

Asti Workshop on Anomalies in Hydrogen / Deuterium Loaded Metals

November 27-30, 1997 in Asti, Asti Province, Italy

The Asti Workshop from the Organizer's Point of View

by William J.M.F. Collis
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Asking the organizer to write about his own workshop is like asking a mother to describe the virtues of an unmarried daughter. The answers are likely to be personal and incomplete. With that proviso, let me attempt to give my impressions on the meeting.

Apart from ICCF-2 held in Como in 1991 there have been about a dozen or so Cold Fusion meetings held in Italy since 1989. Most of these have not been advertised. Invitation has been by word of mouth and budgets have been very limited. As a result these meetings have generally been attended by Italian academics only.

Four years ago Fiat, the automobile group, (and other sponsors) invited a group of nearly 20 international experts in Cold Fusion to a private meeting at Villa Riccardi, near Asti. The meeting was followed by a press conference and the first "truffle prize" was given to Yan Kucherov for his pioneering work on transmutations induced by glow discharge. A common interest of Martin Fleischmann and Stanley Pons was gastronomy. The main reason for choosing Asti as the site for the meeting was the chance to eat truffles and drink the local Barbaresco red wine! There was no Cold Fusion going on in Asti!

This format was followed again in October 1995. This time some forty scientists attended and two truffle prizes were awarded. One was given to Akito Takahashi for his electrochemical work

and the other to Francesco Piantelli for the development of the high temperature gas loading device. It should be mentioned that Fiat was, and still is supporting Piantelli and his group at the University of Siena.

Come 1997, Fiat was not ready to make public announcements on its own development of Cold Fusion and so did not plan to sponsor the Asti meeting. With Fiat's consent and the support of the other sponsors, the author of this article decided rather late to take the initiative. As an Englishman resident near Asti I am ideally placed to make the local arrangements.

I had originally counted on the financial and organizational support of La Sapienza (University of Rome III) and INFN (Istituto Nazionale per la Fisica Nucleare) who in the past had sponsored other Italian meetings. After having been promised this in writing, it transpired that sponsorship would not be forthcoming because the proceedings of a 1995 Italian meeting had still not been published. News of this setback only arrived after initial invitations had been sent. The organizer's nightmare had been realized—I was committed to organizing an international workshop without support. Little did I know at that time, that most of invitations sent out by air-mail would actually reach their intercontinental destinations by surface mail more than a month later. I was risking greater failure by giving insufficient notice to attendees.

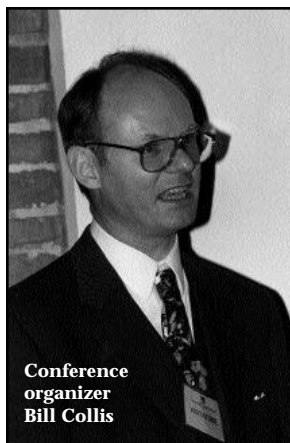
I do apologize to all those who would have liked to come but were unable to do so. Perhaps too, I should also have known better than to fix a date close to Thanksgiving Day in the United States. However, in the event I was overwhelmed by acceptances and by all accounts the workshop was a success! In fact, more than 60 people attended at least one of the three days, making the meeting the most popular Cold Fusion workshop on record. Although I had booked all 32 rooms at the hotel Villa Riccardi, this was not enough and two other hotels were filled to capacity!

How was it possible, to transform the situation after such an unpromising

start? I think there were several key factors. Firstly the good reputation of the Asti workshops was created by Fiat. Previous attendees of the workshop were amongst the first to accept their invitations. Secondly many of the attendees and sponsors know each other personally. Finally, the speed of e-mail and a web-site make up for deficiencies of the postal service.

The Cold Fusion community has shown the world that the subject still excites extraordinary interest. But one of the most extraordinary things is that "Cold Fusion"—in the sense of fusion of hydrogen isotopes—was hardly mentioned at the entire workshop! A conceptual revolution has been taking place where alternative explanations are now accepted as the most reasonable basis for discussion. In my own presentation, I mentioned, in passing, some data of several years ago regarding Piantelli's gas loading cell. There was so little natural hydrogen in this device that the tiny quantity of deuterium present was insufficient to explain the abundant heat production. This unpublished and preliminary result of course was a bombshell! At a stroke, it demolished the Cold Fusion explanation for excess heat. It also rendered irrelevant the critique of that explanation. "Cold Fusion" is dead. Long live New Hydrogen Energy (NHE)!

I would hope that some of the moderate skeptics will now return to study NHE, comforted by the fact that their doubts on Cold Fusion were in fact justified. Sterile hydrogen fusion theories have never correctly made any significant prediction. Indeed they have made many false predictions (such as the unverified production of ^3He from p-d). I think it is fair to say that major responsibility for the lack of progress in the field has been due to clinging to these unrealistic models. One attendee described it as a hardening of the arteries. It is time to cut away the dead wood, reexamine the evidence, and reconstruct predictive theories which can be tested experimentally. Perhaps the Asti workshop has accelerated this process.



Conference organizer
Bill Collis



The Group Photo at Hotel Villa Conte Riccardi

Back Row: Don Holloman, Stan Gleeson, Stefano Sanvito, Giorgio Iacuzzo, Danielle Garbelli, Francesco Premuda, Mike McKubre, Jean de Lagarde, Jean Pierre Vigier, Pierre Clauzon, Bill Collis, Jacques Dufour, Bart Simon, Giuliano Mengoli.

