occur on both sides of this line. This is the first comprehensive paper on the *Schizonycha* since Péringuey published a similar but much less extensive paper in 1904.

Pope combines the genus *Atys* Reiche with *Schizonycha* to list 107 species described from southern Africa. In the present paper he points out 22 cases of synonymy and five cases of preoccupied names. Nineteen new species and the five new names bring the total number of valid species to 117.

A complete history of the genus is given. *Scarabaeus globata* Fabricius (1781) is selected as the type of the genus *Schizonycha* Dejean (1833), and discussion of and reasons for the selection are presented. The taxonomic position of the genus and its relationship to other genera are covered adequately. The paucity of information on the biology and habits of the group is pointed out, with a review of what little is known.

Perhaps the most valuable part of the revision is the carefully prepared, easily followed key to the species involved. It is very full, but it is clear and understandable even though it includes 125 couplets covering 15 pages. For each species the following information is given: pertinent references, description of both sexes, type locality, location of type, distribution, and number of specimens seen. Five plates, illustrating adults and diagnostic characters other than genitalia, plus nine illustrations of genitalia, complete the book.

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Ecology of the Peregrine and Gyrfalcon Populations in Alaska. *University of California Publications in Zoölogy,* vol. 63, No. 3, pp. 151–290. Tom J. Cade. University of California Press, Berkeley, 1960. Illus. + plates. $2.50.

This study of two closely related raptors in an environment "biotically simple, geologically young, and still in a state of active surficial change" began as a study intended to supplement and extend analyses already made of peregrine populations in North America, the British Isles, the Baltic Sea region, the Soviet Union, and Greenland. The author found that in Alaska the gyrfalcon is an important part of the peregrine's ecology, so the study became comparative; his report includes sections on the distribution, abundance, and breeding biology of the two species in Alaska; it also includes discussions of the nesting cliff as an "ecological magnet," the importance of a strong pair bond, tradition as a factor linking generations to the same cliff, the significance of sexual dimorphism in falcons, and peregrine versus gyrfalcon competition. Cade shows clearly that further study of the gyrfalcon is sorely needed, an observation that applies, I hasten to add, not only to Alaska but to all parts of the species' range.

The gyrfalcon is the world's largest true falcon, and it is the only true falcon that breeds exclusively in the far north. It is highly polymorphic. Its polymorphism varies geographically both in kind and in degree, mixed broods of white and gray birds being the rule in some areas, most birds being white in northern Greenland, all breeding birds being gray in Iceland, some birds being very dark in the Canadian Arctic Archipelago and in Labrador. Geographical races have been described, but none of them are strongly characterized. The species is sexually dimorphic, strikingly so in size, the females being much larger than the males, but less strikingly so in color, the males being paler than the females, as a rule. Cade considers the gyrfalcon "the counterpart of a basic stock which has always been associated with landscapes of open expanse such as prairies, steppes, and deserts, and which is adapted for catching both birds and mammals (and also reptiles) pursued on or near the ground." The species breeds circumboreally—northward to 82°N. in Greenland, southward to 60°N. in Greenland, and even somewhat farther southward in the Komandorski Islands, Labrador, the Altai Mountains, and around the base of the Alaska Peninsula.

The peregrine, the third-largest of the true falcons, is also sexually dimorphic in size, females being much larger than males. The species is a bird of compact plumage "adapted primarily for the pursuit of flying quarry." Unlike the gyrfalcon, the peregrine is virtually world-ranging, and it is highly polytypic, 22 geographical races being recognized by some taxonomists. Possibly as a result of an ameliorating arctic climate within recent times, it now breeds northward to 75° to 78° N. Birds which breed in the far north are strongly migratory. An important (but in my opinion not wholly valid) point made by the author is that the arctic peregrine's reproductive cycle is determined to a considerable extent by the migrations of prey species, while that of the gyrfalcon is not.

The breeding ranges of these two large falcons overlap to some extent. The peregrine is not known to breed northward to 82°, but in some areas at the southern limits of the gyrfalcon's breeding range, the peregrine may breed in greater numbers than it does in any other part of the world. The overlap is more apparent than real, and only in certain restricted areas are the two species truly sympatric. Thus, while the gyrfalcon inhabits Iceland, the peregrine does not; the common falcon of northern Greenland is the gyrfalcon, of southern Greenland the peregrine; in the Aleutians there are many breeding peregrines but no gyrfalcons, while on the mainland coast from the base of the Alaska Peninsula to Point Hope, gyrfalcons "maintain maximum densities" but peregrines are rare.

