The effects of water restriction on renal mucoid materials in *Columba livia*.—Renal mucoids appear to facilitate the excretion of uric acid by avian kidneys. The location and types of avian renal mucoid materials have been demonstrated in chickens and canaries by Longley et al. (1963, Ann. New York Acad. Sci. 106: 493) and in pigeons by McNabb et al. (1973, Auk 90: 14). In the species investigated, these materials consist of glyco- and mucoproteins and acid mucopolysaccharides in the cells and lumina of the distal parts of the nephrons and in the ureters. McNabb et al. (ibid.) found that dietary protein content did not affect the sites of mucoid secretion or the types of mucoids secreted in histological sections of pigeon kidneys, and concluded on the basis of physiological evidence that total renal mucoid production was increased when uric acid excretion increased with increased protein intake. It is important to note that pigeons with water available *ad libitum* increase total urate excretion by increasing urine flow with no increase in urinary uric acid concentration (McNabb et al. ibid.).

The objective of the present study was to test the effects of water restriction on renal mucoid materials in pigeons. To do so, we adapted White King pigeons to four dietary-water regimes using high protein (HP; ground soybean diet, 44% protein) or low protein (LP; wheat seed, 11% protein) diets in combination with *ad libitum* water availability (AW) or minimum water requirements (NW). Thus the four regimes were HPAW, LPAW, HPMW, and LPMW. All birds received a veterinary vitamin-mineral supplement with their food. Stable body weight was the criterion for considering a bird adapted to a regime. The birds were decapitated and bled; the kidneys were removed immediately and fixed for 48 h in neutral buffered formalin, then embedded in paraffin, sectioned, and stained as described by McNabb et al. (ibid.) using three histochemical stains specific for mucoid materials (Periodic Acid Schiff(PAS)-hematoxylin, Toluidine blue, and Alcian blue). For each stain, three slides per bird (one from each kidney lobe) were examined and stain intensity was rated on an arbitrary 5-point scale from absent to very intense. All sections on a slide were scanned before rating the staining intensity for that slide.

Mucoid materials (muco- and glycoproteins, acid mucopolysaccharides, and sulfur-bearing carbohydrates) were present in the distal portions of the nephrons (collecting ducts in both cortical and medullary regions) and in the ureters of birds on all four dietary-water regimes. Mucoidal materials were present in both the cells and the lumina of these structures. The pattern of greatest stain intensity in the most distal parts of the system (ureters $>$ ureteral branches $>$ medullary collecting ducts $>$ cortical collecting ducts) was consistent for all four regimes. Tabulation of the intensity ratings indicated no differences in stain intensity between AW and MW groups on either type of diet.

These results support previous studies regarding the distribution and types of avian renal mucoids and the idea that they stabilize colloidal urates (McNabb 1974, Comp. Biochem. Physiol. 48A: 45) and act as physical lubricants in facilitating uric acid elimination. This conclusion is based on the highest concentration of mucoid materials existing in the most distal parts of the nephrons, where the highest concentrations of uric acid would occur. The lack of differences in mucoid concentration (staining intensity) between AW and MW groups in the present study seems to suggest that mucoid production is directly proportional to urine flow. If low urine flow combined with high urate excretion resulted in increased mucoid production, staining intensity should be greatest in MW groups, especially HPMW. Likewise high urine flow rates should cause "wash-out" of mucoids in

the tubular lumina in AW groups, especially LPAW. The lack of differences between regimes in staining intensity in the tubule lumina suggests that mucoids are secreted by the distal parts of the nephron at rates proportional to the urine flow. This would result in constant amounts of mucoid in the system at any time on any regime, i.e. the situation that occurred in this study. This idea does not conflict with the hypothesis that mucoids in the distal part of the nephron facilitate uric acid excretion; it merely suggests that mucoid production/secretion rates are not positively responsive to conditions of high uric acid concentration and low urine flow. Thus the apparent increase in urinary mucoid production of pigeons on an HPAW regime observed by McNabb et al. (ibid.) was probably due to high urine flow rates rather than to a direct effect of the high protein diet.

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Band-tailed Gull photographed in Florida.—On 6 June 1970 during a summer bird census at Marco Island, Collier County, Florida, the author and Brian J. Catley found a black-backed gull resting with several Laughing Gulls, *Larus atricilla*, at the edge of a partly filled-in marsh in a resort housing development. We were able to drive up to within 20 feet of the bird and could see that it was only slightly larger than the Laughing Gulls. Closer inspection showed the legs were a bright yellow. The heavy bill was also yellow and had a red tip. In the color slide two narrow blackish blotches were noted on the maxilla within the area of the red tip. The eyes were dark, but the eyelid color was not noted. The head and underparts were pure white, the mantle a slatey black. The secondaries had a narrow white edge that could be seen as the bird flew away from us. There was no white in the tips of the primaries. The white tail had a terminal black band that was slightly wider in the midline.

From color photographs taken by Catley, George E. Watson and Richard L. Zusi of the Smithsonian Institution identified the bird as a Band-tailed Gull, *Larus belcheri*, of South America. Watson comments that the secondaries show some signs of wear and also that the mantle has a brownish cast. The latter characteristic points to the Pacific race, *L. b. belcheri*, but the whiteness of the head and the absence of a gray wash at the base of the neck and extending around to the breast point strongly to the Atlantic race *L. b. atlanticus* Olrog. However, it is not possible to determine the race with certainty as the color of the underwing coverts was not noted (white in *atlanticus*, gray in *belcheri*, Olrog 1967, Condor 69: 42). The blackness on the bill indicated closeness to full breeding plumage. Watson comments that by June individuals of the Atlantic race should be in winter plumage, i.e. head mottled with gray and a black spot on the bill. This might be construed as evidence that the bird was physiologically unusual and therefore acclimatized to Northern Hemisphere seasons, possibly from captivity. However, Olrog (op. cit.) noted a tentative record in May in Panama (Pacific side, presumably *belcheri*) in which the individual also had a white head. The tail feathers should be tipped with white, but the lack of white could have been caused by wear.