

# Presentation of the O. E. Meinzer Award to William Back and Bruce B. Hanshaw

CITATION BY LEO HEINDL

Few things can possibly give me greater pleasure than presenting the 1973 O. E. Meinzer Award to William Back and Bruce B. Hanshaw. It might be more fun to present them with the 1973 World-of-Wine Award for a paper on "Comparison of Physical and Chemical Hydrogeology of Wine Cellars and their Contents in Arlington County (Virginia)"; and it might be more useful were I given the opportunity to present them with the 1973 Beat-the-System Award for a paper on "Comparison of Methods for Stretching Administrative Regulations to Permit the Study of Carbonate Hobbies Around the World," as published in what would be the final issue of the *WRD Bulletin* of the U.S. Geological Survey; but actually, it is my privilege and honor to present them both with the O. E. Meinzer Award for their paper, "Comparison of Chemical Hydrogeology of the Carbonate Peninsulas of Florida and Yucatan (Mexico)." The paper appeared in 1971 in the *Journal of Hydrology*, v. 10, no. 4, p. 330-368.

This very appropriate selection was made by the Meinzer Award Panel consisting of V. T. Springfield, Chairman, and J. W. Harshbarger, R. L. Nace, Irwin Remson, and J. E. Slosson, members.

You are familiar with Bruce and Bill and there seems very little need here to review their educational and professional careers. The two of them, in collaboration with a few other intensely hard-working hy-

drogeochemists and hydrogeologists, have done the general field of hydrogeology a tremendous service by bringing chemistry back into the hydrogeological fold as one of the several factors which must be considered wherever ground-water problems, and water problems in general, are studied and considered. The work that these two men have done, and the correlative work done by their colleagues, has made all of us conscious that the chemistry of a water regime cannot be neglected in the analysis, interpretation, and synthesis of ground-water conditions, occurrences, and situations in general. They have not only brought chemistry back into the fold, but they have also done it in such a way that everyone acquainted with their work, their colleagues' work, and the spin-offs from their combined efforts, realizes that no great amount of serious hydrochemical or geochemical work can be done without going into the field and becoming acquainted with conditions as they are there. It is no coincidence that both of these men were trained first to be geologists and became geochemists, hydrologists, and world travelers through later interest and application. The fact that their field work has taken them to many delightful spots around the globe is beside the point.

I have here the O. E. Meinzer Award, a wassail cup of magnificent proportions. This cup or bowl was presented to this cause by John Birdsall. I have never looked

at the bowl carefully enough to know if John's name is on it, but if it isn't, it should have at least as much prominence as the manufacturer's trade-mark, preferably more. If John is here in the audience, I would like to hear a round of applause for him and his generosity.

One of the difficulties in presenting the O. E. Meinzer Award for a paper written by two or more authors is the problem on how to divide the bowl. Who gets it first and for how long? Who pays for shipping it from one place to another? The problem might have seemed simpler when both Bill and Bruce lived in Arlington, but now that Bruce is in Denver and Bill is still in Arlington, the problem of how to divide possession of the bowl poses a number of difficulties. Recently, someone suggested a hacksaw. But this suggestion overlooks the fact that the sum of the parts would be less than the whole. Other suggested solutions here posed equally unresolvable situations. Consequently, I am trying a new approach which I hope starts a new tradition. It is my pleasure to present William Back and Bruce Hanshaw not only with the Birdsall Bowl for the 1973 O. E. Meinzer Award, but also to accompany it with a bottle of reasonably adequate wine for each of the authors. Now, even if only one can have the bowl at a time, the other has at least some consolation.

Gentlemen, my congratulations.

RESPONSE BY WILLIAM BACK



Thank you, Leo, for those very nice words, although some of those early sentences could have well gone unsaid.

I think a precedent has been set for me to do what I'm going to do. If Luna can play his guitar at the Presidential address, I think I can show Charlie Brown cartoons at the Meinzer Award Ceremony. While we're getting the projector set up I should mention that these slides were prepared partly in recognition of the fact that John Bredehoeft has always maintained that he could see a great deal of similarity between some of the day-to-day activities of Charlie Brown and some of the scientific activities of Hanshaw and Back. I have a feeling that you are laughing at the wrong places, that statement was meant to generate sympathy and develop rapport with the group — not to establish credibility for Bredehoeft's preposterous comments.

