

TABLE OF CONTENTS

Consolidated Minutes of the Eighty-Seventh Annual Meeting of the South Dakota Academy of Science1
 Presidential Address: Reflections on Science in South Dakota and on Vitamin B₁₂. M. Steven McDowell11

Complete Senior Research Papers presented at

The 87th Annual Meeting of the South Dakota Academy of Science

Hydrogeology of the Homestake Mine. Perry H. Rahn and William M. Roggenthen19
 Mycorrhizal Colonization as Impacted by Corn Hybrid. Marie-Laure A. Sauer, Diane H. Rickerl, Patricia K. Wieland, Courtenay Hoernemann, and W.B. Gordon.....27
 Retention and Survival Rates Associated With the Use of T-Bar Anchor Tags in Marking Yellow Perch. George D. Scholten, Daniel A. Isermann and David W. Willis35
 Impact of Crop Harvest on Small Mammal Populations in Brookings County, South Dakota. Melissa K. Pinkert, Jonathan R. Meerbeek, George D. Scholten, and Jonathan A. Jenks39
 Observations at the Lake Martin Rookery, Cypress Island Preserve, St. Martin Parish, Louisiana. James E. Martin47
 Juvenile Marine Reptiles from the Late Cretaceous of the Antarctic Peninsula and their Relationships to Other Such Occurrences in Central South Dakota and Belgium. James E. Martin.....53
 Analysis of Wind Observations in the Black Hills Region. Srivisakha Skandaswamy Pokkunuri, Sameer Kumara Krishna Dronamraju, Abul R. Hasan, and Andrew G. Detwiler.....59
 Modeling Streamflow in Spearfish Creek, Black Hills, SD. Larry D. Stetler and John P. Knight.....69
 South Dakota Turfgrass Industry: Impacts and Value. Leo C. Schleicher.....75
 Chondrichthyes from the Upper Part of the Minnelusa Formation (Middle Pennsylvanian: Desmoinesian), Meade County, South Dakota. D.J. Cicimurri and M.D. Fahrenbach81
 Influence of Age-0 Yellow Perch Abundance on Walleye Populations in Two Eastern South Dakota Lakes. Jonathan R. Meerbeek, Daniel A. Isermann, and David W. Willis93
 Constitutive Expression of a 3-Deoxy-D-Arabino-Heptulosonate-7-Phosphate Synthase Gene in Alfalfa (*Medicago sativa* L.) Lines Differing in Morphology and Lignin Concentration. T. Liu, K.D. Kephart, and C.D. Carter101
 Construction of Natural and Real Numbers from Generalized Order, Congruence and Continuity Axioms (A “Real Line” May Cross Itself). Richard P. Menzel.....109
 Initiation of Feeding During Hatchery Rearing of Landlocked Fall Chinook Salmon Fry. Michael E. Barnes, William A. Saylor, and Rick J. Cordes137
 White-Tailed Deer Behavioral Response to Predator Feces. Christopher C. Swanson, Cory M. Kassube, and Jonathan A. Jenks143
 Variation in Small Mammal Richness Among Ecotypes in Eastern South Dakota. David F. Terrall, Nick G. Cochran, and Jonathan A. Jenks.....147
 The Expanding Distribution of the Least Shrew, *Cryptotis parva*, in South Dakota. Douglas C. Backlund153
 Rare Earth Element Signatures of Fossil Vertebrates Compared with Lithostratigraphic Subdivisions of the Upper Cretaceous Pierre Shale, Central South Dakota. Doreena Patrick, D.E. Grandstaff, James E. Martin, and D.C. Parris161
 Phosphonosulfonate(3-) O₃PSO₃³⁻ and Related Ions. Arlen Viste and Kari Lunder Stone181
 Sets of Half-Reactions Which Yield Different Emf for an Overall Reaction, But Equivalent Standard Gibbs Free Energy and Equilibrium Constants. April Kay Bobbie and Arlen Viste.....189
 Application of ADF Amsterdam Density Functional Package to Relativistic Effects in Mercurous Ion Hg₂²⁺ and Related Species. William J. Delfs and Arlen Viste.....195
 Estimating Summer Fawn Mortality of White-Tailed Deer Using Corpora Albicantia and Lactation Status. Robert G. Osborn, Beth A. Hippensteel, Jonathan A. Jenks, and Ted A. Benzon.....201
 Longitudinal Patterns in Fish Community Composition of Upper Missouri River Backwaters. Kipp A. Powell and Steven R. Chipps.....211
 Zooplankton Communities of Black Hills Reservoirs. Benjamin M. Holcomb and Steven R. Chipps.....219
 Fecal Egg and Oocyst Counts in Dogs and Cats from Animal Shelters from South Dakota. M.B. Hildreth, J.A. Bjordahl and S.R. Duimstra.....227

