

## Proclamation of the Gaston Planté Medal Committee

In 1989 the Bulgarian Academy of Sciences founded an International Medal in honour of the discoverer of the lead/acid battery, the French scientist Gaston Planté. The medal is bestowed for fundamental contributions to the development of lead/acid battery science and technology.

The selection of the Gaston Planté Medallist is a two-stage procedure. First, all Members of the International Advisory Committee, a total of 40 scientists and experts on lead/acid batteries all over the world, are asked to send their rating of the three most distinguished scientists who should compete for this award. The Organizing Committee summarizes all proposals and nominates the three highest ranked candidates for the Gaston Planté Medal Award.

This year the following scientists were nominated (given in alphabetical order):

Dr Norman Bagshaw, UK

Dr Kathryn Bullock, USA

Dr David Rand, Australia

The nomination itself is a grant of honour and an acknowledgement of worldwide recognition.

The nominated candidates were asked to supply information on their scientific work and public activities. This information was sent to the Members of the International Gaston Planté Medal Committee, a total of 18 scientists from 13 countries. Each member had the right to vote for one of the nominated only. The vote was secret. This year two of the nominated: Dr Kathryn Bullock and Dr David Rand received equal number of votes and Dr Norman Bagshaw got only two votes less.

We approached the Presidency of the Bulgarian Academy of Sciences and informed them of the voting results. The Presidency's decision was that this year the Bulgarian Academy of Science would grant two Gaston Planté Medals to the two candidates having received equal number of votes. The Gaston Planté Medal Committee congratulates the two 1996 medallists Dr Bullock and Dr Rand, and wishes Dr Bagshaw to win the award during the next nomination. We are convinced that he fully deserves it.

### 1. Dr Kathryn Rice Bullock — 1996 Gaston Planté Medallist



Kathryn Bullock was born in Bartlesville, OK, USA in 1945. She received a Bachelor of Arts degree from the University of Colorado, Boulder. She was employed as a Research Technician at the famous Gates Company, Denver, where she conducted investigations on the nickel/zinc bat-

teries. The interest in chemistry led her to the Northwestern University in Evanston, IL, where she was appointed as a Research Assistant in the Chemistry Department. At the same University she completed a Ph.D. Thesis in Physical Chemistry in 1972. In her graduate research, she used alternating current polarography to study the kinetics of organometallic reactions and experimentally verify the electrochemical models of homogeneous chemical processes coupled with electrochemical reactions.

The same year Dr Bullock returned to the Electrochemical Research Department of Gates Company, where she worked on a valve-regulated lead/acid battery design. In 1977 she moved to Globe Union, Milwaukee, WI. In 1980 she was promoted to Manager of the Chemical Department of Globe Union (now a Division of Johnson Controls). Under her supervision, this Department did applied research on battery materials, conductive oxides, semiconductors and conductive polymers, and developed new processes for battery production as well as new valve-regulated lead/acid battery designs. In a project sponsored by the US Department of Energy, Dr Bullock's group did research on batteries for electric vehicles, load leveling and solar energy storage. Working in Milwaukee Dr Bullock was associated as an Adjunct Assistant Professor and a Member of the Doctoral Committee in the Chemistry Department of the University of Wisconsin, Milwaukee.

In 1991 Dr Bullock joined Bell Laboratories to form a battery development group in Texas where the Power Systems Business Unit of Lucent Technologies (formerly AT&T) is located. Her technical team at Bell Laboratories has worked on improvements to the design of power systems, new and improved battery designs for high temperature environments, the development of battery monitoring techniques and new battery manufacturing processes. Dr Bullock is a Technical Manager of Reserve System Development and Purchased Product Quality at Lucent Technologies Bell Laboratories and is a Member of the Management Team of the Lucent Technologies System Business Unit at Mesquite, TX.

Dr Bullock is the author and co-author of more than 50 scientific papers and has six US patents and two patents pending. The basic scientific endeavours presented in Dr Bullock's works can be summarized as follows:

1. The self-discharge processes in valve-regulated lead/acid batteries were disclosed and their kinetics and impact on the shelf life and discharge capacity of the batteries was elucidated.
2. The structure and properties of the corrosion layer on Pb, Pb–Sr and Pb–Sb electrodes was studied via electrochemical, photoelectrochemical and microprobe laser Raman spectroscopy methods.
3. It was established that in the corrosion layer of the positive plate a solid-state Pb/PbO/PbO<sub>2</sub> element with an e.m.f. of 0.8 V can be formed under certain conditions. It influences the polarization of the positive plate.
4. The mechanism of beneficial influence of H<sub>3</sub>PO<sub>4</sub> on the positive plate of lead/acid batteries was established.
5. The influence of Sb on the negative plate of lead/acid batteries was determined.
6. Tridimensional E–pH–pS diagrams of the system Pb/H<sub>2</sub>SO<sub>4</sub>/H<sub>2</sub>O were elaborated and thermodynamic values for open-circuit voltages, acid activities and lead sulfate solubilities compiled and evaluated.
7. The recombination efficiency of the oxygen cycle in valve-regulated lead/acid batteries was determined.
8. New conductive materials and processes to enhance lead/acid battery formation were developed.
9. The possibility of perovskite coating of the lead current collectors in positive plates to reduce their corrosion was determined.