(Charlie Brown slides showing that when he loses ball games he feels miserable, and when he wins, he worries about the other team and has guilt feelings.)

The point is, we've played the scientific game, we've played it for quite a while, and we've played it hard. Sometimes you win and sometimes you lose and, based on my experiences, I want to give you some words to live by. Anytime you have a choice, it's a lot better to feel guilty. Do everything you can to develop those guilt feelings, but remember, it must be guilt with honor. Before you start believing I'm being too self-effacing, I want to say that I know that our work has been good, it's been appreciated in many parts of the world, and I know the particular paper selected this year is a good paper, but the important point is that there is a lot of exciting and excellent work being done in hydrology now.

I feel guilty because I know that if I were quantitatively oriented I could do such things as look around the room, count the number of legs, multiply by one-half and determine that 95 percent of the people in the room could just as readily be up here instead of me. Nongeologists and past recipients make up the remaining 11 percent. I said if I were quantitatively oriented — besides that is pretty close for hydrology.

The other reason I feel guilty is because I consider this an extremely high honor, probably the greatest public recognition I'll receive, but so many people have contributed to our work and we are the ones getting the recognition. However, I want to point out that it is not really our fault that more people aren't being recognized today, but we simply have to put the blame on the librarians. I hate to be critical of a group of people who are the most helpful, kind, and generous — the true salt of the earth — but they do get furious when a paper shows up with 18 authors.

First is Vic Stringfield, whose classic work, begun in the early 1930s and continued since (much of this work in cooperation with Harry LeGrand), has shown us what the hydrology of Florida is like. Without his work we never could have selected Florida as the field laboratory in which to test our geochemical hypotheses. The second person is Meyer Rubin who showed us how to use carbon<sup>14</sup> in hydrologic studies. The more recent addition is Al Weidie who showed us where the Yucatan is and who has both figuratively and literally led us by the hand through the botanical jungles and geological jumbles of the Yucatan.

The other people who made contributions to this paper and other papers of ours are in the acknowledgments, and I would like to express my thanks to them and many others of whom they are representative: Burke Maxey, John Sharp, Bert Slemmons, Bill Scott, Bill Butcher, Leo Heindl, John Thraillkill, Rod Cherry, and Bob Vernon.

I mentioned earlier the excellent and exciting work being done in hydrology now, and I would like to expand on that a bit. In any discipline it is easy to recognize the older giants — in addition to several I've already mentioned, ours include people like Stan Lohman, Bob Bennett, Hilton Cooper, King Hubbert, John Ferris, John Hem, Joe Poland, Phil Lamoreaux, Paul Witherpoon, C. V. Theis, and many others. It is also easy to recognize the not-so-old giants, represented by people like John Bredehoeft, Pat Domenico, Olaf Pfannkuch, John Cherry, Marty Mifflin, Bob Farvolden, Warren Wood, Roger Wolff, Peter Fritz, Al Freeze, Dick Parizek, Steve Papadopulos, Dave Stephenson, and many, many others. But despite the tremendous contributions of

all these people and their colleagues, the way to test the viability of a discipline is to look at the young giants. And we have been able to attract a great number of young people like Neil Plummer, George Pinder, Peter Trescott, Jim Mercer, Frank Swartz, John Sharp, Roger Jacobson, John Fish, Charles Drake, and many others that I've not yet had the opportunity to meet. When people like these look at geology and decide that ground water offers a scientific challenge equal to or greater than that they can obtain in other topics of geology, we are in for an exciting period of time.

