

# JOURNAL OF SOIL AND WATER Conservation

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### Cover

A farmer stands in a field of birdsfoot trefoil in Iowa.  
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## P E N   P O I N T S

### **Soil architecture and tensegrity**

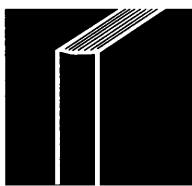
Dear Editor:

Three things came together in my mind this morning: a paper I have to put together about the significance of organic matter in soils; Doug Kleine's SWCS View "Conservationists: loss prevention engineers or healers of the land?" (*JSWC* 52(4) p.214, July/Aug. 1997), and Donald E. Ingber's paper, "The Architecture of Life" in *Scientific American*, Jan. 1998, 30-39. The introductory note to the latter says: "A universal set of building rules seems to guide the design of organic structures—from simple carbon compounds to complex cells and tissues." This is described as 'tensegrity.' "The term refers to a system that stabilizes itself mechanically because of the way in which tensional and compressive forces are distributed and balanced within the structure" (pp. 30, 31). The article shows some static and dynamic features shared in common between such diverse objects as geodesic domes, pollen grains, nerve cells, certain

sculptures, and giraffes (among others). Although Ingber does not mention soils as such, it occurs to me that soil architecture which relies on organic matter and processes for its formation and maintenance may also rely on tensegrity as Ingber has described. Sustainable use of rural land depends heavily on the nature and dynamics of organic materials and processes, as does healing of damaged land. The form and strength of soil-structural/architectural units may be derived, at least in part, from features of tensegrity. The resilience and sensitivity of soils to physical damage coupled with their capacities for self-recuperation may depend on it as mediated by soil-inhabiting organisms. Is anyone out there already studying the implications of this (to me, at least) new insight?

—T.F. Shaxson

*Pen Points is a forum for readers to comment on material that has been published in the JSWC or on land and water management issues in general. Readers are invited to express their views in a letter to the editor. Letters are judged on their clarity and pertinence to natural resource issues. Letters may be edited. Send letters to Editor, JSWC, 7515 Northeast Ankeny Road, Ankeny, Iowa 50021-9764; fax (515) 289-1227; email [swcs@swcs.org](mailto:swcs@swcs.org) or check our web site at <http://www.swcs.org/>*  
—Editor



## BOOKS, ETC.

### Economics

*An introduction to ecological economics* (ISBN 1-88401-572-7), by R. Costanza et al. 288 pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: orders@crcpress.com. \$39.95, hardcover.

### Environmental engineering

*Environmental engineering dictionary, 3rd edition* (ISBN 0-86587-620-7) by C.C. Lee, 730 pp., 1998. Government Institutes, 4 Research Place, Suite 200, Rockville, MD 20850. Phone: (301) 921-2323; fax: (301) 921-0373; email: giinfo@govinst.com; internet: http://www.govinst.com. \$89.00, hardcover.

*Carbon dioxide mitigation: recovery, utilization, and disposal* (ISBN 1-56670-284-4), by M. Halmann and M. Steinberg. 352 pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: orders@crcpress.com. \$69.95, hardcover

*Preventing waste at the source* (ISBN 1-56670-317-4), by N. Crampton. 220 pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: orders@crcpress.com. \$49.95, hardcover.

*Fundamentals of environmental engineering* (ISBN 1-56670-047-7), by D. Reible. 400

pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: orders@crcpress.com. \$69.95, hardcover

### Forestry

*The North American forests: The geography, ecology, and silviculture* (ISBN 1-5744-4176-0), by L. Walker. 464 pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: orders@crcpress.com. \$69.95, hardcover.

*The once and future forest: A guide to forest restoration strategies* (ISBN 1-55963-552-5), Leslie Sauer Andropogon Associates. 350 pp., 1998. Island Press, Box 7, Dept. 2PR, Covelo, CA 95428; Phone: 1-800-828-1302. \$50.00, hardcover.

*The southern forest* (ISBN 77648-9), by Laurence C. Walker. 1998. University of Texas Press, P.O. Box 7819, Austin, TX 78713-7819. Phone: (512) 471-4032; fax: (512) 320-0668; internet: http://www.utexas.edu/utpress/. \$32.95, cloth.

*Trees, shrubs, and woody vines of the southwest* (ISBN 73414-X), by Robert A. Vines. 1998. University of Texas Press, P.O. Box 7819, Austin, TX 78713-7819. Phone: (512) 471-4032; fax: (512) 320-0668; internet: http://www.utexas.edu/utpress/. \$75.50, cloth.