In Alaska the gyrfalcon breeds in foothill tundra and arctic alpine areas (frequently in localities above 2500 feet elevation and far from water) and on coasts and islands in the Bering Sea region. The peregrine, on the other hand, invariably breeds near water, either on the outer coast or along a river, and at elevations below 2500 feet. "The principal areas of actual overlap . . . are the foothills of the arctic slope and the coast and hinterland of the Arctic Ocean from Kotzebue Sound to Cape Lisburne."

Some sort of cliff is required by both species for nesting. In general, cliffs used by gyrfalcons are more "accessible" than cliffs used by arctic peregrines. Gyrfalcons have fewer nesting sites to choose from since they must find one that is free of snow at the laying season. Gyrfalcons start nesting about a month ahead of the peregrines and, therefore, take possession of some cliffs that might, were it not for the gyrfalcons, be used by peregrines. Nesting cliffs are rarely very close together, and no cliff is occupied by both peregrines and gyrfalcons or by more than one pair of either species.

Choice and defense of the nesting cliff are an important part of the reproductive cycle. The cliff must be close to an adequate supply of food. Since gyrfalcons prey heavily on ground squirrels in Alaska, especially in the

Alaska Range, it occurs to me that the gyrfalcon's laying season, which begins in April, may take place about the time the ground squirrels emerge from hibernation, a predator-prey relationship not discussed in this paper. Wilber and Musacchia [*J. Mammalogy* **31**, 307 (1950)] state that *Citellus barrowensis* comes out of hibernation "about the middle or end of April," and my friend W. O. Pruitt, Jr., informs me that he saw an active, adult ground squirrel in the Cape Thompson region of Alaska as early as 19 April 1960. The comparatively euryphagous peregrine, which can and does subsist on mammals as well as on transient birds, has no trouble obtaining food when its own laying season starts, if its nesting cliff is near water. On treeless Baffin Island peregrines frequently take lemmings when these rodents are numerous; but peregrines are highly prone to take flying prey, and robins, jays, waxwings, and the like expose themselves to capture when they fly across rivers in wooded parts of Alaska.

I call attention to the need for proof that the gyrfalcon is truly sedentary at high latitudes. Available data indicate that the species is regularly migratory, less so than the peregrine in that it rarely moves very far south of the arctic, but definitely migratory within latitudinal limits. White ptarmigan feathers found at plucking spots well north of the Arctic Circle (see page 204) are not proof of the gyrfalcon's winter residence, for cock ptarmigan wear white plumage well into summer. The Kenai area, in which gyrfalcons are said to be commoner in winter than at any other season, is well south of the Arctic Circle. There are very few (if any) valid records of gyrfalcons being seen or taken at really high latitudes in the dead of winter. Gyrfalcons are known to follow the ptarmigans south during the period when the nesting grounds of both gyrfalcons and ptarmigans are in winter darkness. To this extent, I submit, the gyrfalcon and peregrine are equally dependent upon migratory species.

The discussion of the nesting cliff as an "ecological magnet" is thought-provoking. Cade found that in Alaska "very high cliffs seem to be avoided by peregrines," nesting birds frequently being found on a low bluff only a few hundred yards from an unoccupied cliff with face 300 to 500 feet high. "Such a lack of preference for cliffs is especially conspicuous along the Colville River, but it seems to be generally true over much of Alaska." Cade is convinced that the "first-class aerie" is not so much a matter of cliff dimensions, exposure, and the like, as of occupation by a pair of "effective breeders"—that is by "a pair that usually is able to fledge one or more young each year because the mates have established all the social adjustments required for a strong pair pond. Such pairs can withstand a great deal of molestation by human beings and other predators, regardless of the physical characteristics of their aeries . . ." Breeding pairs of peregrines observed by Cade in Alaska were, almost without exception, composed of fully mature birds.