Another reason for my enthusiasm about the viability of hydrogeology is the great co-operation that we are having with people from disciplines such as with carbonate petrologists as demonstrated at the recent Penrose Conference. When we can get people like Tom Freeman, Al Weidie, Tony Randazzo, Pete Rose, Meyer Rubin, and many others to work in close association with hydrogeologists, it is fairly clear that we have something to offer. Another statement that I think is significant that we will be hearing often and is becoming obvious to a large number of geologists who have tended in the past to ignore ground-water geology is the statement, "the total field of geology is becoming more and more a study of fluids." We see this in carbonate sedimentation, the migration of oil, underground waste storage, dilatancy models for earthquake prediction, the diagenesis of recent marine sediments, the ground-water alteration processes, sediment transport, sanitary landfills, fluid inclusion studies, and many others. All of this is making people aware that the ground-water geologist is needed in many other fields of geology for the complete understanding of many geologic and social problems. Fortunately, the timing is perfect because the Penrose Conferences can provide the mechanism for us to interrelate with these other groups, and hydrogeology is ready for these new challenges.

I think another indication of the viability of hydrogeology is to look at the list of award recipients for this year elsewhere within GSA. Two other hydrogeologists, Jim Hackett and Murray McComas, are receiving the Burwell Award from the Engineering Division (Jim, Murray, and I were all students of George White — who is here with us today — at the University of Illinois); King Hubbert, this year's recipient of the Penrose Award (some of his greatest contributions have been in ground water), has been most helpful in many discussions with us and has provided critical reviews of several of our manuscripts; when one mentions the word "critical" and King Hubbert in the same sentence, we are all aware of the

strong and honest usage of the word "critical." Bob Garrels, who is receiving the Goldschmidt Award, was Bruce's and my professor at different times at Harvard and showed us how to study geochemistry and apply it to field problems. Bob Rye, who is receiving the Waldemar Lindgren Award, is a coauthor on a paper we have just completed on sulfur isotopes. If you get the feeling that I am name dropping — I am — and will continue to do so until the end of the remarks. Because as much of an honor as the award is, it is only a token — the real honor and ego satisfaction is in being a colleague and friend of people I have mentioned, others I will mention, the people in this room, and many others I couldn't possibly list. These associations are what promote the dedication to science that makes each day an exciting new experience for all of us.

However, sometimes things go wrong. When things go wrong for scientists it's common sport to kick around deans, department chairmen, provosts, and public administrators. In saying what I am about to say I am not relinquishing this privilege, which does so much good and rids our souls of depression and frustration. But on an occasion like this when I am trying to demonstrate that hydrogeology has progressed much more through the spirit of co-operation than by the threat of competition, I want to express publicly our appreciation of the many administrators of the Water Resources Division in particular, who have largely forsaken their own scientific careers in order that the rest of us could develop ours. There obviously have been many, but some of those known to you in the room include Luna Leopold, Milt Hackett, Phil Lamoreaux, George Ferguson, Frank Clarke, Joe Upson, Jerry Meyer, Al Clebsch, George Davis, Russ Brown, Joe Callahan, Roy Hendricks, and of course many more. They have demonstrated their faith by providing the support for us to work to the limits of our capabilities. To me this is the highest praise that can be given to an administrator.

In an interdisciplinary field like Bruce and I have worked in, it is necessary for us to understand something about geology, ground-water hydrology, and geochemistry. It is obvious to you by now that we have relied on a great number of people. I want to make special recognition of our close colleagues from whom we are learning a great deal and will continue to learn for many years. These include, but certainly are not restricted to Ruth Deike, Blair Jones, Joe Pearson, Ivan Barnes, Ike Winograd, Don Langmuir, Bob Maclay, Paul Seaber, Rod Cherry, Craig Rightmire, Steve Papadopulos, Roger Wolff, and John

Bredehoeft; to these people we extend our thanks for continuously helping us with our publications, and of equal and perhaps greater importance, we also thank them for saving us from publishing many of the things we have written.

