

## Manual can make life in lab easier

The New Mexico Water Resources Research Institute has just published a new laboratory manual that is certain to provide both information and entertainment to water and wastewater operators and laboratory analysts.

The highly illustrated manual, "Microbiological Skills for Water and Wastewater Analysis" will make it easier for treatment plant and laboratory personnel to perform the microbiological tests used to control water and wastewater systems.

Although the manual relies heavily on humor, the text, written with exacting simplicity, also contains a wealth of practical information. Many procedures, for example, are pictured in step-by-step illustrations that even the novice lab technician can follow.

"It's the kind of manual a laboratory analyst can have at his elbow and follow the directions like a cookbook," author Douglas Clark says. For example, the section on preparing serial dilutions contains both step-by-step illustrations and written instructions. Clark even has "Favorite Microbiological Recipes" that describe how to prepare delights such as nutrient agar, which is used to cultivate pure culture isolates.

Clark has first-hand knowledge of what a laboratory analyst needs to know. For four and one-half years he was supervisor of the municipal water quality laboratory in Las Cruces. "When I was writing the manual, I kept thinking, 'This is the book I would like to have had when I started running a lab,'" he says.

The manual is a companion volume to Clark's earlier highly popular manual, "Basic Laboratory Skills for Water and Wastewater Analysis," which also was published by the institute.

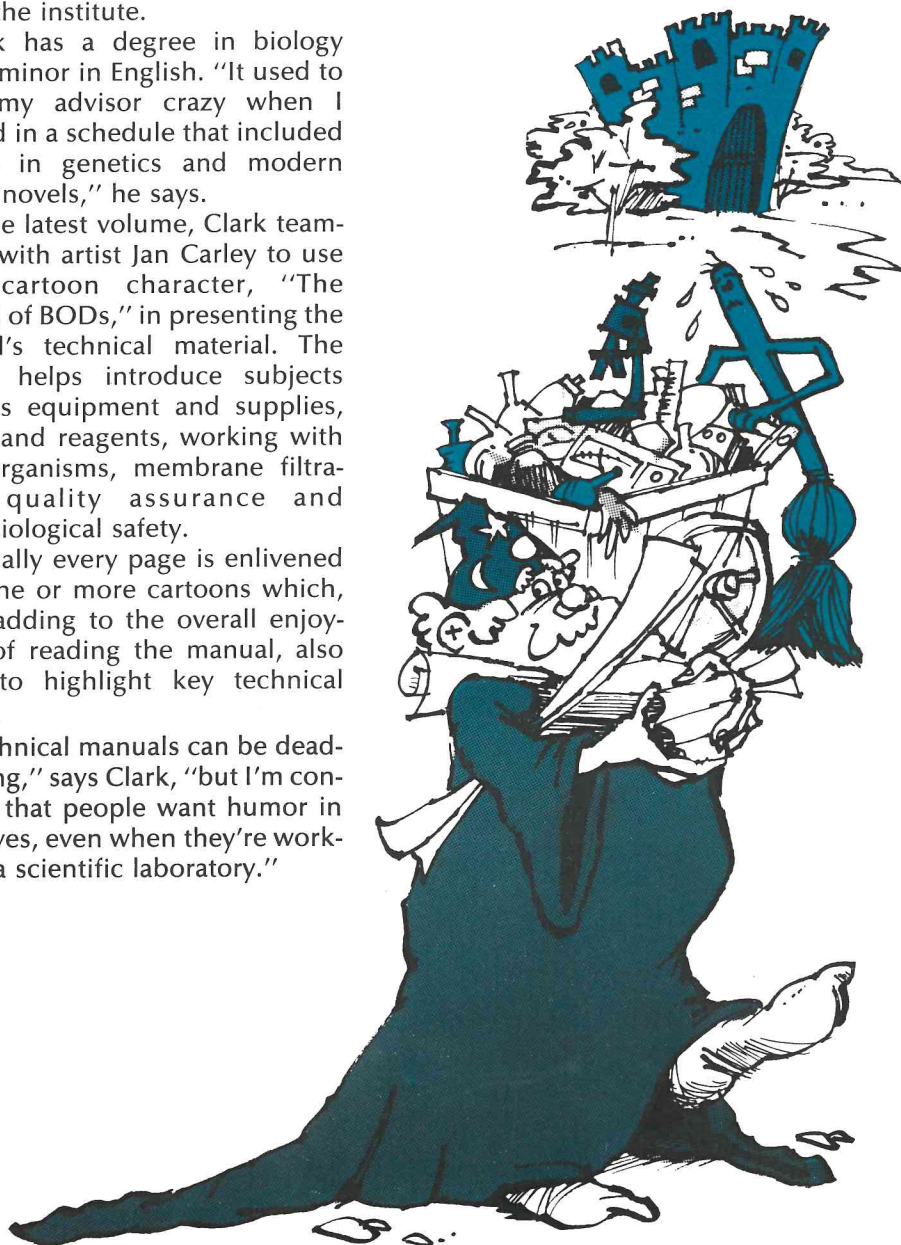
Clark has a degree in biology with a minor in English. "It used to drive my advisor crazy when I handed in a schedule that included classes in genetics and modern British novels," he says.