Front Row: Linda Holloman, Celine Estille, Christos Stremmenos, Robert Huggins, Giovanna Selvaggi, Jean Paul Biberian, Peter Glueck, Lino Daddi, Tomio Uehara, Hiroshi Kamimura, Naoto Asami, Misa Nakamura

Below: Fulvio Frisone, Sergio Focardi, Francesco Celani

Alas others were in a different hotel or had simply had too much Dolcetto to drink the night before! (WC) (Photo: Courtesy, Bill Collis)

The Asti Cold Fusion Workshop: A Pilot for ICCF-7?

by Dr. Peter Glück

Institute of Isotopic and Molecular Technology

The “Asti Workshop on Anomalies in Hydrogen/Deuterium Loaded Metals,” actually the third Italian Workshop on Cold Fusion, was organized by ENECO Ltd., chief organizer William Collis, one of most enthusiastic promoters of new energy research in Italy. Bill has done a great job, everybody has agreed. Place: Hotel Conte Riccardi at Rocca d’Arazzo, some 7 kilometers from Asti, the capital of Asti province—a very beautiful area of a wonderful country. Timing: Nov 27, Thursday–Nov 30, Sunday 1997. Participants: some 60 cold fusioners, experimentalists, and theorists from Italy, the US, Japan, France, England, Germany, Canada, and Romania. Many of the international leaders of the field were present. Organization: perfect, in my opinion, excellent conditions for the lectures (16) and the posters (5), and what is even more important, the best opportunities created for professional

scientific discussions, for networking and collaboration. Please do not forget the fine hotel, tasty food, and world leader quality wines, both red and white. Sponsors, besides ENECO: (names in Italian, difficult to translate exactly)

- Fondazione Cassa di Risparmio di Asti
- 21 mo Secolo Scienza e Tecnologia
- L’ACN- L’Accessorio Nucleare srl
- Associazione per lo Sviluppo Scientifico e Tecnologico di Asti
- Orim srl
- The Cincinnati Group from USA
- Infinite Energy* Magazine

[Editor’s Note: Some 60 pounds of magazines and brochures sent to the conference by INFINITE ENERGY were unfortunately *lost* by the US or Italian postal authorities!]

General impression and problems. The “cold fusion” war continues, on many battlefields. In Japan, CF was defeated [*Officially, but the best work continues nonetheless.*—Editor], the official “New Hydrogen Energy” program will be stopped in April 1998. The reason?

“APPALLING MANAGEMENT”—in Martin Fleischmann’s words. Excellent science (as demonstrated in the Asami et al. and the Kamimura et al. papers) combined with such management is a perfect recipe for a disaster. “Metrologomania” (focusing on measurement and not on the effect), investing many times more little grey cells in the means as in the aims: a cult for calorimetry displacing and replacing the efforts aiming at a really strong and reliable excess heat effect. We are at a point where the lack of a theory hurts. A great gap between experimental practice and the most bright theories. One of the world’s greatest theorists, Jean-Pierre Vigier, asks for a perfect, self-sustained demo, for a public acceptance of the reality of cold fusion. With the existing theories: “We all are walking in the fog,” as somebody remarked. More or less true. Existing theories which try to reconcile the experimental facts with classical physics cannot help, we need new thinking for the new reality. A brand new paradigm, back to the very basics. Not consulting with the successful workers (as Prof. Yoshiaki Arata in

Japan). Not accepting reality: the classical bulk Pd/D₂O system is not able to scale-up. Some ways are good, some not; we had enough time to make the difference. "Errare humanum est, perseverare diabolicum" has to be applied. CF is progressing through some leading, creative groups. The Cincinnati Group is one of these and it was at Asti. It has shown us some very valuable and interesting things. We regretted the absence of the president of Trenergy, Inc. (Hal Fox) who intended to speak about plasma-injected transmutation. A strongly polarized field---good perspectives for LENR/LENT as concluded from the paper of George Miley and the results of the Cincinnati Group near Mike McKubre's unforgettable lecture concerning the tremendous difficulties inherent to the classical Pd/D₂O cell and near the NHE papers. Somewhere in the middle, we learned that the Italian Piantelli et al, system is not dead at all; it is claimed to be nuclear; Piantelli is working separately from his colleagues; scale-up is more difficult than I thought. Good, but not excellent results are coming from France but this is only a new start. Perhaps I was right stating the truism that the greatest peril and obstacle for CF is irreproducibility and that a solution for the future needs clever management and strategy. ICCF-7 is coming soon, and if the organizers will learn from the Asti experience, the number of errors and blunders in the field will decrease.

First Day: Thursday, November 27.

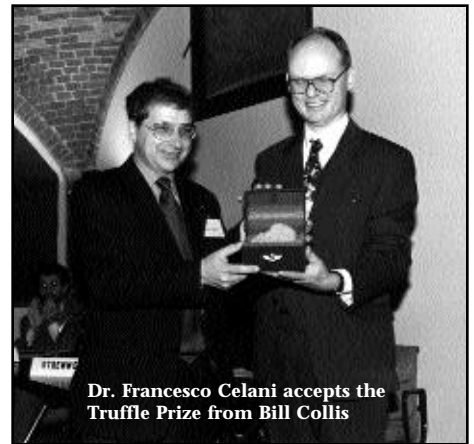
William Collis: Introduction. Our host described the history, leading principles and ideas, the "raison d'etre" of these workshops, a general image of cold fusion, some open scientific and some settled (and well settled) organizational problems. He is promoting the foundation of a European CF community/organization; he suggested the nice name of HEIDI (we all like very much Johanna Spyri's novel about the Swiss girl called Heidi), that is HYDROGEN ENERGY INNOVATION AND DEVELOPMENT INSTITUTE. This is conceived as a multi-national, industry sponsored organization. Good idea; I hope it will become a reality.

