

Newsletter

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Editor’s Note

Issues of this newsletter are available on the World Wide Web (<http://soils.usda.gov/>). Click on NCSS, then on Activities & Newsletters, and then on the desired issue number.

You are invited to submit stories for future issues of this newsletter to Stanley Anderson, National Soil Survey Center, Lincoln, Nebraska. Phone—402-437-5357; FAX—402-437-5336; email—stan.anderson@nssc.nrcs.usda.gov.



National Cooperative Soil Survey (NCSS) Honors NRCS Soil Scientists

By Sylvia Rainford, Public Affairs Specialist, NRCS, Conservation Communications Staff, Washington, D.C.

The NCSS will honor two NRCS soil scientists for exemplary performance in soil survey production. Thomas P. D’Avello from Champaign, Illinois, will receive this year’s NCSS Soil Scientist of the Year award, and Kerry Arroues of Hanford, California, will receive this year’s NCSS Soil Scientist Achievement Award.

NCSS cited D’Avello for his “exceptional achievement” in soil survey production. He has worked on the Soil Science staff in Illinois for 13 years, specializing in geographic information systems (GIS). He has published several papers on the use of GIS in the soil survey program and has led several projects that advanced the development of new techniques for making digital soil surveys. Under D’Avello’s leadership, NRCS in Illinois has secured more than 60 cost-share agreements with State and local governments to deliver digitized soil surveys valued at more than \$1 million annually.

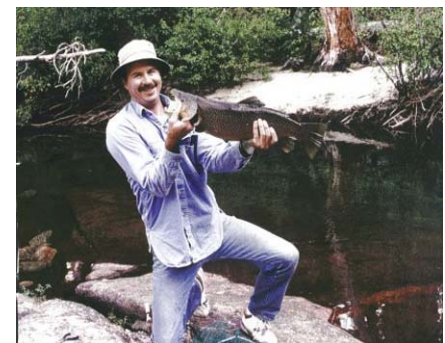
Kerry Arroues was also selected by NCSS for his “exceptional achievement” in soil survey production. Arroues has been mapping soils in California’s San Joaquin Valley for more than 27 years and has authored or participated in five soil surveys. As a major land resource area (MLRA) project leader, he is responsible for two MLRAs covering the Central and San Joaquin Valleys and Sierra Nevada in

that State. He has authored more than 15 publications on soil survey practices and initiated a movement that led to legislation that ratified the California State Soil—the San Joaquin series.

D’Avello received his award at the NCSS Conference in Plymouth, Massachusetts, in June 2003. Arroues will receive his award at the 2003 Soil Science Society of America national meeting in Denver, Colorado, in November 2003. ■



Thomas P. D’Avello



Kerry Arroues

The State of the Nation's Ecosystems

By Karl W. Hipple, National Leader, Soil Survey Interpretations, NRCS, National Soil Survey Center, Lincoln, Nebraska.

The State of the Nation's Ecosystems: Measuring the Lands, Waters, and Living Resources of the United States, by the H. John Heinz III, Center for Science, Economics and the Environment, was published in 2000 by Cambridge University Press, NY (270 pp., ISBN 0-521-52572-1, \$25.00 soft-cover). It provides a methodology for "taking the pulse" of America's natural resources based on several defined ecosystems. This attractive, colorful book is not for leisurely reading. It is a serious, factual, comprehensive book containing an abundance of scientific information presented in a fairly straightforward and not-too-technical manner.

The treatment of data helps the reader to understand the complexity and enormity of the effort required to collect and report ecosystem trend data. The publication clearly identifies what we know and what we do not know regarding the nation's ecosystems. It demonstrates that scientists have miles to go before they possess all the needed data but that useful relationships and trends can be established presently even with only part of the required data set.

This book is a collective effort of almost 150 researchers. The proposed framework used by the group to evaluate natural resources may not be ideal, but it demonstrates a new perspective on the issue. It also clearly establishes a template that can be used for periodic evaluation and reporting on the state of our natural resources. According to the writers, it is "the first report in what is intended to be a series of regular reports."