*Wildflowers of the western plains* (ISBN 79062-7), by Zoe Merriman Kirkpatrick. 1998. University of Texas Press, P.O. Box 7819, Austin, TX 78713-7819. Phone: (512) 471-4032; fax: (512) 320-0668; internet: http://www.utexas.edu/utpress/. \$16.95, paper.

### General

*A green plan for industry: 16 steps to environmental excellence* (ISBN 0-86587-622-3), by D. Schell. 220 pp., 1998. Government Institutes, 4 Research Place, Suite 200, Rockville, MD 20850. Phone: (301) 921-2323; fax: (301) 921-0373; email: giinfo@govinst.com; internet: http://www.govinst.com. \$59.95, hardcover.

*Digest: The international GIS standard* (ISBN 1-56670-241-0), by Kelly Chan and John Lyon. 200 pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: orders@crcpress.com. \$49.95, hardcover.

*The dolphins are back: A successful quality model for healing the environment* (ISBN 1-56327-183-4), by P. Scanlan. 290 pp., 1998. Productivity Press, P.O. Box 13390, Portland, OR 97213-0390. Phone: (503) 235-0600 or 1-800-394-6868; fax: (503) 235-0909 or 1-800-394-6286.

*To heal the earth: selected writings of Ian L. McHarg* (ISBN 1-55963-594-0), edited by Ian L. McHarg and Freder-

ick R. Steiner. 310 pp., 1998. Island Press, Box 7, Dept. 2PR, Covelo, CA 95428. Phone: 1-800-828-1302; fax: (707) 983-6414; internet: http://www.islandpress.org. \$34.95, cloth.

*Biodiversity in agroecosystems* (ISBN 1-56670-290-9), W. Collins and C. Qualset, eds. 352 pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: orders@crcpress.com. \$59.95, hardcover.

*Ecoregions: The ecosystem geography of the oceans and continents* (ISBN 0-387-98311-2), by Robert Bailey. 176 pp., 1998. Springer-Verlag New York, Inc., PO Box 19386, Newark, NJ 07195-9386. Phone: 1-800-springer. \$39.95, softcover.

*Farmer led extension* (ISBN 1-85339-417-3), by V. Scarborough, et al. 1997. Stylus Publishing Inc., 22883 Quicksilver Dr., Sterling, VA 20166-2012. Phone: (703) 66101500; fax: (703) 661-1501. \$24.95, softcover.

*Bounded people, boundless lands: envisioning a new land ethic* (ISBN 1-55963-418-9), by Eric T. Freyfogle. 200 pp., 1998. Island Press, P.O. Box 7, Dept. 2PR, Covelo, CA 95428. Phone: 1-800-828-1302; fax: (707) 983-6414; internet: http://www.islandpress.org. \$24.95, cloth.

*The complete guide to environmental careers in the 21st century* (ISBN 1-55963-

586-x), Environmental Careers Organization. 280 pp., 1998. Island Press, Box 7, Dept. 2PR, Covelo, CA 95428. Phone: 1-800-828-1302; fax: (707) 983-6414; internet: <http://www.islandpress.org>. \$39.95, cloth; \$17.95, paper.

## Land use planning

*Desert landscape architecture* (ISBN 1-57444-225-2), by J. Krieg. 576 pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: [orders@crcpress.com](mailto:orders@crcpress.com). \$89.95, hardcover.

*Landscape restoration handbook: second edition* (ISBN 1-56670-175-9) by D. Harker. 600 pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: [orders@crcpress.com](mailto:orders@crcpress.com). \$89.95, hardcover.

## Plant science

*Interrelation between insects and plants* (ISBN 1-5744-4052-7), P. Jolivet, ed. 336 pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: [orders@crcpress.com](mailto:orders@crcpress.com). \$59.95, hardcover.

*Gaseous nitrogen emissions from grasslands* (ISBN 0-85199-192-0), S.C. Jarvis, ed. 1998. To order, contact Order Department, Oxford University Press, 2001 Evans Road, Cary, NC 27513. Phone: 1-800-451-7556; fax: (919) 677-1303. \$110.00, hardcover.

*Plant virus disease control* (ISBN 0-89054-191-4), A. Haddi et al., eds. APS, 3340 Pilot Knob Road, St. Paul

MN 55121-2097. Phone: (612) 454-7250 or 800-328-7560; fax: (612) 454-0766; email: [aps@scisoc.org](mailto:aps@scisoc.org).