I know that it is desirable when receiving an award like this, which is in memory of a great scientist, to be able to tell of personal experiences with Dr. Meinzer; unfortunately, we never met him. I graduated from college the day Dr. Meinzer died, June 14, 1948. At that time Bruce had just graduated from high school and was on an oil tanker in the Persian Gulf. But we have both had a great deal of association with many people that Dr. Meinzer trained in ground-water geology, and I think we can see this by our

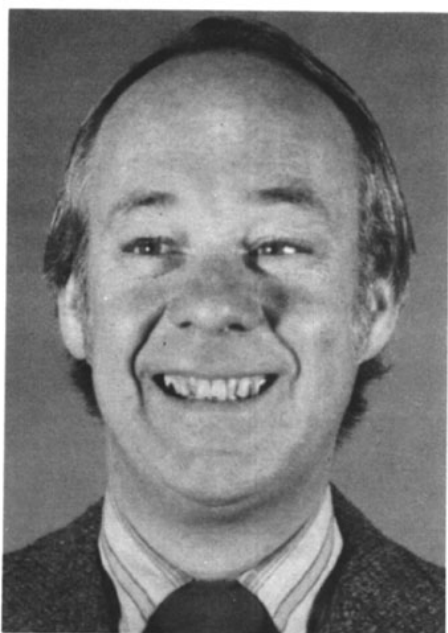
close association with the past recipients of the Meinzer Award. My first two bosses when I came to work with the Geological Survey were last year's recipients, Joe Poland and George Davis. I then transferred to Washington where I worked as Vic Stringfield's assistant, a recent recipient. As most of you know, I studied with Burke Maxey, who was trained by Dr. Meinzer, and was the recipient two years ago. Bruce and I both have benefited greatly from our close association with other recipients, Bob Stallman, Lee McGuinness, and Hilton Cooper. So, although we did not have direct contact with Dr. Meinzer, I feel as though we are benefiting from the second generation of his teachings and philosophy.

So, when one thinks of the great number

of people from many disciplines who have helped us in our work I lose the guilt feeling, because I can believe that we are accepting this award on their behalf and in recognition of the contributions that they have made to science. I think I can paraphrase Will Rogers and in one sentence say everything I've been trying to say today. As you recall, he said, "I've never met a man I didn't like." Anytime I'm asked I can honestly say, "I've never met a geologist who didn't offer to help." So, on behalf of all these people, we enthusiastically accept the Meinzer Award and promise you that we will continue to try even harder each year.

Now Bruce has a few words to say.

#### RESPONSE BY BRUCE B. HANSHAW



As Bill indicated, perhaps we don't deserve the award but we are going to accept it anyhow, and I'll tell you why we're going

to accept it. During the course of our joint studies in the Yucatan, we have been the recipients of many undeserved things: Five stand out clearly in my mind — the first four were hypertension, hemorrhoids, hepatitis, and colitis. These were not only undeserved, they were also very much unappreciated, unexpected, unproductive, and unrewarding. The fifth, of course, is the O. E. Meinzer Award, also unexpected, but I can assure you, very much appreciated.

As I looked over the list of previous Meinzer Award recipients, I was impressed not only by the stature of each individual, but also by the fact that they are true hydrogeologists, one and all, and many, more or less mathematically inclined. Bill can hold his own in this company, but I have a confession to make — I'm really a geochemist. I'm only a hydrologist by edict of the Civil Service Commission and by virtue of my association during my career with many of you here in this room. So here I stand, exposed as a geochemist, but one who is still trying to learn enough hydrology to pass.

It is because I am a geochemist that I am especially pleased to accept this award. We

have been convinced for many years that the application of geochemical principles to hydrologic problems would lead to increased insight into hydrologic processes and, possibly, even to the solution of some problems. So we have aimed our research in that direction over the years with the particular emphasis on the application of thermodynamics and on the use of natural isotopes to understand hydrologic systems better. In the course of this work, we have been unselfishly helped by many of our colleagues, some of whom are here today, and by our administrators who have provided us with the encouragement and the freedom of enquiry under which science can advance. To all of these people, we say, "Thanks for making our work possible."

In conclusion, for my part, I am proud to accept this award on behalf of geochemists in general and in recognition of the marriage between hydrology and geochemistry. This has already proven to be a fruitful relationship and I am confident it will be even more so in the future. So to every one of you here today and to our friends and colleagues who have aided us so greatly, we thank you very much.