Several employees of the USDA, Natural Resources Conservation Service (NRCS), served in various capacities on the project. Some served on the Design Team, while others served as specialists in working groups on established ecosystem teams. Among the recognizable NRCS names are Maury Mausbauch, Lawrence Clark, Jeri Berc, Daryl Lund, Leonard Jolley, and Dennis Thompson. Another easily recognizable project member is Craig Cox, Executive Director of the Soil and Water Conservation Society. The project team is comprised of a variety of people representing State and Federal governments, environmental groups, academia, and numerous foundations.

The broad spectrum of team members was intended to provide a balanced approach to this project. This goal was clearly accomplished. Other stated goals were:

- 1) To produce a report for decision-makers and leaders wanting "big picture" information on America's ecosystems.
- 2) To identify a succinct set of strategic indicators that can help to define and rate the nation's ecosystems.
- 3) To provide decision-makers scientific information without making value judgements and policy recommendations.
- 4) To provide a report that focuses on the condition of the nation's ecosystems.
- 5) To select indicators that reflect both the goods and services derived from ecosystems as well as key measurable ecosystem properties.

- 6) To identify critical data gaps.

The Design Team used the land cover approach in defining ecosystems instead of a geographic approach. The land cover approach bases ecosystem types on the dominant vegetation or other physical characteristics. In contrast, the geographic approach takes into account all regional living and nonliving things, regardless of vegetation types. This fact, like many other qualifiers, is clearly stated.

The book is divided into two parts. Part I identifies needs, origins, principles, and processes and discusses the report framework. It also addresses knowns and unknowns about the nation's ecosystems and identifies the six ecosystems selected by the Design Team to represent America. These are:

- 1) Coasts and oceans,
- 2) Farmlands,
- 3) Forests,
- 4) Fresh waters,
- 5) Grasslands and shrublands, and
- 6) Urban and suburban areas.

Part II discusses indicators that characterize national ecosystems, core national indicators, and existing data gaps that must be filled before comprehensive analyses can be completed. The work groups also identified between 15 and 20 specific indicators used to evaluate ecosystem status plus an additional set of core national indicators.

Interestingly, urban and suburban lands were identified not by population density, but by physical characteristics. Such criteria as percent of area covered by buildings, roads, concrete, etc. were used in conjunction with a minimum land area size to categorize an area as urban and suburban. This definition excludes some developed lands. For

example, some rural paved roads and small built-up areas are excluded because of their size, a factor that limits the comparability of the data with some other existing data. Again, the authors are up front in divulging this information.

The latter section of Part II has a set of technical notes arranged by ecosystem type. While not inclusive for all indicators, these provide additional

useful information. Each technical note includes a succinct description of the indicator and additional information regarding the data, such as data source, data manipulation, data collection methodology, data analyses, data quality, and data access. Each technical note also has a reference section to help the user gain additional information.

Four groups of ecosystem

characteristics, additionally subdivided into ten major characteristics, provide a framework for data comparisons. An example that demonstrates the basic framework for national indicators is shown in table 1. Depending on the selected ecosystem, a variable number of indicators is used to define and compare ecosystem characteristics. Pertinent identified indicators were not discarded simply because data did not exist.

Overall, the H. John Heinz Center has furthered our understanding of the nation's resources and their interrelations within ecosystems and large-scale components of our world. I recommend this publication as a credible source of information regarding the state of our nation's ecosystems in the cases where data were available. The authors clearly identify the areas where data are insufficient or nonexistent. The publication provides additional references that can be used to expand one's knowledge of specific ecosystem indicators, and it is up front regarding the methodologies used to analyze data. The report does not try to interpret insufficient data, and it plainly acknowledges existing data gaps. By defining a framework and identifying indicators that can be used to measure ecosystem trends, it provides leverage to solicit funds for the purpose of filling data gaps or expanding data sets. It makes a strong case that monitoring, although expensive, is necessary if we are to detect natural resource trends, ecosystem changes, and their related societal impacts.