## Policy

*Battling the inland sea: floods, public policy, and the Sacramento Valley* (ISBN 0-520-21428-5), by Robert Kelley. 422 pp., 1998. University of California Press, 2120 Berkeley Way, Berkeley, CA 94720. Phone: (510) 642-4562. \$16.95, softcover.

*When city and country collide: managing growth in the metropolitan fringe* (ISBN 1-55963-597-5), by Tom Daniels. 420 pp., 1998. Island Press, Box 7, Dept. 2PR, Covelo, CA 95428. Phone: 1-800-828-1302; fax: (707) 983-6414; internet: <http://www.islandpress.org>. \$32.50, paper.

*The politics of ecosystem management* (ISBN 1-55963-675-0), by Biliana Cicin-Sain and Robert W. Knecht. 256 pp., 1998. Island Press, Box 7, Dept. 2PR, Covelo, CA 95428. Phone: 1-800-828-1302; fax: (707) 983-6414; internet: <http://www.islandpress.org>. \$50.00, cloth; \$25.00, paper.

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*Reducing soil water evaporation with tillage and straw mulching* (ISBN 0-8138-2857-0), by S.K. Jalota and S.S. Prihar. 150 pp., 1998. Iowa State University Press, 2121 S. State Avenue, Ames, IA 50014-8300. Phone: 1-800-828-1302; fax: (707) 983-6414; internet: <http://www.islandpress.org>. \$50.00, cloth; \$25.00, paper.

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*Agroforestry in sustainable agricultural systems* (ISBN 1-56670-294-1), L. Buck, J. Lassoie, and E. Fernandes, eds. 400 pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: [orders@crcpress.com](mailto:orders@crcpress.com). \$69.95, hardcover.

*Setting the stage for sustainable community development* (ISBN 1-57444-187-6), by Chris Maser. 288 pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: [orders@crcpress.com](mailto:orders@crcpress.com). \$34.95, hardcover.

*Ecosystem management for sustainability* (ISBN 1-57444-053-5), by John D. Peine. 250 pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: [orders@crcpress.com](mailto:orders@crcpress.com). \$69.95, hardcover.

*Ecotourism and sustainable development* (ISBN 1-55963-581-9), by Martha Honey. 350 pp., 1998. Island Press, Box 7, Dept. 2PR, Covelo, CA 95428. Phone: 1-800-828-1302; fax: (707) 983-6414; internet: <http://www.islandpress.org>. \$50.00, cloth; \$25.00, paper.

*Bugs in the system: Redesigning the pesticide industry for sustainable agriculture* (ISBN 1-85383-430-0), W. Vorley and D. Keeney, eds. 240 pp., 1998. Iowa State University Press, 2121 S. State Avenue, Ames, IA 50014-8300. Phone: 1-800-862-6657 or (515) 292-0155; fax: (515) 292-3348. \$64.95, hardcover; \$29.95, softcover.

*Wild species as commodities: managing markets and ecosystems for sustainability* (ISBN 1-55963-571-1), by Curtis Freese. 256 pp., 1998. Island Press, Box 7, Dept. 2PR, Covelo, CA 95428; Phone: 1-800-828-1302. \$59.95, hardcover.

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*ABCs of environmental science* (ISBN 0-86587-627-4), by William Katz. 180 pp., 1998. Government Institutes, 4 Research Place, Suite 200, Rockville, MD 20850. Phone: (301) 921-2323; fax: (301) 921-0373; email: [giinfo@govinst.com](mailto:giinfo@govinst.com); internet: <http://www.govinst.com>. \$49.00, softcover.

*Environmental compliance made easy* (ISBN 0-86587-599-5) by Andre R. Cooper, Sr. 300 pp., 1998. Government Institutes, 4 Research Place, Suite 200, Rockville, MD 20850. Phone: (301) 921-2323; fax: (301) 921-0373; email: [giinfo@govinst.com](mailto:giinfo@govinst.com); internet: <http://www.govinst.com>. \$69.00, softcover.

*Sixty ways farmers can protect surface water* (pub. number NCR589). 317 pp., 1998. Information Technology and Communication Services, Taft House, 1401-NR S. Maryland Dr., Urbana, IL 61801. Phone: 1-800-345-6087. \$10.00, softcover.

*Environmental statutes, 1998 edition* (ISBN 0-86587-625-8). 1200 pp., 1998.