Cade concludes that the gyrfalcon is the "dominant competitor" in Alaska because of its greater size and strength and because its early nesting "gives it first chance to settle on the available cliffs," but that the peregrine is "numerically more successful" over most of its Alaska range because it readily adapts itself to changing climatic conditions, is less exacting than the gyrfalcon in choice of nesting cliffs, has no difficulty in obtaining plenty of food all summer long, and escapes the arctic winter by migration.

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New Books

Biological and Medical Sciences

The Lower Animals. Living invertebrates of the world. Ralph Buchsbaum and Lorus J. Milne. Doubleday, Garden City, N.Y., 1960. $12.50. This volume ranges from the microscopic radiolarians to the giant squids, from spiders on high mountains to sea cucumbers. The illustrations include 292 photographs (many of them in color) and 23 drawings.

The Memoirs of Ray Lyman Wilbur. 1875–1949. Edgar Eugene Robinson and Paul Carrol Edwards, Eds. Stanford Univ. Press, Stanford, Calif., 1960. 703 pp. $10.

The World of Amphibians and Reptiles. Robert Mertens. Translated by H. W. Parker. McGraw-Hill, New York, 1960. 207 pp. Illus.

General

Common Sense about Africa, Anthony Sampson, 175 pp.; **Common Sense about the Arab World,** Erskine B. Childers, 192 pp.; **Common Sense about China,** Guy Wint, 176 pp.; **Common Sense about Russia,** Robert Conquest, 175 pp. Macmillan, New York, 1960. $2.95 each. "The aim of this series is implicit in its title. . . . The authors have been asked . . . to assume no special knowledge of the subject on the part of their readers . . . to write in a manner immediately intelligible to [anyone] of average education . . . and . . . to be as objective as . . . possible."

Can We End the Cold War? A study in American foreign policy. Leo Perla. Macmillan, New York, 1960. 251 pp. $4.50.

China Crosses the Yalu. The decision to enter the Korean War. Allen S. Whiting. Macmillan, New York, 1960. 235 pp. $7.50.

The Squeeze. Cities without space. Edward Higbee. Morrow, New York, 1960. 367 pp. $5.95.

Wild Life in an African Territory. A study made for the Game and Tsetse Control Department of Northern Rhodesia. F. Fraser Darling. Oxford Univ. Press, New York, 1960. 168 pp. $4.

Reference and Bibliography

The International Dictionary of Applied Mathematics. W. F. Freiberger, Editor-in-Chief. Van Nostrand, Princeton, N.J., 1960. 1181 pp. Illus. $25. More than 8000 entries, prepared by 33 contributing editors, define terms and describe methods in the applications of mathematics to 31 fields of physical science and engineering. The volume contains a group of four foreign language indexes that alphabetically list the French, German, Russian, and Spanish equivalents of the terms defined and give their English equivalents. Typical entries are: "*ABAMPERE.* The *cgs electromagnetic unit* of current. It is that current which, when flowing in straight parallel wires 1 cm apart in free space, will produce a force of 2 dynes per cm length on each wire. One abampere is ten absolute amperes. (See *electromagnetic units.*)" "*ATOMIC ORBITAL.* See *orbital.*" "*GEODESIC COORDINATES (PARAMETERS) FOR A SURFACE.* Parameters u, v such that the curves $v =$ constant are a singly-infinite family of geodesics and the curves $u =$ constant are the *geodesic parallels* orthogonal to them." "*MACAULEY METHOD.* A method of simplifying the double integration procedure for calculating the deflections of beams of uniform cross section when the applied loading is discontinuous. Two constants of integration only are introduced. Junction conditions at points of discontinuity of loading $x = a$ are satisfied by integrating $x—a$ as a unit, and by extending all distributed loads to the right-hand end of the beam, introducing negative loads as needed." Entries vary in length from a line to more than a page, and many are illustrated.

Nuclear Reactors. Bibliographical series, No. 2. International Atomic Energy Agency, Vienna, Austria, 1960 (order from National Agency for International Publications, New York). 716 pp. $5. The 4118 items in this bibliography cover the relevant literature in English, French, Russian, German, Italian, Japanese, and certain other languages, published from 1947 to 1959. All items are classified by subject (ten categories) and are listed alphabetically, by title of the abstracted paper, within each category.