— Looking for Heat —

Impressions of the ISCMNS Asti Workshop, June 2017

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Meetings come and go, as years pass by. This was for me the first "in between" LENR-related meeting, held between the biannual ICCF international conferences. To me this workshop was far better than the large recent meetings, like Padua (ICCF19) or Sendai (ICCF20).

The 12th International Workshop on Anomalies in Hydrogen Loaded Metals was held from June 5 to 9, 2017. There were about 70 participants, less than the average 150 participants attending the large conferences, but the second largest group at one of the Italian workshops. I found this smaller meeting more productive and there were more opportunities for personal talks and networking.

Bill Collis, of the International Society for Condensed Matter Nuclear Science (ISCMNS), and his organizing team did a superb job. Collis has been organizing the "Asti Workshops" since November 1993.

Participants stayed at the same hotel, sharing lunch and dinner together. Dinner was Italian style: food served slow. This means three or four hours of superb courses and ample time in between to talk with each other, which we were unable to do in Padua or Sendai.

The structure of the audience was also different. There were young, interested, motivated researchers, and potentially interested business people. Some of the businessmen attending included: Laurent Levin, chief engineer of Renault's electric car team; Bo Gardmark from Sweden, a supporter of cold fusion development; J. Dewey Weaver of Industrial Heat; a Japanese man from Nissan.

A real shift in paradigm came from two active participants: Bob Greenyer of the Martin Fleischmann Memorial Project (quantumheat.org), and Russ Gries from Quantum Gravity Research (quantumgravityresearch.org). What was unexpected and potentially very useful: these groups repeat experiments and disseminate knowledge through the net. They have hundreds of followers, who are really interested in the potentials of cold fusion. Frankly, there is a need for fresh talents, and fresh insights.

Needless to say, the last 30 years of cold fusion research has been an uphill struggle. Articles, patents and books didn't help. Funding is scarce, progress is slow. Unconventional research requires an unconventional practical approach, and this is delivered by the open-minded backyard inventors of the net.

A strange but welcome surprise was Sam Hansson, the director of a small webshop that specializes in cold fusion applications: www.lookingforheat.com

Thomas Claytor (right) was awarded the Preparata Medal. Fabrice David (left) was awarded the Bronze Medal for Best Poster Presentation. *(Photo courtesy of Mathieu Valat.)*

For me the most awaited lecture was Tom Claytor's presentation about tritium production in gas (deuterium) discharge.

J.J. Thomson (the discoverer of the electron) was the first to observe "mass 3" gas in a hydrogen discharge, in 1913. He used an early, simple mass spectrometer for "X_3." He published results in *Science*, but it was entirely forgotten, seen as insignificant. Due to false logic, he concluded that X_3 was "occluded" in all metals, and it is only liberated by a high energy gas discharge or ion bombardment.

Maybe Thomson made only deuterium, resulting in observation of only DH molecules with 3 nucleon masses. He abandoned this research line, and no one followed him to clear up the ambiguities. Thus, a promising route to advancement was lost.

Tom Claytor of Los Alamos National Lab followed this line nearly a century later with sophisticated equipment. He found tritium in a pulsed wire corona/glow discharge in deuterium gas, but none in hydrogen. But while Claytor didn't exceed 2 kV of pulse voltage, Thomson used 100 kV, which may have made the difference. (Collie, Patterson, etc. used pulsed discharge up to 250 kV!)

Claytor, and his fellow worker Malcolm Fowler,

used sophisticated equipment to "manufacture," capture and measure tritium—the most expensive material on Earth.

They used the instability of tritium, its slight beta emission activity, to identify it unambiguously. Usually thin palladium wires or foils were used to generate tritium, always in a pulse mode. This was a lucky strike, as it is essential for transmutation. DC current will not yield the same result.

The Claytor-Fowler results are the most stable, most apparent experimental proofs of cold fusion, as they can't be explained by textbook nuclear physics. Tom Claytor's Preparata Medal, given to him this year, was long overdue. (*The Los Alamos Daily Post* published a story highlighting Claytor's receipt of the Preparata Medal, and includes details about his career: http://www.ladailypost.com/content/los-alamos-scientist-awarded-giuliano-preparata-medal.)