For the latest volume, Clark teamed up with artist Jan Carley to use their cartoon character, "The Wizard of BODs," in presenting the manual's technical material. The wizard helps introduce subjects such as equipment and supplies, media and reagents, working with microorganisms, membrane filtration, quality assurance and microbiological safety.

Virtually every page is enlivened with one or more cartoons which, while adding to the overall enjoyment of reading the manual, also serve to highlight key technical points.

"Technical manuals can be dead-ly boring," says Clark, "but I'm convinced that people want humor in their lives, even when they're working in a scientific laboratory."

The manual is available from the institute for \$14.50 plus postage. The basic lab skills manual is \$10.50 plus postage. Both manuals also are available at bulk discount rates.



# Water scenario not so far fetched



Joseph F. Coates

*Below are excerpts from Futurist Joe Coates' presentation at the 30th Annual Water Conference. We think you will enjoy a look at the future from his perspective.*

In looking over our family diaries, I note that my father spoke at one of the pre-provincial water council meetings back in '85—to something called the New Mexico Water Resources Research Institute. Both that family connection and the importance of events over the last 50 years lead me to a brief review of the high points of national water resource development and management since 1985.

You recall that the new constitution was adopted in '09 and implemented in 2010. The primary administrative consequence was to eliminate the old 50 states, the several thousand counties, and literally tens of thousands of quasi-independent special authorities, elected units controlling everything from education to water allocation. The basic new units so familiar to us, of course, are the nine provinces and the 28 administrative districts.

Another big change under the Second Constitution was the elimination, or as they preferred to call it, the super-succession, of all prior laws, regulations, and interstate

compacts dealing with infrastructure.

## Earthquake empties Ogallala

The earthquake at New Madrid, outside St. Louis, in '98 was an event of unprecedented magnitude, an earthquake of 8.4 on the old Richter scale. It wiped out 32 dams, restructured substantial portions of the Ogallala aquifer, and did some \$143 billion worth of structural damage in the four states primarily affected. One of the sights I regret not having seen directly but one we all have seen on film, is the 36 hours during which the Mississippi River ran backward. In any case, the primary effect of the New Madrid quake was to stimulate more effective long-range infrastructure and land use planning than ever before.

By 2010, atmospheric management was routine. Snow enhancement was universal through the Rocky Mountain regions from the Arctic Circle to the Mexican border. Hail control was widely practiced throughout the Midwest. Unfortunately, the management of

## O'Meara proposes water tax



Pat O'Meara

*Pat O'Meara, who recently retired from the National Water Resources Association, entertained the Water Conference banquet with his usual Irish humor. In a more serious vein, he also presented this thought-provoking approach to funding.*

What's wrong with a New Mexico water tax? People need your product. They tax every other utility you've got. You pay taxes on your telephone bill, you pay taxes on your electric bill, you pay taxes on your sewage bill but you don't want to tax water.

It could be a miniscule tax per thousand gallons. I think we would have the richest man in New Mexico if we taxed water 1 cent per thousand gallons and sent that money to (state engineer) Mr. Reynolds.

The average person wouldn't even see it in his water bill after the first bill. That's the smallest utility bill you get. So I'm pleading with you, take the product that we need and everyone is going to buy and put a tax on it and you'll have big revenues.

You're fooling yourselves if you sit around and think you're going to get that money out of the federal government anymore. So stand up. Say we want to tax our product. Once we do, we're in business.

drought has on balance been unsuccessful.

There are some continuing, and even recurrent, sticky points in water management. Groundwater pollution or contamination continues to be the nation's major environmental problem. New contamination of groundwater had all but stopped by 2005, with the bulk of it already at an end by '95. However, as was recognized at the time, the difficulties were only beginning, since most of the toxic, polluting or undesirable materials already in the ground had barely begun to move into the aquifers.