Naoto Asami: "On the Material Behaviour of Highly Deuterated Palladium." A comprehensive study, performed in the frame of the now moribund NHE national Japanese plan. The optimum methods for obtaining a high D/Pd ratio in cathodes are pre-

sented and the metallurgy, structure, texture, phase composition of the hydride are thoroughly studied. A great part of these data can be found in two papers published in the *Journal of Alloys and Compounds*, 253-254, 1997, p.185 and p. 657. Unfortunately, even the highest D/Pd ratios couldn't generate strong, repeatable, reliable excess heat.

George Miley: "Transmutation Studies Using Thin Film Electrolysis." The lecture started with the announcement that the American Nuclear Society Meeting planned for 1998 will have a special (official!) session dedicated to the low energy nuclear reactions. In my opinion, this lecture was the highlight of the workshop. We learned about the decisive advantages of the thin-film systems, about the open problems, the complex analytical problems starting with adequate sampling, about all the possible impurities, isotopic shifts, theory based on the swimming electron layer concept. The task of making material and energy balances are immensely difficult for the moment. A must-read paper. The audience did not learn about the recent technological progress made by CETI, the company which created the first technologically viable thin film systems; however it seems that the prospects are really good.

Francesco Celani: "The Effect of Gamma/Beta Phase Interface on (H/D) Overloading." Francesco Celani and his team won the Truffle Prize of the workshop for their global achievements and creative contribution to the CF field. He pioneered the use of high-frequency pulsed current and very long Pd wires for Pd loading. Great expertise in electromigration. Despite his innovative methods and very advanced calorimetry, the system still "offers" surprises. It



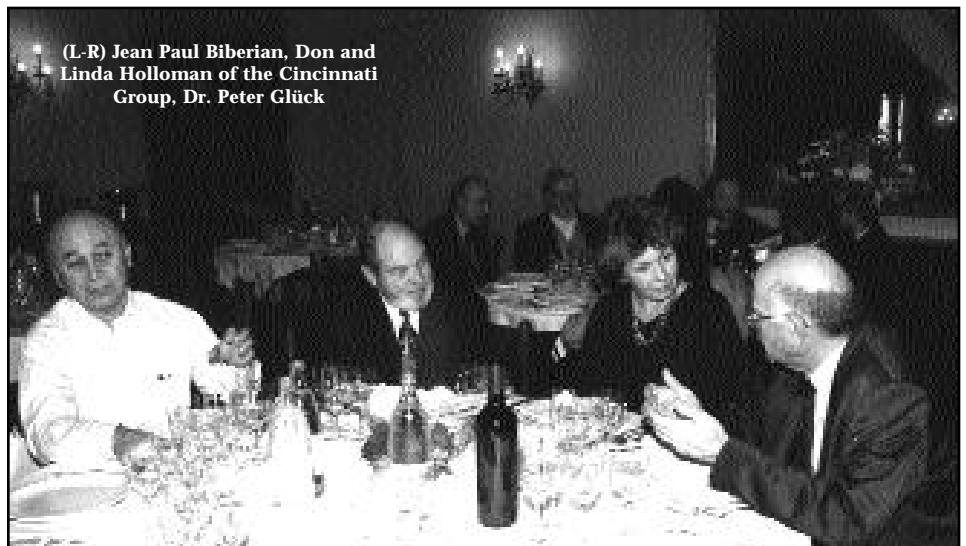
Dr. Francesco Celani accepts the Truffle Prize from Bill Collis

was a front-line report, and we wait eagerly for a continuation.

Felice Iazzi: "Techniques for Loading and Controlling the Deuterium Palladium Atomic Ratio." A study aiming to find neutrons, with clever combination of gas loading and electrochemical loading methods. They use gold plating and electro-migration to achieve high loading ratios and to avoid deloading.

Hiroshi Kamimura: "Excess Heat Measurement by Fuel Cell Type Electrolysis." Another study performed in the frame of the NHE program, with bulk cathodes. The results are entangled in the very subtleties of the high art of calorimetry, 7-18% excess found with one kind of measurement, not confirmed with an other kind (isothermal vs flow calorimeters). Anyway, marginal results are not useful in long range; we need more than some 300% anyway, for a self-sustaining demo and for practical applications.

Stefano Veronesi: "Study of the Ni-H system at 600-800 deg K." This is about the Piantelli-Focardi-Habel system, work



(L-R) Jean Paul Biberian, Don and Linda Holloman of the Cincinnati Group, Dr. Peter Glück



(L-R) Dr. Sergio and Mrs. Focardi with Dr. Francesco Piantelli
[See IE Issue #4 for their pioneering patent]

Photo: Courtesy, Bill Collis

is continuing. This study has demonstrated that the source of excess heat is nuclear reactions (gamma radiation is found). I asked if the nuclear signals are in concordance with the heat measured and got what I thought was an affirmative answer, but Bill Collis states that they do NOT have nuclear products commensurate with heat!

Their calorimetry was questioned by Jacques Dufour. Sergio Focardi, the co-author of the first paper on this system explained to me that there are problems with the scale-up of the heat excess effect. On other hand, Piantelli is working now independently; we learned that the FIAT company will continue to fund his studies. I did not understand exactly what had happen in this area. I was happy enough to see the system alive. After the dinner, a round table discussion was organized aiming to prepare the press conference of the following day. The discussions were dominated by the temperamental theorist, Giuliano Preparata, who pleaded energetically for straight attacks against the scientific establishment. The more moderate and diplomatic approaches (e.g by Collis, Vigier, Biberian and myself) the last based on a presentation of the technological prospects of the field, as those of CETI, CINCY, E-QUEST, ARATA, BLACKLIGHTPOWER etc. couldn't convince the "radicals." The possibility to persuade the Establishment by using a perfect theoretical demonstration was questioned by many, including Vigier himself.