This report, by maintaining political neutrality, balance, and objectivity, provides a model that decision-makers and the public can use to become informed and responsive to both positive and negative impacts on the nation's ecosystems. ■

Table 1.—Example of Basic Comparison Framework

National Indicators	
Groups of Characteristics	Ecosystem Characteristics
Category 1	System Dimensions
Extent	Area of ecosystem and its major components
Fragmentation and landscape pattern	Ecosystem type patterns of shapes and sizes and their relationships to one another
Category 2	Chemical and Physical Conditions
Nutrients, carbon, and oxygen	Quantities and concentrations of key nutrients (nitrogen and phosphorus) and key elements (carbon and oxygen)
Chemical contaminants	Number of contaminants found and how often they exceed regulatory or advisory thresholds
Physical conditions	Condition of physical aspects, such as erosion and water temperature
Category 3	Biological Components
Plants and animals	Native and nonnative plants and animals status
Biological communities	Plant and animal community condition
Ecological productivity	Plant growth on land and in water
Category 4	Human Use
Food, fiber, and water	Values and amounts of products for human use
Other services, including recreation	Tangible and intangible services provided

Electromagnetic Induction Facilitates Soil Survey

Wes Tuttle, Soil Scientist, NRCS, National Soil Survey Center; stationed in Wilkesboro, North Carolina.

The National Soil Survey Center (NSSC) is evaluating alternative tools to help document soil properties and aid in mapping soils. One such tool is the electromagnetic induction (EMI). EMI tools use

electromagnetic energy to measure the apparent conductivity of earthen materials (fig. 1). NSSC has provided EMI training and technical assistance to more than half of the States.

NSSC has two employees assigned to operate these geophysical tools and provide field technical assistance and training as requested by the States. The staff provides EMI assistance to identify areas with high concentrations of sodium and salts (saline seeps), assist with depth to bedrock determinations, identify areas with higher

concentrations of clay, locate ancient stream channels, aid in burial detection, locate septic fields, locate dissolution features in karst topography, discern between differing lithology in reclaimed mine spoil areas, detect plumes from waste storage facilities, and aid in archaeological investigations. EMI has been used to aid in quality control of project soil surveys and line placement of soil map unit boundaries.

The availability of computers, global positioning systems, geographical information systems, and geophysical