Apart from this important consequence, there is an even bigger significance: all forgotten cold fusion inventions were based on this effect. This was the subject of my talk, "Forgotten Effects and Inventions of LENR." It was well received. I hope the audience understood that not only heat, but electric energy, mechanical energy and oxygen/hydrogen mixture, can be produced with LENR. All inventors stumbled into it by accident, most of them considering it a result of an ether fluctuation. The rest of them were just "backyard" inventors who had neither appetite, nor interest, in explanations. However, they understood its practical value and consequently guarded it so closely that even their patents are of little practical value. They hid their success and secrets so successfully that hardly anyone remembers them now.

The Claytor-Fowler tritium synthesis is the key to all forgotten inventions; there is no other path as far as I know.

The details are intricate: they involve dusty plasma and edges on the electrodes. There is a four level series of effects both in time and space, starting from nucleons to electrodes via dust particles. All in all it is a sort of catalysis.

Anatoly Klimov, the director of a successful Russian group, openly and correctly criticized that the participants do not fully grasp the importance of dust particles in plasma, and their non-linearity, which helps LENR.

Two lectures hit the nerves of the LENR community, highlighting important points which all theoreticians should have embraced long ago: David Nagel's "Expectations of LENR Theories" and Michael McKubre and Mahadeva Srinivasan's "LENR: What we must do to complete Martin Fleischmann's undertaking?"

Many theoreticians still prefer their own ivory tower instead of looking for data on transmutations and energy production. As Nagel remarked: some theories are not related at all to practical processes, and some of them are just untestable. Their most important value comes from their predictive power: Do they help experimentalists? Do they give ideas for better experiments? Is LENR a one step, or multi-step, process? In any case, what is the key idea?

Nagel also highlights the importance of equations being written out. In this regard I am skeptical. There is no chance for a testable numerical model, due to the many interconnected levels of time and size scale. These events constitute the typical "stiff" equations. If there are about three orders of magnitude differences in time and distance scales, the equations yield stiff problems. They are simply unsolvable. I had to learn this bitter lesson early in my career, when the solutions for hydrodynamic problems became numerically unstable. Namely they were hypersensitive to the initial parameters.

Nagel's questions about theory really hit the nail on the head. Of course, there were no answers, as "theory" today is a patchwork of weakly related models; there is no candidate for an all-encompassing theory.

The workshop included a one hour panel discussion on theory, with participants like Dubinko, Paillet and Hagelstein. But there was not enough time to get to the details. This session did not live up to my expectations.

Michael McKubre's lecture was especially memorable: What must we do to complete Martin Fleischmann's undertaking? This was his first speech after retirement, with 28 years experience behind him. A shorter version may be published in *Infinite Energy*. (ISCMNS will have video of the presentations available soon on their website, www.iscmns.org.)

McKubre described the most solid evidence of LENR as the following: tritium $^3H_1$; excess heat; $^4He_2$

But why is it so hard to convince mainstream science? Because of the lack of reproducibility. This duty is on our shoulders, which makes projects like the Martin Fleischmann Memorial Project or Quantum Gravity so important.

The entire list of presentations from the workshop are presented below. The abstracts (and in some cases PowerPoints) for the presentations at the 12th International Workshop on Anomalies in Hydrogen Loaded Metals are available at: www.iscmns.org/work12/Abstracts.pdf

