERN Health Physics Group,
Study Groups for the 300 GeV Accelerator Project,
SPS Radiation Group and
CERN Radiation Protection Group

**Presented by
Graham R. Stevenson**

The PS and UK

c. 1964 – Special CERN Fellow with PS Division:

- Hannes became friends with Klaus Goebel (HP) and Hans Geibel (PS shielding).
- Collaboration with shielding experiment after PS beam escape to East Area.
- Development of TRANSK

c. 1968/9 – moved to UK Rutherford Laboratory

- Hannes participated in the Extraction Problems study group (under Leo Hobbis) for 300 GeV European Proton Accelerator Project.
- He later also participated in the Radiation Problems Study Group, first under Leo Hobbis and then under Klaus Goebel
- I had a small part in the Extraction Group and was Secretary of the Radiation Group.
- Pauline and I met with Hannes and Gisela as friends.

SPS – the early years

c. 1970/71

- After taking up appointment at Leipzig, Hannes maintained regular contact with Klaus Goebel for the initial stages of the SPS and the setting up of the Radiation Group.
- He shared the use of FLUKA/MAGKA.....

1971/76

- Klaus convinced John Adams (SPS director) to base the radiological and radiation damage assessment of the SPS on Hannes' cascade codes.

“Right or wrong – FLUKA is right”

- Visits by Hannes to CERN every 3 months or so for code development (and other projects! The SPS paid the travel & subsistence)
- Code maintenance by Jorma Routti
- Radiation damage and book-keeping by Helmut Schoenbacher
- Radiological assessments by me

A Personal Note

Hannes regularly spent the evening with us during his visits to CERN, both when Pauline and I rented a house in Plan-les-Ouates, GE, and, later, when we moved to our house in France.

We made very good use of his “non-theoretical physics” professional advice during our house construction.

The decision to rewrite FLUKA

- Jorma left for Helsinki before the SPS was commissioned in 1976, but continued collaboration with RP by supplying doctoral students from HUT
- Having passed the commissioning stage of the SPS we (at CERN) decided to look carefully at Hannes' codes.
- New IBM computers were installed at CERN with larger core memories
- It became possible to store all secondaries from an event and pick them off a "stack" one by one instead of having to minimise core storage by following each secondary from the first interaction in turn to its death through the subsequent interactions. It meant one had to keep a number of interactions from different generations of the cascade active at once.
- We had a distinct dislike for the banking of the last part of the energy from an interaction after all the secondaries were generated.
- We realised the necessity to use double precision especially in geometry routines

The decision to rewrite FLUKA – continued

- New treatments of the intranuclear and evaporation parts of the cascades became available from Hannes
- Very difficult to graft anything new on to Hannes' existing codes
- Errors in treatment of particles leaving targets
- Important to realise that my own responsibility always was for Radiation Safety at the SPS.
- FLUKA was a useful tool, and its development was a hobby and not an end in itself

Visits to Leipzig

As part of the discussions on FLUKA revision I visited Hannes in Leipzig. The first visit was by plane to Berlin in 1979, crossing the border in the “Hole in the Wall” of the U-Bahn station.

The only problem was convincing the border police that the few papers I was carrying were scientific and not commercial or political documents!

Then there was the experience of the train journey to Leipzig.

For someone with little or no German travelling in a country where no English was spoken, this was somewhat harrowing.

The second visit was a year later, by car, with my wife Pauline and our two daughters (and 2 m² of bathroom tiles)

Customs at the border crossing were only interested in guns and cameras!

We had visas for visiting all parts of E. Germany – a wonderful experience

The Old Mill

October 1980



FLUKA82

- The rewrite of FLUKA was started by Pertti in 1979
- Completely modular
- Prepared for new modifications – weights in geometry and particle production
- New high-energy physics from Hannes
- Physics separated from transport
- Used for initial radiological and environmental impacts of SSC and LHC