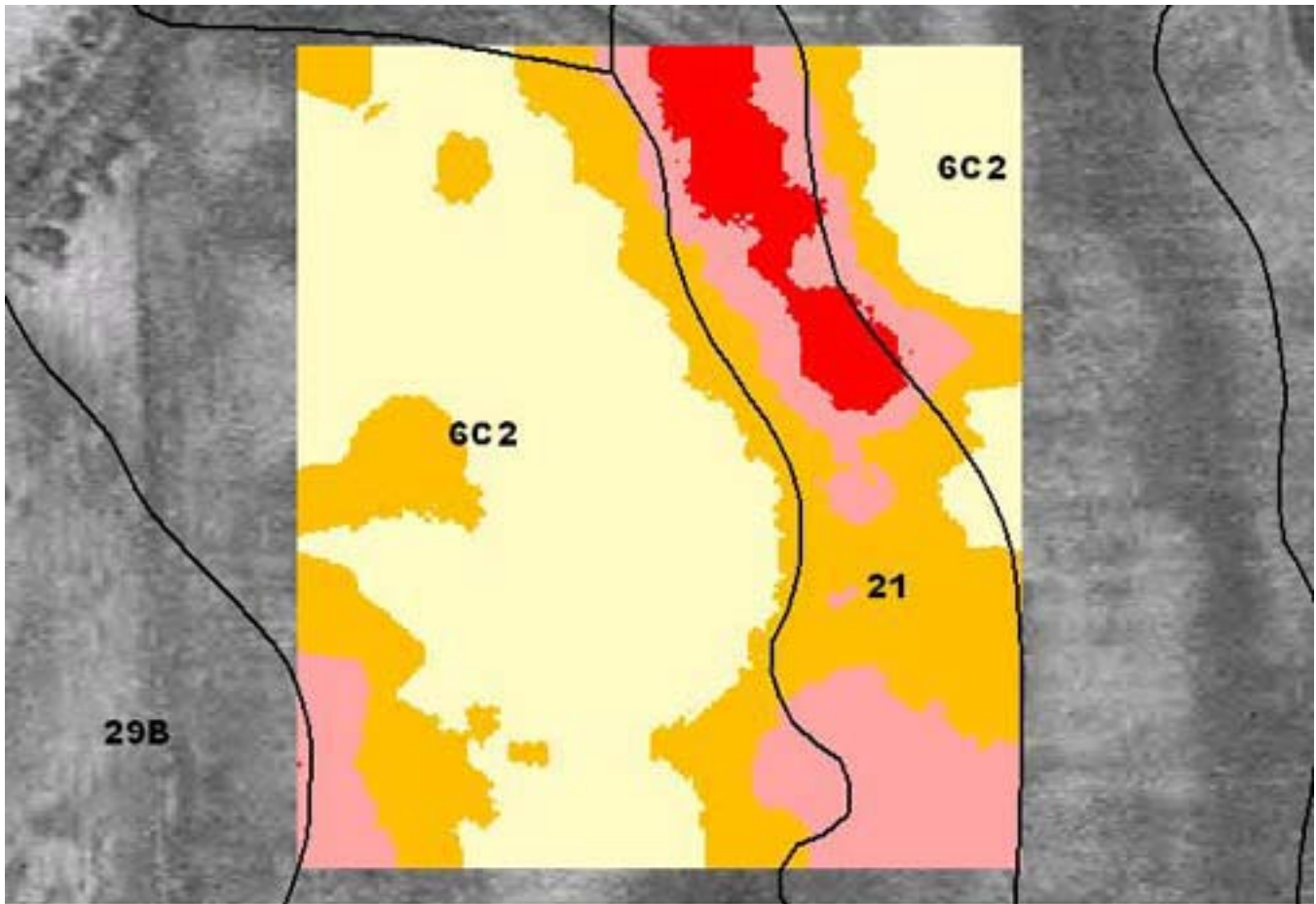


Figure 1.—An ArcView GIS image of the soils map and an apparent conductivity map (EMI survey) that have been overlain on an orthophoto of the study site. The map of apparent conductivity represents variations in soil properties within the upper 150 cm of the soils. Patterns of apparent conductivity conform very well to soil map units. Areas of higher apparent conductivity (red, pink, and orange colors) are associated with areas that have comparatively higher moisture and clay contents (map unit symbols 21 and 29B). Areas of lower conductivity are restricted to higher lying, better drained, and more sloping soils (map unit symbol 6C2).

tools is changing the way we look at and map soils. Because of the speed and ease of use, EMI technology has significant advantages over conventional soil survey techniques. The efficiency of EMI fosters the collection of larger data sets than is possible with conventional soil survey techniques. Because of the larger number of observations, maps prepared from EMI data can provide higher levels of resolution than soil maps prepared by conventional methods. In many areas spatial patterns of apparent conductivity correspond well with the soil patterns shown on soil survey maps.

EMI has proven to be a valuable noninvasive tool, along with ground-penetrating radar, which allows multiple observations with a minimal amount of earth disturbance. Ground truthing is needed to confirm observable changes in apparent conductivity as it relates to soil properties.

EMI has gained wide acceptance over the past few years. Multiple applications of EMI within NRCS have proven to be beneficial in past and present use. EMI shows potential and has expanded applications when used in combination with the knowledge of soils and soil properties. The future of EMI within NRCS appears to be bright as more applications are discovered. ■

Soil Geochemistry Workshop

By Michael Wilson, Research Soil Scientist, Soil Survey Laboratory, National Soil Survey Center, NRCS, Lincoln, Nebraska.