Abstracts of Senior Research Papers presented at

The 87th Annual Meeting of the South Dakota Academy of Science

Good Wasps Gone Bad: Invasive Species in a Parasitoid Guild on a Native Legume. Paul J. Johnson and Arvid Boe.....237
 Comparative Morphology of Several Switchgrass Cultivars. Martine Zamy and Arvid Boe239
 Polymorphism in the Agouti-Related Protein (agrp) Gene in Swine. Kent J. Donelan, Nels H. Granholm, Carl A. Westby, and Donald M. Marshall.....241
 Transgene Dispersal and Effects in Feed and Food from Roundup Ready Soybeans. C. Carter, S. Hansen, R. Scott, B. Turnipseed, L. Wrage, P. Krishnan, R. Thaler, and T. Cheesbrough243
 Species Richness and Nesting Success of Neotropical Migrants in Natural River Corridors and Anthropogenic Woodlands in Southeastern South Dakota. Dale Gentry and David Swanson245
 Isolation and Partial Characterization of the Haplod State of *Ustilago Maydis* from Smutted Ears and Tassels of Field Corn (*Zea mays*) from Southeastern South Dakota. Jodie Linneweber and Donna Hazelwood247
 Gene Expression Patterns in Segmenting Radials of Zebrafish, *Danio rerio*. Patricia L. Crotwell and Paula M. Mabee249