Les Contamines

Mont Blanc →



March 1986

FLUKA86

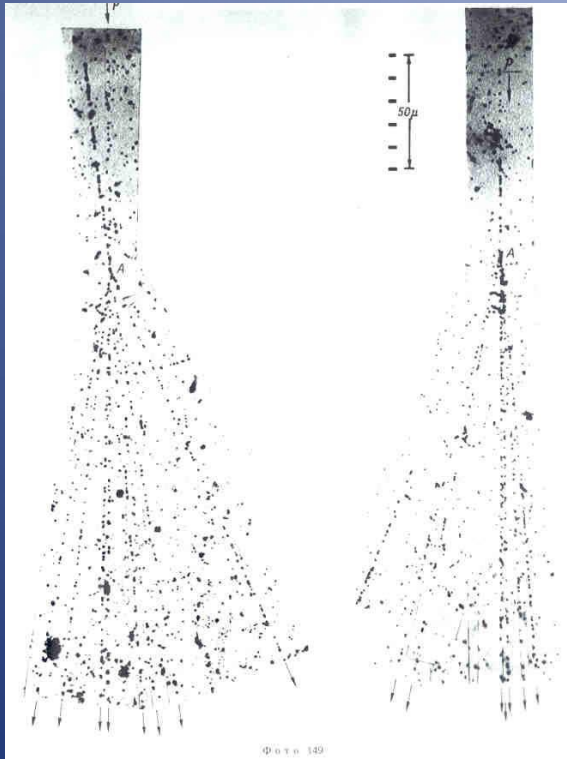
- As usual nothing worked perfectly with a new release, so mistakes were corrected and additions made for a new release in 1986.
- Hannes and Ralph Nelson had tried to couple FLUKA and EGS in 1978/79, and failed – mainly because of the geometry problems at the time.
- I cleared the geometry problem and was able to link the two codes late in 1986
- Jan Zazula joined CERN to work with us after linking MORSE with FLUKA while at Julich in 1987
- I used this version for both LHC and SSC machine studies in the late 1980s and for “scoping” the radiation problems to be expected in the experiments at both colliders.
- The scene was set for the transfer of FLUKA development to Milan in 1990, its significant rewriting by Alfredo and Paola and its use for LHC machine and experiment design.
- Hannes started to get his travel money from Milan and not CERN

Klaus Goebel

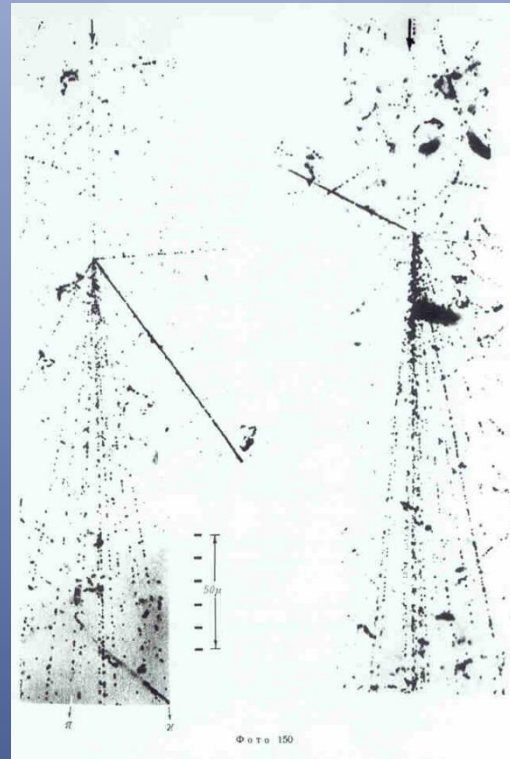
1926-2009
Our friend and mentor



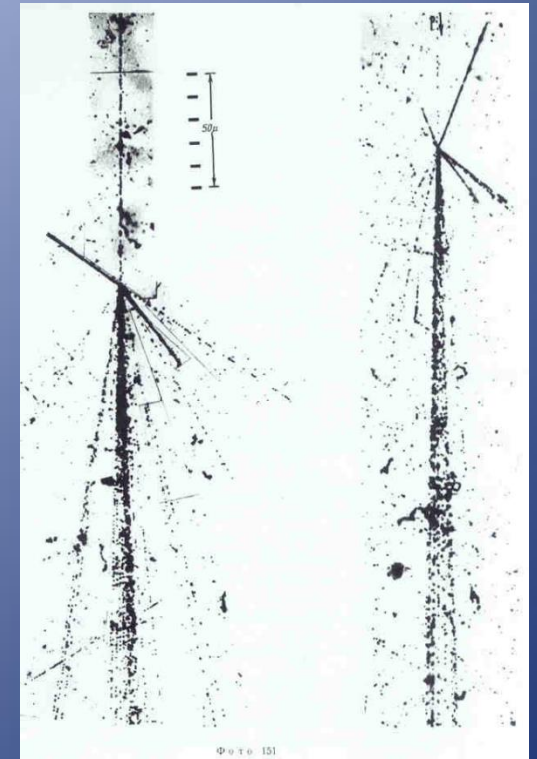
Cosmic Ray Proton Interactions



100-200 GeV



200-300 GeV



3 TeV

Emulsion microphotographs from Prof. C. F. Powell's University of Bristol Cosmic Ray Group c. 1955