

Color Phases of the Screech Owl between Madison, Wisconsin, and Freeport, Illinois.—Between June 8, 1932, and March 27, 1950, a period of 18 years, I made 693 trips between Madison, Wisconsin, and Freeport, Illinois. These trips were uniformly distributed throughout the year. A total of 235 Screech Owls (*Otus asio*) killed by cars was examined. The distance between the above cities is 70 miles, of which 13 miles are in Illinois. It is of interest that approximately 75 per cent of the owls were found in Green County, Wisconsin, the road passing for the most part through what was originally rolling prairie. Here the owls were confined to farm buildings and the surrounding planted trees.

Pure gray birds were common but pure red birds were much less so. It was sometimes difficult to classify the intermediate phases, particularly the birds in juvenal plumage. The number in each of the two color phases is given in the following table:

| Year | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 |
|-------|------|------|------|------|------|------|------|------|------|------|
| Red | 6 | 4 | 4 | 1 | 4 | 3 | 3 | 15 | 3 | 7 |
| Gray | 8 | 1 | 5 | 6 | 12 | 9 | 3* | 20 | 8 | 7 |
| Total | 14 | 5 | 9 | 7 | 16 | 12 | 6 | 35 | 11 | 14 |

* including one melanistic

| Year | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | Grand Total |
|-------|------|------|------|------|------|------|------|------|------|-------------|
| Red | 6 | 5 | 4 | 4 | 3 | 6 | 4 | 8 | 1 | 91 |
| Gray | 13 | 12 | 10 | 10 | 7 | 4 | 7 | 2 | 0 | 144 |
| Total | 19 | 17 | 14 | 14 | 10 | 10 | 11 | 10 | 1 | 235 |

The red phase formed 38.7 per cent and the gray phase 61.3 per cent of the total. Over 60 years ago, C. F. Carr (Wis. Naturalist, 1891, 1: 188) published a note at Madison stating that he had handled over 25 specimens from Wisconsin and had never met with the gray phase; also that the broods of young that he raised all acquired the red phase. If Carr's information is correct, there has been a radical local change, for the gray phase now predominates. J. H. Fleming (Auk, 1907, 24: 74) wrote from the vicinity of Toronto, Canada: "The red phase of plumage is rare, usually occurring for several years in succession and then disappearing." At no time during the period of my investigation did the red phase disappear. Furthermore, the number of specimens examined each year is too small to determine if there is a definite statistical difference between the two color phases from one breeding season to another.

An owl in the melanistic phase was found on the concrete road in Stephenson County, Illinois, on October 28, 1938. It had been flattened to a sheet by the traffic and would have been difficult to recognize as a Screech Owl if the feet had not remained attached. At a distance of a few feet the plumage appeared to be deep black but on closer inspection the color was sooty. This color phase appears to be very rare.—A. W. SCHORGER, *University of Wisconsin, Madison, Wis.*

Aspergillosis, Trichomoniasis, and Drug Therapy in a Gyrfalcon.—Fungal infections in birds and mammals are common. In birds, the species involved is generally *Aspergillus fumigatus*.

As a protozoan parasite of birds *Trichomonas gallinae* (Stabler and Herman, 1951), a flagellated inhabitant of the upper digestive tract and viscera, has few peers with respect to destructiveness.

The stimulating effect of certain antibiotics on protozoa and fungi is well known. *Trichomonas hominis* (Kleeberg and Birnbaum, 1950) and *Tetrahymena geleii* (Nardone and Blaszczyński, 1952) increased in numbers under the influence of aureomycin and streptomycin respectively.

Similarly, Seligmann (1952) described the enhancement of virulence of *Candida albicans* by aureomycin, and Wybel (1952) reported a fatal spinal cord mycosis ("probably due to *Aspergillus*") following penicillin therapy. In the Journal of the American Medical Association the editors (1952), and Kligman (1952) discuss the growing belief in the stimulation and increase of virulence of fungi following the administration of wide-spectrum antibiotics. In addition, Orié (1952) stresses "an underlying debilitating disease" as the basis for moniliasis of the human respiratory tract.

The case of a Gyrfalcon (*Falco rusticolus candicans*) which had all four of these influences seems worthy of record. It had protozoal (*Trichomonas gallinae*) and fungal (*Aspergillus fumigatus*) infections, an additional debilitating condition (severe wing bursitis), and experienced antibiotic (aureomycin) therapy.