NRCS and the U.S. Geological Survey recently co-sponsored a Soil Geochemistry workshop to examine

trace elements in soils. More than 100 persons from a variety of Federal and State agencies, universities, foreign nations, and private environmental consulting companies gathered in Denver, Colorado, recently to establish the need for a continental scale geochemical survey of soils and surficial sediments and discuss protocols that could be used for pilot research studies, sampling, laboratory analysis, data delivery, and products. The NRCS National Soil Survey Center has been producing soil trace element data for several years and recognizes the need for geochemistry information as a part of the soil survey program in the future. The need to link these data to soil surveys was emphasized by the many positive comments from potential data users at the meeting. For the next 2-3 years, NRCS hopes to cooperate with scientists from USGS to develop several limited cooperative pilots to establish protocols and to assure that the actual national survey—if implemented—will be 3-4 years in the future.

Currently, the Soil Survey Laboratory is analyzing selected pedons from requests through the National Cooperative Soil Survey (NCSS) as part of a systemic program to evaluate background trace element concentrations in benchmark soils. NRCS hopes to have these data available to cooperators of the National Soil Survey Program, as well as to the general public in 2003 on the Web. Linking geochemistry data to mapping units of soil series can be achieved by the use of representative or typifying pedons, the conceptual basis of sampling soils for characterization by the NCSS. The goal of the current project is to develop a dataset of soil geochemistry from all major soil series in the U.S. ■

Examples of Soil Names of American Indian Origin

Stephen Gourley, State Soil Scientist, USDA, Natural Resources Conservation Service, Colchester, Vermont.

Soil series are named after such features as mountains, streams, rivers, hills, and villages that are in the area where the soils are first recognized. Some of the place names in New England are derived from poor attempts by the English, Dutch, and French settlers to translate American Indian names into their own languages.

Many Indian tribes settled along the coast and throughout the river valleys all over New England. Many of the tribes relied on farming along with hunting and fishing for food. They understood many of the principles of farming and soil conservation that we use today. In fact, it would be accurate to say that American Indians were the first soil conservationists in North America.

The American Indian names of villages, individuals, and landscape features are fairly well documented. The spellings vary from author to author as result of many attempts to translate the American Indian pronunciation into European languages. As a result, the pronunciation that we use today is probably not the same as the pronunciation in the original native language.

There a number of books written on the origin of American Indian place names. Unfortunately, the accuracy of the translation of these place names varies from source to source. During a flurry of activity in New England in the late 1800s and early 1900s, the meanings of various place names that were perceived to be of American Indian origin were recorded. Some

authors relied on local tradition for their definitions and did not consult with members of the local tribes. Future authors unknowingly perpetuated misinformation by using these unreliable sources.

Local tribes are likely to be good sources for translations, for information about reliable sources, and for verification of information collected about the names. A series on American Indians published by the Smithsonian Institution should be consulted if there are discrepancies among reliable sources. This series is available in many libraries.

Following are a few of the many soils in New England that have names of American Indian origin:

Allagash soil.—Allagash may have been derived from the Abenaki word *walagaskok*, which means “bark” or “rough bark.”

Canandaigua soil.—Canandaigua was a Seneca Tribe village that was destroyed during a campaign by the American Army under General John Sullivan in 1779. Canandaigua may have been derived from *kanandarque*, which means the “chosen spot.”

Missisquoi soil.—Missisquoi is derived from the Abenaki word *masipskoik*, which means “where there is flint” or “where flint is.” The name originates from an Abenaki chert quarry located near Missisquoi Bay on Lake Champlain.

Monadnock soil.—The Abenaki name for Mount Monadnock in southeast New Hampshire is *menonadenak*, which means “smooth mountain.”

Occum soil.—Sampson Occum was a Mohegan Christian missionary during the latter part of the 1700s.