Relationships Among IKONOS Satellite Imagery, Airborne Scanning LIDAR Data, and Ground-Based Tree Inventory Data in a Ponderosa Pine Forest via Subpixel Interpretation. X. Chen, L. Vierling, D. Dykstra, W. Capehart, E. Rowell, and T. DeFelice	251
Seasonal Variation on Brown Trout Diet in Rapid Creek, South Dakota. S. Martin Digler and Kerri T. Vierling.....	253
Urban Gradient Influence on Brown Trout Diet in Rapid Creek, South Dakota. Irene Cherni and Kerri T. Vierling	255
An Evaluation of the Effects of Formalin and Hydrogen Peroxide Treatments on the Exterior Egg Membrane of Chinook Salmon (<i>Onchorhynchus tshawytscha</i>). Hans Stephenson, Mark Gabel, and Mike Barnes	257
A More Biodegradable Quaternary Ammonium Compounds. Keith Hartman and Gary Earl	259
Initial Examination of Possible Novel Macrocycles via CACHe. Ethan Englund, Arlen Viste, and Jetty Duffy-Matzner	261
Synthesis of α,β -Unsaturated Carbaldehydes, Ketones And 1,4 Addition to α,β -Unsaturated Aldehydes. Jerrid Kruse, Andrea Votroubek, and Jetty Duffy-Matzner.....	263
Ridge Detection Using Artificial Neural Networks. Rishi Kishore and John M. Weiss	265
The Effects of Hyperbaric Environment-Induced pH Changes on the Generation Times of <i>Pseudomonas aeruginosa</i> . Contessa E. Creager, Sarah O. Hammar, Mitchell W. Jacobs, John Wayne Kalda, William J. Soeffing.....	267
Observations on the Colonial Morphologies, Cell-Cell Adhesion Characteristics and Antibiotic Sensitivity of <i>Pseudomonas aeruginosa</i> in a Hyperbaric Environment. Brandon J. McCall, Sarah O. Hammar, Nicolas L. Strasser and William J. Soeffing.....	269
Nutritional values of <i>Psoralea esculenta</i> . Giani Perera and Neil Reese.....	271
Extraction, Purification, and Identification of Unique Protein in Root of (<i>Psoralea esculenta</i>). Marcus Braaten and R. Neil Reese	273
Effects of Lethal Yellow and Mahogany Mutations on Reproduction in Female Mice. Trynda N. Oberg, Nels H. Granholm, and Maureen R. Diggins.....	275
Determination of Infective Gastrointestinal Nematode Juveniles on Spring Pastures . K. J. Mertz, M.B. Hildreth, and W.B. Epperson	277
Determining the Feasibility of Restoring River Otters in South Dakota. Alyssa M. Kiesow and Charles Dieter.....	279
Comparative Analysis of Wing Beat Frequency and Eye Span in Stalk-Eyed Flies (Diptera: Diopsidae). John G. Swallow, Jilian M. Fazio, and Gerald S. Wilkinson	281
Late Cretaceous Dinosaurs, Big Bend National Park, Texas. Julia T. Sankey	283
Vertebrate Paleocology from the Late Cretaceous Hell Creek Formation, North Dakota: Surface Collection Versus Screen Washing. Georgia E. Knauss and Andrew A. Farke.....	285
Morphology of the Cornual Sinuses in Chasmosaurine Horned Dinosaurs (Ornithischia: Ceratopsidae). Andrew A. Farke	287
Microvertebrate Fauna Recovered from the Hell Creek Formation (Late Cretaceous), Southwestern North Dakota. Marcus Ross and Tim Pranger	289
Potential Effects of Genetically Modified Soybeans on Mammalian Fetal, Breast-fed Postnatal, Pubertal and Adult Development. Denise Brake and Donald P. Evenson	291
Comparison of Two Techniques for the Detection of DNA Fragmentation in Sperm Chromatin: Sperm Chromatin Structure Assay and Comet. David Trittle, Lorna Jost, Kay Kasperon, and Donald P. Evenson	293
Development of a GFP Construct to Determine the Localization of a Porcine Reproductive and Respiratory Syndrome Virus Protein. William D. Arndt, Susan Ropp, and David Benfield.....	295
Long-Term Plankton and Nutrient Changes in Prairie Lakes. Lois Haertel	297
Plankton-Environment Association in Prairie Lakes. Lois Haertel.....	299
Use of Stable Isotopes to Document the Invasion of Tallgrass Prairie by Deciduous Forest in Newton Hills State Park in Southeastern South Dakota. Craig Spencer, Matt Bukrey, Jason Smalley, Erik Wang, Dan Opheim, and Mike Chapman.....	301
The Utility of Aerial Photographs, Field Observations, and Invertebrate Fossils in the Construction of Geologic Maps. Frank J. Varriale and Alvis L. Lisenbee	303
Observations of a Lightning Channel in a High Plains Thunderstorm. Tom Warner, John Helsdon, Andrew Detwiler, Qixu Mo, and Donna Kliche.....	305
A New Meandering Stream Complex from the Big Badlands of South Dakota. Robert W. Meredith and Jennifer Cavin	307
Using the Pentax Total Station and Arcview to Analyze the Fossil Accumulations Within the Conata Picnic Ground Excavation, Badlands National Park, South Dakota. Daniel B. Lien.....	309
Hydrolytic Stability Testing of Polymer Matrix Composites Reinforced with Fibers Having Novel Surface Treatments. H. Du, C. Struckman, D.H. He, W.M. Cross, J.J. Kellar, and D.A. Boyles.....	311
Forest Classification of the Black Hills, SD Using Decision Tree Analysis on IM and AVIRIS data. Sylvio Mannel, Doug Hua, and Maribeth Price.....	313
Pharmaceuticals, Binding Sites, and Pharmacological Effect. Rosina Barbara Flasch Hendrickson and Arlen Viste	315
Nest Site Characteristics of Eastern Wild Turkey Females in Agricultural Landscapes of Northeastern South Dakota. Roger D. Shields and Lester D. Flake	317
Correlation of Biochemical and Molecular Profiles for 35 Related Isolates of Methicillin Resistant <i>Staphylococcus aureus</i> . Amy J. Stephenson, Lona Haas, and Patricia M. Tille	319
Biodiversity Assessment of The James River Basin. Chad Thury, Christy DeRoos, John Gullikson, Krisma Dewitt, James Sorenson and Patricia M. Tille	321
Diversity, Density and Breeding Status of the Avifauna in the Schramm Addition at Ponca State Park, Nebraska. Eric T. Liknes	323

Syntheses and Applications of the New Organoboron Reagents for Suzuki-Coupling Reaction. Jiangtao Hao and David A. Boyles	325
Use of Aryl Diazonium Tetrafluoroborates For Suzuki-Type Cross-Coupling Reactions with Diarylborinic Acids. Joseph Marshall, Jiangtao Hao, and David A. Boyles	327
Modified Suzuki Reaction Using Bisaryl Tosylates with Diarylborinic Acids. Celeste Mercado, Jiangtao Hao, and David A. Boyles	329