No. 290

EUROMECH

Final Report

Date: 11-2-1994

Please send this report to the Secretary of the European Mechanics Council, Professor Bengt Lundberg, School of Engineering, Uppsala University, Box 534, S-751 21 Uppsala, Sweden, within one month after the Colloquium.

General

Euromech Colloquium No: 290

Title: MECHANICS OF SWELLING

Co-Chairmen: Prof. A. Silberberg and D. Barthès-Biesel

Place and country: GREECE (Rhodos)

Dates: 23 - 27 August 1993

Finance

See attached balance.

The conference fee included

Funding:

Accomodation (type and cost):

Meals:

Participation

Total number of participants: _____

Distribution of participants by country:

Code	Country	Number	Code	Country	Number
A	Austria	—	IRL	Ireland	—
B	Belgium	—	LT	Latvia	—
BG	Bulgaria	—	LV	Lithuania	—
CH	Switzerland	—	N	Norway	1
CS	Czechoslovakia	—	NL	Netherlands	2
D	Germany	2	P	Portugal	—
DK	Denmark	—	PL	Poland	2
E	Spain	1	R	Rumania	—
EE	Estonia	—	S	Sweden	—
F	France	5	SF	Finland	—
GB	Great Britain	7	YU	Yugoslavia	—
GR	Greece	2	CIS	CIS	
H	Hungary	—	-	Others Israel	3
I	Italy	5		Canada	1
				New Zeland	2
				Australia	5
				USA	5

TOTAL 43

Is there need of another colloquium on the same subject? Which year? 1996

Yes during 1996

Turn

→ see attached

SCIENTIFIC REPORT

When I started working on swelling 25 years ago, I was not aware that ancient philosophers had already considered the fundamental principles and rules concerning this subject. From that time, I tried to go deeper in understanding the fundamental rules concerning oncotic variations (such as swelling and shrinkage) by using physics and mathematics, but I was often perplexed. I stated that these principles do not arise from a unique etymological and coherent linguistic structure; some coming from the Greek others from the Latin and others have been settled from English language. To explain the genesis of natural events Aristotle used only dialectic methods e.g. lexical operators such as "being's potential" and "being's action" but not mathematics. Only with Gibbs' who substituted the "being" of Aristotle with the Ancient Greek word "phase" (representing any observable system remaining homogeneous after being divided into smaller parts) do we start modelizing "natural events" with mathematics. In this colloquia we have tried to explain oncotic transformations in natural systems by extending Gibb's thermodynamics e.g. swelling from one configuration to another while the system is undergoing its own conjugated transitions.

Furthermore, by regarding that any system may be considered as a continuum, the meaning of a phase becomes the result from the blend of the meanings of the neighbouring phases and hence any system such as the soil (that is the result of the interaction of the constituent phases such as solid, fluid and vapour) allows that new substances pass, say, into a swelling seed that is undergoing transitions and transformations of different orders for as long as the plant grows, etc.... In the hope of being able to explain swelling and morphogenesis by means of physics and mathematics and, in general, oncotic variations (precisely the form (shape) that a system takes on during swelling), the Euromech Colloquium No 290 has found it necessary to study, outside the mechanical and thermodynamic behaviour of a swelling continuum, the physics, biology and physiology of certain representative swelling systems such as: clays, plants, cells and tissues.

In the different sessions of our colloquium we dealt with the swelling of soils, plants and other living systems. At the same time we elaborated and dealt with the thermodynamics and mechanics of these systems and I hope that in the coming years we will continue by piloting and indexing further knowledge concerning further research on clays, plants, medical problems and eventually on the thermodynamics of swelling.

Therefore, new meetings must follow, by taking note of all these philosophical conceptions, in order to go further complementing our background on the oncotic variations that presently our world.

Theodoros K. KARALIS , Chairman of the Colloquium,
December, 1993 Xanthi, Greece