#### Groundwater treated

Today, and more precisely in the last report as of 2033, 25 percent of all potable water in the United States must go through stage 6, 7, or 8 purifications processes. This, of course, has been a boon to the beverage and prepared food industries.

As early as '95, groundwater contamination had begun to alter the national internal migration and resettlement patterns, both in the

older northeastern and north central regions and in what was then the emerging, rapidly developing Sunbelt regions.

#### Farms become history

The global collapse of the soybean market and the total migration of cotton production and cotton textile manufacturing outside the United States have, of course, had their own effects on agricultural demands for water. I certainly urge all of you to tour the Department of History's nine restored cotton farms in the four southern provinces. They have, of course, been a smashing success, as now maintained and operated by Disney Enterprises.

One of the major innovations in water quality control seems in retrospect so simple it is incredible that it took a quarter of a century from its conception to its implementation. Closed loop water supply requires that all industrial facilities with 25 or more workers must draw their water supply from within 50 feet downstream of their own wastewater effluent.

#### Water taxed

In looking back over the past 50 years, we must acknowledge the previous 100 years. It has taken 150 years for water to be fully controlled and effectively managed. Water management cost per capita as revealed under the Tax Assignment Act of 2012 is \$140 per capita per year. This sharply contrasts with the experience of some 75 years ago when individual per capita subsidies in some regions ran as high as \$4,000 and direct costs in others as high as \$500 per capita.

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What you have just read is one scenario of future water developments in the United States. It is only one picture, albeit a complex picture, of how that infrastructure might evolve over the next 50 years.

There is nothing in the scenario which is scientifically, technically, or public administratively bizarre. And yet it does represent in the aggregate developments which together create a future extremely different from the present.

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## Basic research key to success



Dennis Darnall

*As director of New Mexico State University's Arts and Sciences Research Center and successful researcher, Dennis Darnall is more than qualified to lay claim to the importance of basic research in the future of water resources.*

What are the future trends in research efforts aimed at successfully managing our water resources? Successfully is the key word here. I believe support of fundamental basic research is imperative to insure the successful management of water resources in the future. As many governmental agencies are pressured to "target-direct" their resources, we must not forget that without basic research, applied research founders, and without applied

research, the society we know cannot grow. Water pollution problems, water management problems, water conservation problems will not be solved.

There is no question that fundamental science pays for itself, and returns to society both cultural enrichments and continued resources for enhancing the quality of life. Moreover, given the stresses on our water resources and on the environment that the future appears to hold, an adequate base of fundamental knowledge on which to build a technological response becomes a matter of survival. One can safely assume that for all these reasons the idea of fundamental basic research as a national trust is both sound and profitable.



The 30th Annual Water Conference was pleased to have as special guests, 10 people who attended the first Water Conference in 1956. Joining the reunion are (back row, l. to r.) Steve Reynolds, New Mexico state engineer; Ira G. Clark, NMSU professor emeritus; Eldon Hanson, retired head of NMSU's agricultural engineering department; Stuart Meerscheidt, Las Cruces farmer and owner of the Jornada Water Co.; and Lewis T. Putnam, State Engineer Office district chief for the Deming area. Those on the front row are Phillip E. Crystal, retired Curry County extension agent; Claude Pilley, chief engineer for the City of Alamogordo; Ralph Stucky, retired director of the New Mexico Water Resources Research Institute; Jacob Tejada, retired associate county extension leader; and O. F. Baca, formerly of the Storrie Project Water Users Assn.

## WRRI publications ready for distribution

### PUBLICATIONS

-M16 - *Microbiological Skills for Water and Wastewater Analysis* - Clark, D. W. - August 1985

-162 - *The Potential of Saltgrass as a Forage Grass Irrigated with Saline Water* - Lugg, D. G. - December 1983

-168 - *Studies of Water Quality on Rhizobia* - Botsford, L. - June 1983

-178 - *Quasi Three-dimensional Modeling of Groundwater Flow in the Mesilla Bolson, New Mexico and Texas* - Peterson, D. M.; Khaleel, R. and Hawley, J.W. - October 1984

-180 - *Insitu Determination of Hydraulic Conductivity in the Vadose Zone Using Borehole Infiltration Tests* - Stephens, D. B. et al. - November 1983

-190 - *A Guide to the Elephant Butte Irrigation District Records* - Grassham, J. W.; Miller, D. A. and Clark, I. G. - June 1985

-194 - *The Survival of Growth of Spirulina spp. in the Saline Groundwaters of New Mexico* - Goldstein, B. - October 1985

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### the divining rod

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