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*Environmental management systems: A guide for planning, development and implementation* (ISBN 0-86587-619-3), by J. Martin and G. Edgley. 220 pp., 1998. Government Institutes, 4 Research Place, Suite 200, Rockville, MD 20850. Phone: (301) 921-2323; fax: (301) 921-0373; email: gi-info@govinst.com; internet: <http://www.govinst.com>. \$69.00, softcover

*Clean air handbook* (ISBN 0-86587-616-9) F. Brownell et al., eds. 332 pp., 1998. Government Institutes, 4 Research Place, Suite 200, Rockville, MD 20850. Phone: (301) 921-2323; fax: (301) 921-0373; email: gi-info@govinst.com; internet: <http://www.govinst.com>. \$95.00, softcover.

*Techniques in microbial ecology* (ISBN 0-19-509223-6), R. Burlage, et al. 1998. To order, contact Order Department, Oxford University Press, 2001 Evans Road, Cary, NC 27513. Phone: 1-800-451-7556; fax: (919) 677-1303. \$65.00, hardcover.

*Encyclopedia of seed production of world crops* (ISBN 0-47198-202-4), by A. Kelly and R. George. 403 pp., 1998. John Wiley and Sons Ltd., 506 3rd Ave, New York, NY 10158. Phone: (212) 850-6336; email: cs-books@wiley.co.uk; web: <http://www.wiley.com>. \$250.00, hardcover.

## Water issues

*Introduction to aquifer analysis* (ISBN 1-887201-06-8), by M. Kasenow. 320 pp., 1998. Water Resources Publications, LLC, 7200 E. Dry Creek Road, Suite E-104, Englewood, CO 80112. Phone: (303) 741-9071; fax: (303) 741-9073; email: wrp@sni.net; web: [www.waterplus.com/wrp](http://www.waterplus.com/wrp). \$129.00, hardcover.

*Planting wetlands and dams* (ISBN 0-86840-608-2), by N. Romanowski. 80 pp., 1998. ISBS, 5804 NE Hassalo St., Portland, OR 97213-3644. Phone: (503) 287-3093; fax: (503) 280-8832. \$22.95, softcover.

*Wetland mitigation* (ISBN 0-86587-534-0), by M. Dennison and J. Schmid. 305 pp., 1997. Government Institutes, 4 Research Place, Suite 200, Rockville, MD 20850. Phone: (301) 921-2323; fax: (301) 921-0373; email: giinfo@govinst.com; internet: <http://www.govinst.com>. \$75.00, hardcover.

*Dam hydraulics* (ISBN 0-471-97289-4), by D.L. Vischer and W.H. Hager. 316 pp., 1998. John Wiley and Sons Ltd., Baffins Lane, Chichester, West Sussex PO19 1UD England; email: cs-books@wiley.co.uk; web: <http://www.wiley.com>. \$44.95, softcover.

*Karst water resources* (ISBN 1-56670-280-1), by Neven Kresic. 384 pp., 1998. CRC Press LLC, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431. Phone: 1-800-272-7737; fax: 1-800-373-3401; email: orders@crcpress.com. \$69.95, hardcover.

*Applied ground water hydrology and well hydraulics* (ISBN 1-887201-05-X), by M. Kasenow. 568 pp., 1997. Water Resources Publications, LLC, 7200 E. Dry

Creek Road, Suite E-104, Englewood, CO 80112. Phone: (303) 741-9071; fax: (303) 741-9073; email: wrp@sni.net; web: [www.waterplus.com/wrp](http://www.waterplus.com/wrp). \$129.00, hardcover.

*On-site wastewater treatment, Volume 8, ASAE conference proceedings*. 576 pp., 1998. ASAE, 2950 Niles Road, St. Joseph, MI 49085-9659. Phone: (616) 429-0300; fax: (616) 429-3852; email: hq@asae.org. \$59.00, softcover.

*Drainage in the 21st century: food production and the environment, ASAE conference proceedings*. 737 pp., 1998. ASAE, 2950 Niles Road, St. Joseph, MI 49085-9659. Phone: (616) 429-0300; fax: (616) 429-3852; email: hq@asae.org. \$75.00, softcover.

*Striking a balance: improving stewardship of marine areas* (ISBN 0-309-06369-8), National Research Council. 192 pp., 1997. National Academy Press, 2109 Constitution Ave. NW, Lockbox 285, Washington, DC 20055. Phone: 1-800-624-6242 or (202) 334-3313; fax: (202) 334-2451; internet: [www.nap.edu/bookstore](http://www.nap.edu/bookstore). \$44.95, hardcover.