In the fall of 1951 the Gyrfalcon landed on a ship which was some two days out of England, bound for the United States. It was eventually given to Col. R. L. Meredith, who trained it for falconry, and it passed an uneventful winter.

The following May (1952) its left wing was seen to have suddenly drooped, the bird refused to fly and became progressively weaker, though the appetite remained fairly good. The wing became worse, and 50 mg. of aureomycin per day for three days were administered. There was no improvement, and vitamin B₁ was injected in early June. This was followed by 50 mg. of aureomycin a day for two days, with a continued decline in the bird's condition by late June. By early July the falcon had become quite weak and listless, with virtually no appetite.

At this point the bird was sent to the writers, arriving in the morning of 11 July 1952. During that day, although attached to its customary perch, it sat hunched on the ground, eyes closed, refusing all food. Its breathing was quite labored and wheezy, the slightest exertion resulting in violent breathing efforts. Death intervened at 7:00 p.m. the day of arrival.

At necropsy the following was observed: the bird appeared to be an old one. It was in extremely poor condition, the pectoral muscles being drastically reduced. Undetermined mallophaga were numerous on the head and neck.

In the upper digestive tract the mouth was clean but for a small spot of doubtful etiology on the roof. The saliva was swarming with *Trichomonas gallinae*. The oesophagus and stomach were devoid of pathology. The crop, on the other hand, was completely closed off at the point where it joined the glandular stomach. The stricture was due to a tightly adherent, 10 mm. thick caseous formation which all but encircled the passageway. This firm mass extended some 4 cm. up the crop wall and surrounded the lumen like a ring, closing it and making the passage of food impossible. This type of caseation (called canker) is common in *T. gallinae* infections, and may occur in various places in the avian host. This organism was recovered in abundance from the Gyrfalcon's crop contents.

The abdominal viscera showed no pathology.

The respiratory and air-sac systems proved to be variously and severely infected with a fungus, *Aspergillus fumigatus*. Numerous colonies were observed on the surfaces of the thoracic air sacs, with more being found in the left sac which was completely lined with a thick, tough growth showing scattered patches of dark spores. Both passages to these sacs were likewise lined with sheets of *Aspergillus*, but were not occluded. The abdominal air sacs did not appear to be involved.

The left bronchus was completely occluded by a plug of fungus 2 cm. in length and lying just distal to the bifurcation. There was considerable extension of the aspergillosis into a bursal sac found in the left shoulder. Further, an elongated cyst lying in the muscle parallel to the posterior edge of the left humerus contained pus cells and fungal hyphae. The right shoulder was normal.

The trichomonads from the Gyrfalcon's crop were placed in the mouths of five *Trichomonas*-free homing pigeons. Only one survived. At necropsy 46 days after infection this pigeon showed evidence of having survived severe hepatitis typical of *T. gallinae* infection. The other four died of acute trichomoniasis, showing extensive caseation of the liver. This Gyrfalcon, then, harbored a very virulent strain of this flagellate.

The exact sequence of events which led to this falcon's death is difficult to determine. The bird certainly was under a variety of influences, which may have had important effects upon one another. Subsequent to capture it had been fed many pigeons, in all probability thereby acquiring its *T. gallinae* infection at an early phase of its captivity. Yet it manifested no symptoms of trichomoniasis through the winter months. If it had *T. gallinae*, were these organisms caused to increase or to become more virulent under the influence of the aureomycin? Certainly the trichomonads recovered from the crop at death were quite virulent.

The Gyrfalcon's left wing injury was severe. It was acquired probably during bating (the jumping of a hawk from the fist or perch while restrained by the leg straps—jesses). Antibiotics and debilitating conditions are indicated as contributing to resident fungal upsurge. This bird had most severe fungal involvement at death. As debilitating influences it had trichomoniasis (disease) and a shoulder sprain (injury), and it received antibiotic therapy (aureomycin). Since aspergilli are quite widespread in birds it is very likely that the *A. fumigatus* antedated all the above conditions.