Podunk soil.—The Podunk Tribe lived in the Connecticut River Valley in

northern Connecticut. Podunk may have been derived from the word *petunk*, which means “to put anything in a bag” or “clean place.”

Scantic soil.—Scantic may have been derived from Scanticook, which was a Podunk Tribe village, or it may have been derived from the Nipmuc word *scatacook*, meaning “fork in the river.”

Sunapee soil.—Sunapee may have been derived from the Algonquin words *suna* and *apee*, which together could be translated as “goose lake.”

Taconic soil.—Taconic may have been derived from a Mohegan or Natick word which means wild forest or the Delaware word *tatchan*, which means “woodland.” ■

Mark Twain on Climate and Soil in Nevada

By Stanley P. Anderson, Editor, NRCS,
National Soil Survey Center, Lincoln, Nebraska.

In a newspaper item entitled “Washoe.—‘Information Wanted’,” Mark Twain comments on the climate and soil of Nevada. This item was first published in the Virginia City *Territorial Enterprise* in May of 1864. It is included in *Mark Twain: Collected Tales, Sketches, Speeches, & Essays, 1852–1890*, edited by Louis J. Budd (pages 78–82). The item was written in response to a series of questions about Nevada that a man named William (last name withheld) sent from Springfield, Missouri. The first of these asked about the character of Nevada’s climate, and the second asked about what William called “the productions of the earth.”

Following is Twain’s description of “the productions of the earth” in Nevada:

What are the productions of the earth? You mean in Nevada, of course. On our ranches here, anything can be raised that can be produced on the fertile fields of Missouri. But ranches are very scattering—as scattering, perhaps, as lawyers in heaven. Nevada, for the most part, is a barren waste of sand, embellished with melancholy sage-brush, and fenced in with snow clad mountains.

Here is Twain on Nevada’s climate, which in his description appears to be xeric:

It has no character to speak of, William, and alas! in this respect it resembles many, ah, too many chambermaids in this wretched, wretched world. Sometimes we have the seasons in their regular order, and then again we have winter all the summer and summer all winter. Consequently, we have never yet come across an almanac that would just exactly fit this latitude. It is mighty regular about not raining, though, William. It will start in here in November and rain about four, and sometimes as much as seven days on a stretch; after that, you may loan out your umbrella for twelve months, with the serene confidence which a Christian feels in four aces. Sometimes the winter begins in November and winds up in June; and sometimes there is a bare suspicion of winter in March and April, and summer all the balance of the year. But as a general thing, William, the climate is good, what there is of it.



An area of the Orovada series, which is Nevada's state soil. Orovada soils are classified as Xeric Haplocambids. Semiarid rangeland covered with brush and grass is in the foreground, and low mountains of rock outcrop are in the background.

Tommy Calhoun, who formerly was the State Soil Scientist in Nevada, sent me the following comments about Twain's description:

It's pretty accurate, except for the statement that most of Nevada is a barren waste of sand. Very little is sand. A lot is saline, and the soils are often called sand because of their unproductivity. He also says that anything grown in Missouri can also be grown on the Nevada ranches. He leaves out the fact that in Nevada water must be applied. His characterization of the Nevada climate, what there is of it, is quite accurate. The year we moved from Nevada, I had to go out and cover my tomato plants to protect them from

frost on June 29th. I remember that date specifically because it is my birthday.

The pattern of rainfall in Nevada is briefly described in chapter LV of *Roughing It* (1872). Twain notes that a rain shower late one afternoon was "astonishing" because "it only rains (during a week or two weeks) in the winter in Nevada, and even then not enough at a time to make it worthwhile for any merchant to keep umbrellas for sale."