The second day: Friday, November 28.

A press conference was organized at the Cassa di Risparmio di Asti, actually a great bank which is cleverly sponsoring innovative research. We listened to speeches of the organizers and the local authorities, Professors Preparata and Stremmenos told about their opinion regarding the Scientific Establishment.

Group, photographs were taken of the prize-winner— no questions came from the press. Next point in the program, a splendid luncheon banquet at the elegant Hotel Reale. Exquisite, very high level. Then a visit to the Contratto Wine Cellars in a small town called Canelli. I got a lot of information about how that highest quality wine is manufactured—to be included in my course in Management of Technology. Back to the hotel Villa Riccardi; the guest of honor, Martin Fleischmann has just arrived.

The third day: Saturday, November 29.

Jacques Dufour: "Effect of Hydrex on a Photoelectric Cell." Dufour's excess heat studies (rather complex and not directly scalable) have concluded that there are no nuclear ashes and the hydrogen collapse mechanism is at work leading to Hydrex (Deutex) atoms. In the Asti lecture, a very sophisticated but convincing study was presented: the hydrex state is formed due to strong magnetic fields, and excess heat effects were demonstrated by using a photoelectric cell. Dufour plans to present a transmutation effect of hydrex at ICCF-7. His experimental data are in concordance with Vigier's theory.

Bill Collis: "Cold Fusion or Cold Fission?" Collis has developed advanced computer programs for identifying and selecting the nuclear reactions which can take place in cold fusion systems. He suggested that any theory/explanation needs to account for the following observations: very few gammas, few X-rays, He, transmutations of heavy elements, similar levels of excess heat in H and D based systems, tritium and neutrons in H systems, no 14.1 MeV neutrons. Deuterium does not fuel the reaction, technical grade materials work better than pure ones (Mike McKubre especially makes this point). Perhaps the major contentious point here is the idea

However, everything went well, Francesco Celani got the prize, a great genuine truffle and a Cincinnati Cell. Other speeches were made by the beautiful Celine Estille representing the Cincinnati

that H and D are not the fuel in CF reactions. Collis went on to discuss the kinds of nuclear reactions researchers should be looking for and the possibility of basing new experiments on theoretical predictions.

Peter Glück: "The Reproducibility Problem in Cold Fusion Systems." Using a standard managerial technique (SWOT analysis--Strengths-Weaknesses-Opportunities-Threats) and an original classification of the experimental CF systems, Glück opposed the classical bulk Pd cathode/D₂O setup with the so called "evolutionary energy" systems based on catalysis and/or cavitation. In his opinion, only the later can lead to viable and reproducible commercial energy generating (CETI, BLACKLIGHT POWER, E-QUEST, ARATA, HYDRODYNAMICS, YUSMAR) and/or LENT (CINCINNATI GROUP, CETI) devices. He predicted that classical theories will continue to fail in explaining the new phenomena, a radical paradigm shift will be necessary. Management is the key to the future development of the field.

Giuliano Mengoli: "The Nickel-K₂CO₃ System: an Electrochemical and Calorimetric Investigation." Obviously, Fleischmann's choice; an excellent electrochemical study with innovative calorimetry. It's value and beauty is in the details and these can be understood only by reading the paper in extenso.

Jean-Paul Biberian: "Cold Fusion



Celine Estille of the Cincinnati Group reads Press Release in Italian!

Photo: Courtesy, Bill Collis



(L-R) Naoto Asami, Kamimura Hiroshi, Tomio Uehara Photo: Courtesy, Bill Collis

of excess heat it is wise to design a protocol which can maintain high loading at high voltage. One of the main reasons for irreproducibility of excess heat is the problem of sudden, uncontrollable deloading in the course of an experiment.

Francesco Premuda: "A Unified Theory of Cold Fusion and Superconductivity." Premuda has presented his theory based on the possible formation of special zones in plasma localized in the defect places of the lattice. The ideas have been presented in a very highly mathematized manner. This paper has to be studied *in extenso*. An important aspect is that of the dimensional, structural, and functional characteristics of peculiar places in the lattice; an adequate description/model has to be found. Premuda's theory is stimulating this endeavor.

Results Obtained in Grenoble, France." Biberian announced the major good news of the conference. The French government is now officially supporting CF research at Grenoble (talk about a reversal of fortune). The Grenoble group looks to be in good shape for at least the next three years. The program includes replication of the Fleischmann-Pons system, experiments with the CETI cell and work with solid electrolyte devices. Definitely positive results had been obtained, however Biberian is not content with the level of the excess heat effects and is not absolutely convinced about the reality of the LENR results. A very good team and program, anyway, just starting large scale research.

Jean-Pierre Vigier: "Possible Theoretical Consequences of 'Cold Fusion' Experiments." Vigier's theory of new Bohr orbits is a great achievement per se, irrespective of its correlation to cold fusion. According to it, the source of excess heat is the collapse of the hydrogen atom in tight orbits, a concept in the front-line of the theory (Vigier is developing quantum mechanics while Mills is radical and heretical, the future will show who was right). The results of Dufour and that of Szpak are proving Vigier's theory, and in Belgrade a team of scientists is working in the same direction. New details on Vigier's theory will be known from a publication in *Physics Letters A*.

