northwestern Sonora; I measured a sample from Puerto Peñasco, Sonora, which is not included in the figures as I have only nine male and four female specimens. On the basis of my specimens, these have somewhat smaller bills than *P. s. atratus*. I feel that we should defer changing the taxonomy of the saltmarsh Savannah Sparrows until additional information is available.

In conclusion, I see no justification in retaining either P. s. oblitus or P. s. brooksi. Careful field work along the coast of northern California is needed to clarify the status of the saltmarsh birds there. Many of the other subspecies are poorly differentiated, and all of the geographic variation among the non-saltmarsh localities is clinal. A careful analysis of plumage variation in needed. I suspect that it will appear reasonable to recognize only three subspecies of non-saltmarsh Savannah Sparrows, P. s. sandwichensis (large size), P. s. savanna (typical Savannah Sparrows), and P. s. princeps (large and pallid). However, because P. s. sandwichensis merges clinally into P. s. savanna (as defined above), I would prefer to recognize only two subspecies of non-saltmarsh Savannah Sparrows, P. s. sandwichensis and P. s. princeps. As mentioned in the introduction, a preliminary study (Zink et al. 1991) suggests that the large-billed Savannah Sparrows (P. S. rostratus) may be specifically distinct; the same may be true for "Belding's" sparrows. Biochemical studies (J. D. Rising and R. M. Zink, in prep.) of the typical Savannah Sparrows may help us better understand the relationships among the populations.

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LITERATURE CITED

- ALDRICH, J. W. 1940. Geographic variation in eastern North American Savannah Sparrows (*Passerculus sandwichensis*). Ohio Journal of Science 40:1–8.
- AMERICAN ORNITHOLOGISTS' UNION. 1957. Check-list of North American Birds, 5th edition. Lord Baltimore Press, Baltimore, MD.
- AMERICAN ORNITHOLOGISTS' UNION. 1998. Check-list of North American Birds, 7th edition. American Ornithologists' Union, Washington, D.C.
- Austin, O. L., Jr. 1932. The birds of Newfoundland Labrador. Memoir Nuttall Ornithological Club No. VII, Cambridge, MA.
- Brewer, D., A. DIAMOND, E. J. WOODSWORTH, B. T. COLLINS, AND E. H. DUNN. 2000. Canadian Atlas of Bird Banding. Special Publication, Canadian Wildlife Service, Ottawa, ON.
- Case, T. J. 1978. A general explanation for insular body size trends in terrestrial vertebrates. Ecology 59:1–18.

- COOK, R. E. 1969. Variation in species density of North American birds. Systematic Zoology 18:63–84.
- DIXON, W. J. 1983. BMDP Statistical Software. University of California Press, Berkeley, CA.
- Environment Canada, 1973. Canadian Normals. Vol. 1. Temperature 1941–1970. Environment Canada, Downsview, ON.
- GOULD, S. J., AND R. F. JOHNSTON. 1972. Geographic variation. Annual Review of Ecology and Systematics 3:457–498.
- Hubbard, J. P. 1974. Geographic variation in the Savannah Sparrows of the inland southwest, Mexico, and Guatemala. Nemouria 12:1–21.
- Jackson, D. A. 1995. PROTEST: A PROcrustean randomization TEST of community environment concordance. Ecoscience 2:297–303.
- JAMES, F. C. 1970. Geographic size variation in birds and its relationship to climate. Ecology 51:365–390.
- MAILLIARD, J. 1916. Some bird notes from Humboldt Bay. Condor 18:198–200.
- MAILLIARD, J. 1917. Concerning two forms of the Bryant Marsh Sparrow in California. Condor 19:69–70.
- MAYR, E. 1963. Animal species and evolution. Harvard University Press, Cambridge, MA. McNab, B. 1971. On the ecological significance of Bergmann's Rule. Ecology 52:276–280.
- MURPHY, R. C. 1938. The need of insular exploration as illustrated by birds. Science 88: 533-539.
- NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION. 1983. Local climatological data. National Climatic Data Center, Asheville, NC.
- Peters, J. L., and L. Griscom. 1938. Geographic variation in the Savannah Sparrow. Bulletin of the Museum of Comparative Zoology 80:443–479.
- RISING, J. D. 1987. Geographic variation of sexual dimorphism in size of Savannah Sparrows (*Passerculus sandwichensis*): a test of hypotheses. Evolution 41:514–524.
- RISING, J. D. 1988. Geographic variation in sex ratios and body size in wintering flocks of Savannah Sparrows (*Passerculus sandwichensis*). Wilson Bulletin 100:183–203.
- RISING, J. D. 1996. A guide to the identification and natural history of the sparrows of the United States and Canada. Academic Press, London, UK.
- RISING, J. D., AND K. M. SOMERS. 1989. The measurement of overall body size in birds. Auk 106:666–674.
- ROBINS, J. D., AND G. D. SCHNELL. 1971. Skeletal analysis of the *Ammondramus-Ammos-piza* grassland sparrow complex: a numerical taxonomic study. Auk 8:567–590.
- ROHLF, F. J., J. KISHPAUGH, AND D. KIRK. 1982. NT-SYS. Numerical taxonomy system of multivariate statistical programs. Technical Report, State University of New York at Stony Brook, Stony Brook, NY.
- SAS Institute. 1985. SAS user's guide: statistics. Version 5. SAS Institute, Inc., Cary, NC.
- Schoener, T. J. 1969. Size patterns in West Indian *Anolis* lizards: I. Size and species diversity. Systematic Zoology 18:386–402.
- SIBLEY, C. G., AND B. L. MONROE, JR. 1990. Distribution and taxonomy of birds of the world. Yale University Press, New Haven, CT.
- SPSS. 1986. SPSSX. 2nd edition. McGraw-Hill Book Co., New York, NY.
- STOBO, W. T., AND I. A. McLaren. 1975. The Ipswich Sparrow. Nova Scotian Institute of Science, Halifax, NS.
- SQUIRES, W. A. 1916. Are there two forms of the Bryant Marsh Sparrow in San Francisco County? Condor 18:228.
- Todd, W. E. C. 1963. Birds of the Labrador Peninsula and adjacent areas. University of Toronto Press, Toronto, ON.
- VAN ROSSEM, A. J. 1947. A synopsis of the Savannah Sparrows of northern Mexico. Condor 49:97–107.
- WHEELWRIGHT, N. T., AND J. D. RISING 1993. Savannah Sparrow (*Passerculus sandwichensis*). In A. Poole and F. Gill (editors). The Birds of North America, No. 45. The

- Academy of Natural Sciences, Philadelphia, PA, and American Ornithologists' Union, Washington, D.C.
- ZINK, R. M., D. L. DITTMANN, S. W. CARDIFF, AND J. D. RISING. 1991. Mitochondrial DNA variation and the taxonomic status of the Large-billed Savannah Sparrow. Condor 93: 1016–1019.
- ZINK, R. M., AND J. V. REMSEN, JR. 1986. Evolutionary processes and patterns of geographic variation in birds. Current Ornithology 4:1–69.