Twain comments on another element of the Nevada climate, the wind, in chapter XXI of *Roughing It*, noting that in summer "the daily Washoe Zephyr" is a "pretty regular" wind," that its "office hours are from two in the afternoon till two the next morning," and that it is accompanied by "a soaring dust drift about the size of the United

States set up edgewise." This "vast dust cloud" is "thickly freckled with things strange to the upper air," including, from the highest to the lowest elevation:

"hats, chickens, and parasols sailing in the remote heavens"
"blankets, tin signs, sagebrush and shingles a shade lower"
"doormats and buffalo robes lower still"
"shovels and coal scuttles on the next grade"
"glass doors, cats, and little children on the next"
"disrupted lumberyards, light buggies, and wheelbarrows on the next"
and, 30 or 40 feet above the ground, "a scurrying storm of emigrating roofs and vacant lots."

Twain adds that the wind is responsible for the large number of bald people in Carson City, noting that it “blows the hair off their heads while they are looking skyward after their hats.” ■

A Mark Twain Story on Agriculture

By Stanley P. Anderson, Editor, NRCS,
National Soil Survey Center, Lincoln, Nebraska.

For idle amusement, check out the Mark Twain story “How I Edited an Agricultural Paper Once,” first published in *Galaxy* in July 1870. This story is available in collections of Twain’s works, including *Mark Twain: Collected Tales, Sketches, Speeches, & Essays, 1852–1890*, edited by Louis J. Budd (pages 412-417).

In the *Buffalo Express* for April 12, 1870, Twain announced his intention to edit a monthly “department” in the *Galaxy*. He described this announcement in “A Couple of Sad Experiences,” which was published in the June 1870 issue of *Galaxy* (reprinted in Budd, ed., pages 388-395). The announcement, called a “squib,” was done as a burlesque that backfired on Twain. Giving broad hints that he was joking, the squib claimed that the column would be an “Agricultural Department.” These hints included references to “launching a triumphal *barge* upon a *desert*, and planting a *tree* of prosperity in a *mine*.” To show that he was not serious about attempting an agricultural column, he admitted in a postscript that he knows nothing about agriculture. This admission was his biggest mistake, for it “seems to have recommended my proposed Agriculture more than anything else.” He was deluged with queries from farmers who perhaps were hasty readers or were bored by “the

oracular profundity” of know-it-all agricultural editors. The farmers wanted to know “about potatoes, and cabbages, and hominy, and vermicelli, and macaroni, and all the other fruits, cereals, and vegetables that ever grew on earth.” Thus, Twain was taken seriously even though he had made his burlesque “so broad and so perfectly palpable that even a one-eyed potato could see it.”

At the end of “A Couple of Sad Experiences,” Twain announces that he does not intend to answer the farmers’ questions, noting that earlier in his career he would have attempted to do so. He then refers the reader to “the narrative of my one week’s experience as an agricultural editor” to be published in the next issue of *Galaxy* (the one for July 1870).

The last word in the title of the story “How I Edited an Agricultural Paper Once” is significant. The narrator was hired to replace the vacationing regular editor, who was forced to cut his vacation short because the narrator made a curiosity of himself and of the paper by publishing ridiculously inaccurate statements about agriculture in the only issue of the paper he was allowed to edit.

These statements include the observation that turnips grow on trees. When an old man notes that this

statement is in error, the narrator claims that the statement was figurative and that he knew all along that turnips grow on vines.

In his “editorials,” the narrator assumes that guano is a bird, that ganders spawn, that the words “fallow” and “harrow” refer to the same thing, that there is a moulting season for cows, that clams can be quieted by music (as if they need to be quieted), that buckwheat cakes are planted, that cornstalks should be set out in July this year, and that oyster beds are properly discussed under the heading “Landscape Gardening.”

He observes that a pumpkin is a berry that provides better food for cows than a raspberry, that it is an “esculent of the orange family,” and that it is a failure as a shade tree.

When the regular editor returns early from his holiday, he fires the narrator, who claims that knowledge is not needed in the newspaper business, that “the less a man knows the bigger noise he makes and the higher the salary he commands.” After calling the regular editor various names, including “cornstalk,” “cabbage,” and “son of a cauliflower,” and after implying that peaches grow on vines, the narrator gives his parting shot: “*You* are the loser by this rupture, not me, Pie-plant. Adios.” ■

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