Antonio Spallone: "A preliminary D/Pd loading study: anomalous phase transition effect" Spallone, who works with Celani, reported on some of the Frascati experiments, more studies of Pd loading, more studies of excess heat production using flow calorimetry. Again the importance of dealing with electromigration in achieving high loading was discussed and a warning not to try and load the cathodes too quickly. This is the common theme—in pursuit

Michael McKubre: "Materials Issues of Loading Deuterium into Palladium and the Association with Excess Heat Production." A most impressive work, with really tragic elements in it due to the terrifying complexity and difficulty of the subject, perfectly shown by McKubre. Irreproducibility seems to be inherent to this system and ultrafine details can transform a working cathode into a dead one. There are no two cathodes with the same loading-deloding behavior. McKubre reported about almost 8 years of research at SRI with pretty disappointing results, but scientifically clearly positive. My (PG) reaction was radical; "Crush your cathodes, Mike!!"

Vittorio Violante: "Lattice ion trap—classical and quantum description." A theoretical study demonstrating that nuclear reactions in the lattice are possible due to the combined effects of trap force, electrostatic interaction, and non-linearity. Both the classical representation and the quantum mechanical one show an interaction effect between deuterons in the lattice. A theoretical "new wave" work, with many Italian supporters. Posters.

Fulvio Frisone: "Study on the probability of interaction between the plasmons of metal and deuterons." A theoretical work; the author has studied the influence of impurity concentration on the phenomenon of fusing of deuterons, catalyzed by the "efficacious" interaction

with the plasmons of the metal. The numeric calculation, conducted on different metals considering the degree of impurities present in the reticulum, shows that the probability of fusion is amplified by the impurities. This result is confirmed qualitatively by the trend of the potential gap that describes the interaction inside the metal (and by many experimental data).

Lino Daddi: "On the detection of cold fusion neutrons by radioactivation." An experimental study and tutorial, describing the principle and practical application of the radioactivation method, specific for the detection of neutrons. A very important example of application of the method to the Siena experiment is presented, where gold activation was used (to be published in *Il Nuovo Cimento*). The method can be used for both the cases of continuous or burst-like neutron emissions.

C. Cammarota, W. Collis, A. Rizzo, C. Stremmenos: "Calorimetric measurements on nickel samples charged with hydrogen" (in Italian). An experimental study, demonstrating exothermal reactions in the system (81 Mcal/mol Ni in 35 days), local melting (!), and formation of craters on the surface of the sample. New elements appear in these craters (study continuing). The most important point of the Bologna work is that the group verified Piantelli's excess heat measurements using mass-flow calorimetry. Consequently, the excess heat results are so much more reliable.

First draft of a Report on the Asti Conference:

"Fusione Fredda e Tartufo"
by Bart Simon (Dec. 12, 97)

Dept. of Sociology, Queen's University

This is just my first quick draft of events based on my rough notes. I'm going to go back over things this weekend but some of the tapes of the talks turned out poorly because of loud conversations in Italian behind me!

General Observations

Forgive me, but some of you know I have an intellectual obsession with the scientific undead. The scene at Asti was positively gothic. I note the large, empty, aging Villa on top of a hill in an old medieval town, the ceaselessly dark and gloomy sky, the endless drizzle and fog. How could one not expect great things from a place like this?

Bill Collis, the workshop organizer, did a fantastic job. Despite some late adver-

tising, some 60 or so participants attended the 3rd Asti workshop on cold fusion - "Fusione Fredda e Tartufo." Slightly more than half the attendees were Italian CF researchers (Celani, Bressani, Premuda, Piantelli, Preparata, Veronesi, Scaramuzzi etc.). Fleischmann was there, as was Vigier, Biberian, and Dufour. Asami and Kamimura came from the NHE lab, and McKubre and Miley rounded out the U.S. contingent. A fairly complete list of attendee's can be found on the workshop web page (<http://www.netcity.it/coldfusion/>)

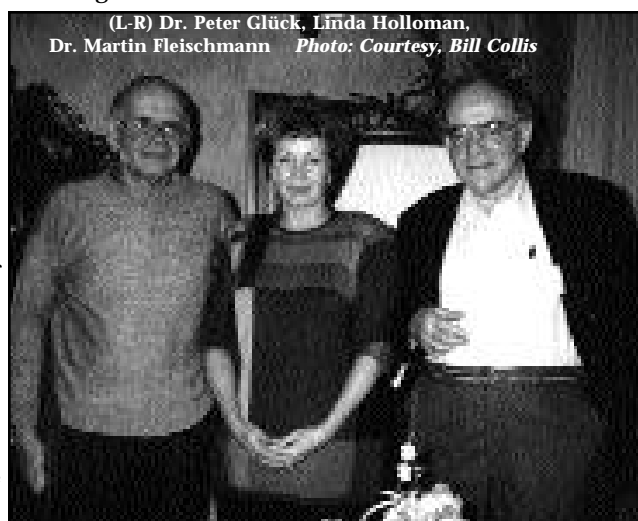
The conference was organized over three intensive days. Thursday morning (Nov 27) started early with papers from Asami, Miley, and Celani. After lunch there were papers by Veronesi (works with Focardi and Piantelli on the Bologna-Sienna collaboration), Iazzi (works with Bressani in Turin) and Kamimura. Somewhere in there we had a coffee break, and just before dinner there was a round-table session meant for discussing what kind of presentation to make to the Italian media. In between all these papers were a series a three-course meals, copious amounts of wine, and all the cold fusion conversation you could handle.

Friday (our day off?) began in the town of Asti with a press conference. The events were in Italian, so all I can say is that Bill Collis gave a short speech followed by longer controversial talks by Giuliano Preparata and Christos Stremmenos (Bologna). Francesco Celani was presented with the coveted "truffle prize," which was a giant white truffle that we could smell 10 rows back from the podium. The Cincy Group (Cincinnati Group) was also on hand, and made a short public announcement. I'm not quite sure what the fallout from the press conference was, but since there was not a single question from the floor, I don't expect much. No matter, selling cold fusion to the press was not the purpose of this workshop. We adjourned to the Ristorante Reale and proceeded to scarf down a 15-course lunch (I finally tasted white truffles!). The day proceeded in a similar spirit, a trip to the Contratto winery, where we witnessed some great baiting of the tour-guide from Jean-Paul Biberian over the wine's status as champagne-like. Following this... more food and then...more food.