The works of Dr Bullock have found widespread acknowledgment in the scientific literature resulting in more than 300 citations.

Dr Bullock assumes wide public activities. She is an active member of The Electrochemical Society, which membership extends to 7000 scientists and experts in 60 countries. She has served as a Chairman or member of many Committees and has been appointed to the following positions in this Society: Chairman of Rocky Mountain Local Section, Councilor of the Southern Wisconsin Local Section, Chairman of the Council of Local Sections, Vice President, and from May 1995 to May 1996 she was the President of The Electrochemical Society. Dr Bullock is a fellow of the Royal Society of Chemistry (London) and a member of the American Chemical Society and the International Society of Electrochemistry.

Dr Bullock has been invited to speak at many universities and professional meetings. She lectured at the University of Wisconsin, the University of Minnesota, Northwestern University, Brigham Young University, the University of Illinois, the State University of New York in Buffalo, the University of Texas, etc. She has delivered lectures at the Frumkin Institute of Electrochemistry in Moscow, in the Istitochnik Institute in St Petersburg, in the Technical University of Dresden, in the Central Laboratory of Electrochemical Power Sources in Sofia, etc. She has delivered key-note lectures and reports at many congresses and conferences throughout the world and herself has been a Chairman and Co-Chairman of several conferences on lead/acid batteries.

She is co-editor of a proceedings volume on Advances in Lead/Acid Batteries of the New Orleans Symposium of The Electrochemical Society, in 1984.

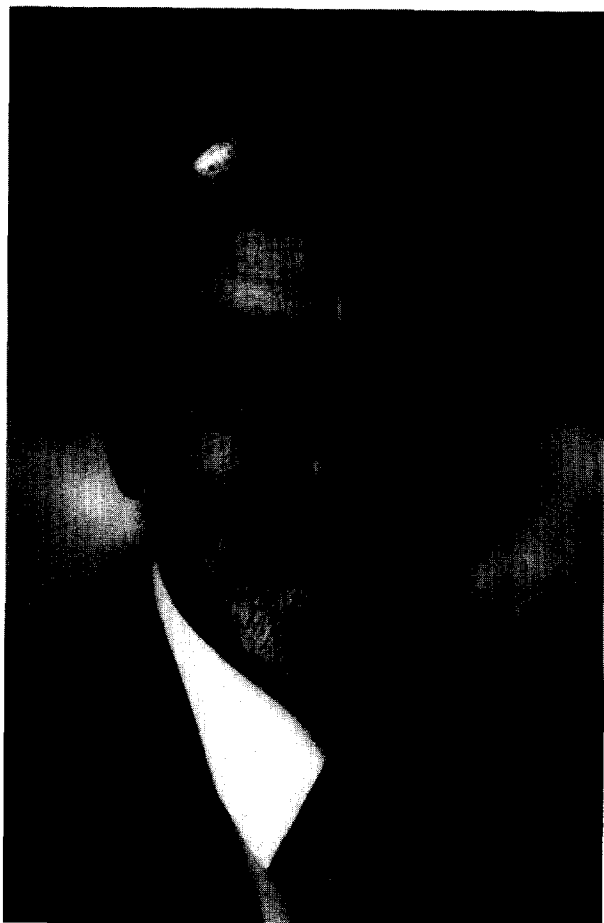
Dr Bullock was granted the Research Award of The Electrochemical Society in 1980 for her research work on the mechanism of the effect of H<sub>3</sub>PO<sub>4</sub> on the PbO<sub>2</sub> electrode. She is a member of the quality team at Lucent Technologies Power Systems which won the prestigious Deming Prize of the Japanese Union of Scientists and Engineers.

Dr Bullock married Ken Bullock in 1967. They have two children: Kerry and Kevin. Dr Bullock enjoys history, literature, art, music and travel.

The Organizing Committee of the LABAT Conference and the Planté Medal Committee congratulate Dr Kathryn Bul-

lock on receipt of the Gaston Planté Medal and wish her the best of health and much creative energy in her future activities.