What, step by step, led to the fatal condition seems difficult to state. It would appear wise, however, to caution against the empirical use of antibiotics in the light of the side effects so often attendant upon their administration. In man, the patient is usually under, or has just received, treatment with large doses of antibiotics at the time of fungal upsurge. In the present case, even though the dosage of aureomycin was not large and was given some weeks prior to death, the antibiotic might have tipped the balance from chronic to acute disease (trichomoniasis and/or aspergillosis).

The writers are most grateful to Ruth R. Pearson, bacteriologist at Glockner-Penrose Hospital, Colorado Springs, and to Dr. Kenneth B. Raper, Northern Regional Research Laboratory, Peoria, Illinois, for the determination of the Gyrfalcon's fungus.

LITERATURE CITED

- EDITORIAL. 1952. Fungus infections complicating antibiotic therapy. Journ. Amer. Med. Assoc., 149: 762-763.
- KLEEBERG, F., and D. BIRNBAUM. 1950. Effect of aureomycin on *Trichomonas intestinalis hominis*. Nature, 166 (4232): 989.
- KLIGMAN, A. M. 1952. Are fungus infections increasing as a result of antibiotic therapy? Journ. Amer. Med. Assoc., 149: 979-983.
- NARDONE, R. M., and H. J. BŁASZCZYŃSKI. 1952. The effect of streptomycin, streptobiosamine and streptomine hydrochloride on *Tetrahymena geleii*. Proc. Soc. Protozool., 3 (Sept.): 12.

- ORIE, N. G. M. 1952. *Candida (Monilia)* infection of the respiratory tract. *Dis. of the Chest*, 22 (1): 107-117.
- SELIGMANN, E. 1952. Virulence enhancing activities of aureomycin on *Candida albicans*. *Proc. Soc. Exp. Biol. Med.*, 79: 481-484.
- STABLER, R. M., and C. M. HERMAN. 1951. Upper digestive tract trichomoniasis in Mourning Doves and other birds. *Trans. 16th N. Amer. Wildlife Conf.*, pp. 145-163.
- WYBEL, R. E. 1952. Mycosis of cervical spinal cord following intrathecal penicillin therapy. *Arch. Path.*, 53 (2): 167-171.

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Ornithology in Barton's Medical and Physical Journal.—In the outstanding bibliographical contributions of Elliott Coues, Barton's magazine either is unnoticed or is labelled "not seen." It was a notable periodical for its time and deserves remembrance. Its title in full is: "The Philadelphia Medical and Physical Journal. Collected and arranged by Benjamin Smith Barton, M.D." All of it was published at Philadelphia. A collation of the volumes and parts is:

- Vol. I. Part I. 1804. x + 185 pp.
 Vol. I. Part II. 1805. vii + 192 + viii pp.
 Vol. II. Part I. 1805. xii + 208 pp.
 Vol. II. Part II. 1806. ix + 209 + [10] pp.
 Vol. III. Part I. 1808. viii + 190 pp.
 First Supplement. March 1806. [3] + 98 + [1] pp.
 Second Supplement. 1807. pp. 103-201.
 Third Supplement. May, 1809. iv + pp. 207-312.

The periodical included some plates, but they are lacking in the set examined. Disregarding the convention of brackets indicating that the name of the author has been supplied, it may be stated that only the last of Barton's contributions here listed was signed with his name; the others were "by the Editor."

Barton, Benjamin Smith.

Facts relative to the food of the hummingbird. I (I), 1804, pp. 88-89. (Takes insects and spiders as well as nectar.)

Note on the natural history of the substance called Guano. II (I), 1805, pp. 66-68. (Compiled.)

Ornithology. II (I), 1805, pp. 161-164. (Magpie taken on the Lewis and Clark Expedition; canvasback on the Susquehanna by his brother Matthias Barton; wild-celery as food of that species; wild turkey.)

Ornithology. First Supplement, March 1806, pp. 67-68. (Anhinga; charcoal for fattening poultry.)

A discourse on some of the Principal Desiderata in Natural History, and on the best means of promoting the Study of this Science, in the United-States. III (I), 1808, pp. 165-175. (Old accounts of torpidity of hummingbirds.)

Bartram, William

Anecdotes of an American crow. I (I), 1804, pp. 89-95. (Traits of a bird reared by hand: tractable, benevolent, docile, humble, prone to imitation, had an excellent memory, mischievous.)

Description of an American species of *Certhia* or Creeper. I (II), 1805, pp. 103-106. Pl. I. (The brown creeper; no binomial name.)