Saturday picked up where we left off on Thursday, with papers from Dufour, Bill Collis, Peter Glueck, Giuliano

Mengoli (from Padua I think), Biberian, Vigier, Antonio Spallone (works with Celani), Francesco Premuda (Bologna), McKubre and Vittorio Violante.

Overall there were no real bombshells, but the workshop was productive, if only in terms of communicative aspects. I witnessed lots of worthy technical exchanges and agreements to collaborate. I gather that the various Italian groups don't maintain such tight links, so the workshop was no doubt helpful for them. All the Italian groups, by the way (except Piantelli), are suffering from the bad press and cutting of research support and the mood was not encouraging on this score (this was balanced by good news from the French however—



(L-R) Dr. Peter Glück, Linda Holloman, Dr. Martin Fleischmann Photo: Courtesy, Bill Collis

see below). In general I think people were impressed with the level of technical/experimental competence and the increase in practical knowledge of materials, calorimetry, and other elements of experimental protocol, but the mood was sour about the lack of some kind of result that could bring CF work back into the mainstream. My read on this is something of a sense of impatience and frustration (except for the French researchers who seemed pretty happy really).

There was an attempt to talk about the possibility of some more integrated synthetic research effort perhaps orchestrated through the formation of an international society of some kind, but this discussion didn't get very far—I imagine it will come up again in Vancouver (ICCF-7, April 1998). I have plenty of sociological observations to make, but I will do my best to avoid this, so I can try to produce a better sense of what was discussed. I will do my best to summarize the basic points of the papers in brief synopses below.

Naoto Asami: "On the Material Behavior of Highly Deuterated Palladium"

Asami reported an extensive series of experiments looking at the various material properties of the cathodes (grain size, surface treatments, preparation techniques, etc.) and their effects on loading. A major point seemed to be the problem of lattice deformation during electrolysis (a point McKubre focused on) and there is a need to reduce the effects of lattice deformation in order to achieve higher loading ratios. I gather there is not too much that is new about this (I remember these discussions in Maui at ICCF-4) except that I get the sense that the NHE crowd has accumulated a lot of useful data on this loading question. I just wonder, like many others, about the extent to which high loading is necessarily tied to the production of excess heat. Asami did not report the measurement of excess heat using their new flow calorimetry set-up.

George Miley (University of Illinois):

Miley started with a background on investigations in the phenomena of LENR (low energy nuclear reactions). I didn't notice a whole lot of new data, but Miley is taking the problem of impurities very seriously and I am pretty much convinced that LENR observations

are moving into the mainstream of cold fusion thinking, forcing the conventional Pd-D electrolysis types to take notice. Miley listed a number of observations that need to be accounted for: Relatively large rates of reaction, the appearance of four distinct atomic mass zones (for the products observed), the lack of energetic radiation, the lack of isotope trends, and the uniqueness of the thin film coatings for producing a significant result. Miley, as many of you know, proposes his RIFEX model for what is going on. This is beyond me, but one important feature of the model is the implication of a high degree of predictability for the kinds of fission reactions taking place. On this score, Bill Collis offered to "run the numbers" to see if he could specify exactly what kinds of stuff Miley should be observing at the end of the day. Some predictability would be nice I gather, because at the moment it seems as if lots of surprises are turning up in these LENR reactions.

Francesco Celani (Frascati)

Ok, I had a hard time following the main point of this paper. Celani uses

thin wire Pd in a high power pulsed electrolysis rig. The main claim to fame here is huge XS-heat using high voltage and the big focus here is reproducibility and the issue of electromigration. I learned some more about how the Pd wire loads unevenly and it seems that the uneven loading sets up a fine dynamic balance which allows for the production of XS-heat at high voltages without too much loss of Deuterium (which would kill the reaction). A central feature of this discussion is the relationship between the beta phase and gamma phase of the metal—how to get high loading without diffusion (and I must remember that there is no consensus on the existence of a gamma phase).

Stefano Veronesi (Sienna)

An Ni-H gas loading set-up. Calculates XS-power in the range of 20-60 watts. One graph shows a temperature increase during input power decrease (this is always a good sign). But the big news is neutrons from gammas using gold activation—looks like a few thousand neutrons/sec and a very clear peak. The emission is not constant, but occurs in bursts and some sustained low activity. I gather the gamma peak appears during the early stages of the experiment—ostensibly in the loading phase. In any case there is no evidence of XS-power when the peak appears. As I understand it though, the same experiment produced the peak and then the XS-power. Apparently there is also some evidence of transmutations but I missed the specifics on this.

I gather reproducibility is an issue here for people. Dufour, for one, was not too happy with the calorimetry. People were impressed with the gamma peak, and a few people were agreeing that this kind of clear nuclear signal is what cold fusion research needs right now.

Felice Iazzi (Turin)

I thought this was nifty experiment (if it helps, I think McKubre thought so too). Again the electromigration issue comes up to stave off diffusion, the Turin group gold-plates the ends of the Pd cathodes and report 1996 loadings of 0.8 or so along with He-4 (in one experiment). They were apparently already to start a new spiffy set of experiments when their funding from Fiat got axed. An important protocol item is that electrolysis at high currents is a good thing but the current must be increased slowly to avoid the deloading problem.