## 2. Dr David Anthony James Rand — 1996 Gaston Planté Medallist



Dr David Rand was born in 1942 near Portsmouth in England. His father was an officer in the Royal Navy and, for a time, was in charge of the commissioning and maintenance of the submarine fleet's batteries. Thus, David was introduced to the problems of lead/acid batteries from a very early age. Dr Rand undertook his Ph.D. Thesis in the Department of Physical Chemistry of Professor R.G.W. Norrish (Noble Prize Winner) at Cambridge University. Under the guidance of Dr J.N. Agar, he conducted research into the electrochemistry and hydrodynamics of 'meniscus' electrodes. At the time, these electrodes were attracting great interest as useful models for elucidating the complex behaviour of porous gas-diffusion electrodes in fuel cells.

On completing his Ph.D., Dr Rand received an offer from Dr D.F.A. Koch to join the CSIRO Division of Mineral Chemistry at Port Melbourne, Australia. There, Dr Rand

teamed with Dr R. Woods and enjoyed a productive period of research on the electrochemical properties of noble metals. This work was directed towards the improvement of fuel-cell catalysts.

Dr Rand's scientific endeavours next turned towards the development of electrochemical sensors for the automatic control of flotation circuits used in the beneficiation of mineral sulfide ores. These studies included experimental campaigns in the lead concentrators at several Australian mines.

Following the Oil Crisis of 1973, the Australian government decided to reduce the nation's dependency on this resource. In 1976, as part of this programme, Dr Rand was given the responsibility to establish and direct a battery research group. Initially, his efforts were focused on the then emerging alternative rechargeable technologies to classical batteries. Although some exploration was made of nickel/zinc and zinc/bromine, and rechargeable lithium batteries, major attention turned towards the advancement of lead/acid batteries. The CSIRO group has since emerged as one of the worldwide acclaimed centres of lead/acid battery research and development.

In 1994, CSIRO appointed Dr Rand to the level of Chief Research Scientist. He is presently the Manager of the Novel Battery Technologies Group of the CSIRO Division of Minerals.

Dr Rand is the author of 113 scientific publications in either international journals or the proceedings of international conferences; 67 of these publications are concerned with lead/acid batteries.

Dr Rand's major contributions to the science and technology of lead/acid battery systems include the following:

1. By using X-ray diffraction techniques, he evaluated the crystalline phases that are either present in the positive-plate active material or are encountered during the manufacture of such material. These techniques have been developed by his colleague, Dr R.J. Hill, into the PEAKS PC software that is successfully used by many battery manufacturers throughout the world.
2. Quantitative determination of amorphous material in positive plates and measurement of its electrochemical activity.
3. Development of practical procedures for the optimization of lead oxide production, paste mixing, plate curing and formation.
4. Development of pulsed-current formation schedules for the more efficient oxidation of tetrabasic lead sulfate to lead dioxide.
5. Disclosure of different forms of cracking in the corrosion layers on lead-antimony and lead-calcium grids and definition of a general view of premature capacity loss.
6. Identification and demonstration of the beneficial effects of bismuth on both the capacity and the cycle life of valve-regulated (AGM) batteries.
7. Formulation of novel fast-charging algorithms and discovery of the advantageous effect of pulsed-current

charging on the cycle life of batteries with low-antimony and lead–calcium grids.

8. Formulation of test methodology for batteries designed for operation in solar-based, remote-area power supply batteries.

Dr Rand is a busy editor in the domain of lead/acid batteries. He is the editor or co-editor of 20 volumes on research into lead/acid batteries and other electrochemical systems. The most important of these volumes is 'Power Sources for Electric Vehicles', co-edited with Dr B.D. McNicol. Since 1981, he has been the Asia–Pacific Editor of the Journal of Power Sources.

In collaboration with Mr J.E. Manders (Pasminco Metals, Australia) he has organized the technical programme of all six Asian Battery Conferences held to date. He has likewise collaborated with Mr M. Mayer in the organization of the European Lead Conferences. He was Vice-Chairman and Co-Chairman, respectively, of LABAT'89 and LABAT'93. He has presented over 90 lectures on the theory and technology of lead/acid batteries at International Conferences and Meet-

ings, and at institutes and factories in 19 countries. In 1993, Dr Rand initiated the World Study Group into Premature Capacity Loss and was appointed its Chairman. The Group was set up by the Advanced Lead–Acid Battery Consortium (ALABC) — a programme of the International Lead and Zinc Research Organization — to share knowledge on this serious limitation to battery performance.

The Royal Chemical Society (UK) awarded Dr Rand its Electrochemistry Medal in 1991 in recognition of his contribution to electrochemical science in general and battery research in particular.

Dr Rand is married to Gwen Lloyd Jones, a very sympathetic music teacher from Wales. They have three sons: Simon, Timothy and Toby. In his spare time, Dr Rand referees football, plays bridge, and enjoys good conversation.

The Organizing Committee of the LABAT'96 Conference and the Planté Medal Committee congratulates Dr David Rand on receipt of the Gaston Planté Medal and wishes him the best of health, and much creative energy in his future activities.