Presentations at Asti-12

- Effect of Supporter Material on Heat Evolution from Ni-based Nano-Composite Samples under Exposure to Hydrogen Isotope Gas *Akira Kitamura et al.*
- Model Mechanism for AHE by Nano-Metal and H(D)-Gas *Akito Takahashi*
- Erzion Interpretation of Rossi & "Lugano" Experiments with "Hot E-cat" Cell & Our Plasma Electrolysis Experimental Results *Yu. Bazhutov*
- Patents in the Land of LENR *David J. French*
- Forgotten Effects and Inventions of LENR *George Egely*
- "Road Map" for Developing Engineering Applications of LENR Technologies *I. Goryachev*
- An Improved Differential Calorimeter to Study the Synthesis of an Iron Pico-Hydride *Jacques Dufour, Jenny Vinko*
- A LENR View after SSICCF20 and ICCF20 *Jean-Francois Geneste, Jenny Vinko*
- News about Symmetries in Physics *Jean-Francois Geneste, Jenny Vinko*
- Deepening Questions about Electron Deep Orbits of the Hydrogen Atom *Jean-Luc Paillet, Andrew Meulenberg*
- Reanalysis of an Explosion *Jacques Ruer, Jean-Paul Biberian*
- Isotopic and Elemental Composition of Substance in Nickel-Hydrogen Heat Generators *K.A. Alabin et al.*
- Verification of the Results of G.L. Wendt and C.E. Irion Experiment on Electric Explosion of Tungsten *L.I. Urutskoev et al.*
- Interaction of Erosive Metal Clusters with Hydrogen Atoms in Heterogeneous Plasmoid *A. Klimov, N. Belov, B. Tolkunov*
- LENR: What We Must Do to Complete Martin Fleischmann's Undertaking *Michael McKubre, Mahadeva Srinivasan*
- Cold Nuclear Transmutation Study of Various Atomic Nuclear Structures *Philippe Hatt*
- Structure of the Neutron and Proton *Philippe Hatte*
- Recent Progress on Transmutation Experiments Induced by D_2 Gas

Permeation *T. Itoh, J. Kasagi, Y. Iwamura, S. Tsuruga*

- On the Heat Transfer in LENR Experiments *T. Toimela*
- Chemical and Nuclear Catalysis Mediated by the Energy Localization in Crystals and Quasicrystals *V. Dubinko, D. Laptev, K. Irwin*
- Peculiarities of Hydrogen Interaction with Ni Powders and Melt Spun $Nd_{90}Fe_{10}$ Alloy *Vladmir Dubinko et al.*
- Anomalous Excess Heat Generation by the Interaction between Nanostructured Pd/Ni surface and D_2/H_2 Gas *Yasuhiro Iwamura, Takehiko Itoh, Jirohta Kasagi, Hiroki Shishido*
- Anomalous Heat Generation Experiments Using Metal Nanocomposites and Hydrogen Isotope Gas *Yasuhiro Iwamura et al.*
- Demonstration of Large Excess Heat in Ecological Plasma Electrolysis *Yu. Bazhutov et al.*
- Simulations & Measurements of the Thermal Behavior of an Electrochemical Cell *Zachary Awtry et al.*
- Can the Use of Rare Isotopes Help Establish a Working LENR Theory? *Bob Greenyer, Alan Goldwater, Mathieu Valat, Bob Higgins*
- Synthesis of Helium as Result of Interaction of Deuterium with Palladium *Dimiter Alexandrov*
- Rubidium Carbonate Electrolysis with a Fibrex Nickel Cathode *William Collis*
- Observation of Zener-like Behavior, in Air of Constantan Sub-micrometric Wires after D_2-Xe Loading-deloading and Related AHE *Francesco Celani et al.*
- Transmutation of Heavy Stable and Radioactive Isotopes in Growing Biological Systems *V.I. Vysotskii, A.A. Kornilova*
- Generation of Undamped High Frequency Temperature Waves and Nuclear Transmutation of Isotopes under the Action to Target Shock Waves Generated at Cavitation of Water Jet *V.I. Vysotskii, A.A. Kornilova*
- Design and Initial Testing of the Least Action Nuclear Process [LANP] Computer Model of the Cold Fusion Process *Daniel Szumski*
- Summary of Tritium Evolution from Various Deuterided Metals *Thomas N. Claytor, Malcolm M. Fowler, Edmund K. Storms, Rick Cantwell*
- Development of a Sensitive Detection System for the Measurement of Trace Amounts of He^4 in Deuterium or Hydrogen *Malcolm Fowler, Thomas Claytor*
- The Reasons and Mechanism of Giant LENR Optimization at Pulse Formation of Coherent Correlated States of Interacting Particles *V.I. Vysotskii, M.V. Vysotskyy*
- Expectations of LENR Theories *David J. Nagel*
- LEAP: The LENRIA Experiment and Analysis Program *Steven B. Katinsky, David J. Nagel, Melvin H. Miles, M. Ashraf Imam*
- LENR, Existential Risks and Rewards *Alan Smith*
- Can We Avoid Penetrating Radiation? *William Collis*
- Preventing Thermal Runaways of LENR Reactors *Jacques Ruer*