Hiroshi Kamimura (NHE)

Kamimura ran through the history of some of the NHE electrolysis experiments. As everyone now knows, they haven't been too successful on the XS-heat front. The crucial point of this talk, however, was to present the weirdness associated with the fact that XS-heat that appeared reproducibly (in 1996 40% of cells had XS around 15%) in their old isothermal calorimeters disappeared in their newer flow calorimeters. I would have guessed that this would suggest that the NHE XS was an artifact of the early calorimetry, but people took this as real weirdness which might question the suitability of flow calorimetry in certain cell designs (McKubre especially seemed to take this seriously).

Jacques Dufour (Shell)

I am a Dufour fan but this latest set of experiments were extremely hard for me



Dr. Francesco Celani holds a Cincinnati Group Cell as Don Holloman explains. Photo: Courtesy, Bill Collis

to grasp. Dufour, unlike most, has increased funding from Shell (an oil company!!!) to expand his research program. Dufour is clearly trying to design new experiments in accordance with a theoretical model following the Vigier-Mills route (i.e. the shrunken H atom). Dufour's own speculation concerns the existence of a hydrex/deutrex state under the influence of a strong magnetic field. The new experiments make use of photovoltaic cells as XS energy detectors and this is the limit of my ability to understand what's going on.

Bill Collis (Bologna)

Collis talk started by pushing the theoretical possibility of fission reactions in cold fusion systems sparked by the LENR results. Collis' thinking draws on the ideas of Kucherov and Hagelstein. He suggests that any theory/explanation needs to account for the following

observations; very few gammas, few x-rays, He, transmutations of heavy elements, similar levels of XS-heat in H and D systems, tritium and neutrons in H systems, no 14.1 MeV neutrons, Deuterium does not fuel the reaction, H isotopes are a common factor, technical grade materials work better than pure materials (McKubre especially makes this point). Perhaps the major contentious point here is the idea that H and D are not the fuel in CF reactions. Collis went on to discuss the kinds of nuclear reactions researchers should be looking for and the possibility of basing new experiments on theoretical predictions.

Peter Glück, The Reproducibility Problem in Cold Fusion

Glück presented a chart schematizing the various experimental approaches to the production of CF phenomena and proceeded to point out that in relation to a number of the more commercialized ventures (CETI cell, Griggs device, sonofusion, Cincy cell etc), the conventional Pd-D electrolysis route amounts to barking up the wrong tree (or beating a dead horse, whatever). For me Glück highlighted a kind of entrenchment of the Fleischmann-Pons exemplar within the CF community, but there is mounting pressure to change the approach especially given the demise of the NHE program. I think people in the audience were basically agreeing with this, but that the kinds of experiments Glück is in favor of are hard to integrate into the existing research programs of many of these university-based folks. A key exception perhaps is Jean-Paul Biberian's project which involves testing these other promising approaches where he can.

Giuliano Mengoli (Padua)

I found this talk very hard to follow and understand for some reason, but if its any help, Fleischmann was extremely im-pressed. Mengoli is working with Ni-H systems and is also interested in the relationship of materials properties and H loading.

Jean-Paul Biberian (Grenoble)

Biberian announced the major good news of the conference. The French government is now officially supporting CF research at Grenoble (talk about a reversal of fortune!). The Grenoble groups looks to be in good shape for at least the next three years. Biberian dis-

The all-important cold fusion luncheon menu!

«COLLOQUI SULLA FUSIONE FREDDA»

TERZO COLLOQUIO

FUSIONE FREDDA E TARTUFO

FRANZO DI GALA

Ristorante «REALE», in ASTI, Venerdì il 28 Novembre 1997
Sale dell'Alfieri - ore 13,00

APERITIVO

*Fresco calice di Spumante Brut Conte Balduino Riccadonna
servito con i giusti e comandati stuzzichini dello Chef*

IN SALA AI TAVOLI TONDI BARONALI

*Fettine di vitello crudo della fassone con scaglie di parmigiano e tartufo bianco
Tortino caldo di patate e funghi
Fagottino di verdure calde in salsa di peperoni*

*Agnolotti quadrati d'Asti in salsa oro
Risottino al bagnetto di quaglie*

Sorbetto alla mela verde

*Cosciotto d'agnello nostrano arrostito e profumato alle erbe
contornato di patate al lardo e di carciofi alla giudea
Medaglioni di filetto di giovane manzo alla salsa di nocciole e Marsala Florio
Insalata mista d'autunno al condiglione
Piccantino piemontese*

*Clementine caramellate
Millefoglie al cioccolato*

DALLA CANTINA

*Spumante Brut Conte Balduino Riccadonna
Arneis 1996 Olivero Antica Cascina dei Conti di Roero
Grignolino d'Asti 1996 Tenuta dei Re
Barbera d'Asti 1996 Superiore Perroncito
Moscato d'Asti 1996 Beria Sant'Antonio di Canelli
Brachetto 1996 d'Acqui Neirano
Grappa Bosso Stravecchia*

cussed results of the FP-cell replications as well as their current work on the Patterson cell. As people know, Grenoble was getting XS-heat from their reproduced FP-cells although not great wads of XS-heat. Biberian's group is obviously very attentive to controls and issues related to testing and this work should be strong evidence to force on the pedantic CF critics. There was less discussion of the CETI replication—Grenoble has a RIFEX kit but they really are after XS-heat. From what I can gather in their own CETI copy they have observed around 12-13% XS-heat and some evidence of transmutations.

Jean-Pierre Vigier (Paris)

I think I am a bigger fan of French CF than Italian. I know I prefer Vigier's enigmatic theorizing to Preparata's charismatic style. Vigier is still on the idea of new Bohr orbits and he is still pushing the need to do experiments which would try to test one theory or another—check out his latest paper in *Physics Letters A* (perhaps its not quite out yet). Vigier cites Dufour's work in support of his view and also the work of Stan Spzak (in collaboration with a few of us at UCSD, by the way). The big news for me here is Vigier's prediction of the observation of a new Balmer series for Hydrogen with the extra line(s) for the new energy states. Spzak's work, Vigier says, confirms this. The mantra here is the same as before -- look for soft X-rays. Um, is this not a pretty important discovery irrespective of CF? Anyway, Vigier's friends in Belgrade (I'm not sure who) are at work on a confirmation of this.

Antonio Spallone (Frascati)

Spallone (works with Celani) reported on some of the Frascati experiments—more studies of Pd-loading, more studies of XS-heat production using flow calorimetry. Again the importance of dealing with electromigration in achieving high loading was discussed and a warning not to try and load the cathodes too quickly. This is common theme—in the pursuit of XS-heat it is wise to design a protocol which can maintain high loading at high voltage. I gather that the major explanation for the irreproducibility of XS-heat is the problem of sudden and unpredictable deloading in the course of an experiment.

Francesco Premuda (Bologna)

I really wanted to follow this talk, but I couldn't (must have been the wine at lunch).

Michael McKubre (SRI)

The issues always seem clearer to me after I hear McKubre talk about them. The good news is that in the wake of the NHE decline, the SRI group will be back on track with some DARPA funding (Hagelstein is involved as well) to work specifically on a demonstration experiment. The bad news was that McKubre reported on his more than 8 years of research on CF with the production of pretty disappointing results. The good news is that McKubre turned the past into an exercise in materials research an attempt to explain why some cathodes "work", and some which should work do not. I'll skip to the

conclusions, but again this all revolves around the loading/deloading issue. McKubre suggests that pure Pd is too weak a material and is prone to deformations which lead to sudden deloading - their best batch of Pd was technical grade stuff. This suggests that Pd alloys might be better, possibly Pd with boron. The other suggestion is that impurities may have a positive effect on producing XS heat by blunting the formation of dislocation chains. It would be great to see Ed Storms and McKubre have a discussion about this stuff, but Bob Huggins was there at least and he suggested that thin films which aren't really "big" enough to deform may be the best way to go.

Vittorio Violante (Frascati)

This paper looked at particle dynamics within the Pd lattice and my notes on this are fundamentally incomprehensible so again I must apologize.

Workshop Program

Thursday 27 November 1997

| | | |
|-------------|---------------------------------|--|
| 8:30-9:30 | Registration of Participants | |
| 9:30-10:00 | W Collis | Introduction and Welcome |
| 10:00-11:00 | N Asami | On the Material Behaviour of Highly Deuterated Palladium |
| 11:00-11:30 | Coffee Break | |
| 11:30-12:10 | G Miley | Transmutation Studies using Thin Film electrolysis. |
| 12:10-12:50 | F Caleni | The Effect of Gamma-Beta phase Interface on (N/D) Overloading |
| 13:00 | Lunch | |
| 14:30-15:15 | S Veronesi | Study of the Ni-H System at 500-800 °K |
| 15:15-15:55 | F Iazzi | Techniques for loading and controlling the Deuterium Palladium Atomic Ratio. |
| 15:55-16:30 | Coffee Break | |
| 16:30-17:30 | H Kamimura | Excess Heat Measurement by Fuel Cell Type Electrolysis |
| 19:00 | Informal Round Table Discussion | |
| 20:00 | Dinner | |

Friday 28 November

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|-----------|---|--|
| 9:00-9:55 | Posters on Display | |
| 9:15 | Group Photograph | |
| 10:00 | Coach leaves Villa Riccardi for Asti | |
| 10:30 | Press Conference at the Cassa di Risparmio di Asti Prize Giving | |
| 13:00 | Luncheon Banquet at the Hotel Reale | |
| 16:00 | Coach leaves Hotel Reale for Canelli | |
| 16:30 | Guided visit to the Contratto Wine Cellars | |
| 19:00 | Informal Round Table Discussion | |
| 20:00 | Dinner | |

Saturday 29 November

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|-------------|--------------|---|
| 9:00-9:40 | J Dufour | Effect of Hydrex on a photo-electric cell |
| 9:40-10:10 | W Collis | Cold Fusion or Cold Fission? |
| 10:10-10:50 | F Glueck | The Reproducibility problem in Cold Fusion Systems |
| 10:50-11:30 | Coffee Break | |
| 11:30-12:10 | G Mengoli | The Nickel-K ₂ CO ₃ System: an electrochemical and calorimetric investigation |
| 12:10-12:50 | J P Siberian | Cold Fusion results obtained in Grenoble, France. |
| 13:00 | Lunch | |
| 14:30-15:10 | J P Vigier | Possible Theoretical Consequences of "Cold Fusion" Experiments |
| 15:10-15:20 | A Spallone | A preliminary D/Pd loading study: the anomalous phase transition effect. |
| 15:20-15:40 | Coffee | |
| 15:40-16:20 | F Premuda | A unified Theory of Cold Fusion & Superconductivity |
| 16:20-17:00 | M McKubre | Materials Issues of Loading Deuterium into Palladium, and the Association with Excess Heat Production |
| 17:00-17:20 | V Violante | Lattice Confinement - A possible mechanism producing collisions in condensed matter |
| 20:00 | Dinner | |

Posters

| | |
|-----------|--|
| A Rizzo | A flow calorimeter study of the Ni/H System. |
| F Frisone | Study of the Probability of Interaction between Plasmons of metal and deuterons. |
| R Shimada | Nuclear Products Measurements by Electrolysis - Vacuum combined System |
| L Daddi | Detection of Cold Fusion Neutrons by Radio-activation |