days. The "dyeing" of the gut coils, kept in upright stoppered test-tubes, appeared after one day on the top end, progressing toward the bottom. No reagent other than ascorbic acid was added, and heating did not accelerate the reaction. The red color was stable for several weeks, then turned gradually brown. The liquid stayed entirely clear and colorless.

This color development took place when the ascorbic acid was dissolved in absolute or in 95 per cent. U. S. P. ethanol, or in a mixture of ethanol-isopropanol 4:1, containing 5 per cent. water, not however in absolute methanol or in water. In the latter two solvents a brown discoloration of the gut was obtained, similar to, though weaker than that developing from the red color. With xylol as medium no visible reaction took place.

The alcoholic or alcoholic-aqueous systems employed cause gut to soften and swell (non-boilable catgut), the final stage being reached within one week. Collagen contains available amino groups whose number may be gradually increased when swelling. The fact that the color is found exclusively on the gut strands and not in the liquid media, suggests the reaction of the ascorbic acid to take place with insoluble reactive groups ($-NH_2$) of the protein, ruling out ammonia in the case of gut.

The oxidation of the ascorbic acid may be attributed to air oxygen, evidenced by the progression of the color from the top, near the liquid-air interphase, toward the bottom.

Koppanyi *et al.* have pointed out that the color is less stable in water than in alcohol (supposedly ethanol). This and the lesser stability of ascorbic acid in water and apparently methanol can explain the failure of the red color to appear in these solvents. In xylol gut does not swell nor soften (boilable catgut), and the solubility of ascorbic acid is low if not zero, hence no reaction takes place. Qualitative tests for ascorbic acid according to Szent-Györgyi (Merck Index 3955), carried out under same conditions for all systems, were positive after a three-day period in all solvents, except in methanol (destruction?) and in xylol (insolubility?). A number of other reducing agents or sugars did not cause this color development with catgut. The reaction of ascorbic acid with other proteins has not been studied, but may furnish some information as to their characteristics.

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HOMING, MIGRATION AND INSTINCT

PLATT and Dare, under the heading "The Homing Instinct in Pigeons" in your issue of April 27, 1945 (p. 439), express the belief that it is more reasonable to "explain the homing and migratory habits of birds by assuming that they use familiar landmarks, together with simple geographical, meteorological and ecological relationships rather than that they possess a new sense organ." They describe recent experiments in the homing of pigeons and point out that their results suggest that training and familiarity with landmarks are integral factors in the successful return of birds to their lofts.

While this opinion corroborates, in essence, the views expressed by earlier investigators of homing in pigeons,[1] it should be pointed out that the coupling of the words "homing" and "migration," as though they were different manifestations of a single phenomenon, appears to be unwarranted. Pigeons have been used often enough as "guinea-pigs" of the air in attempts to elucidate questions of migration (the physicist, Kelvin, being possibly the first to have done so) yet their very success as homing agents rests primarily on the fact that they are entirely devoid of any migratory instinct. One can not, in fact, argue legitimately from the homing habits of pigeons to the migratory ways of other species.

That the generalization made by Platt and Dare can not be upheld is evidenced in the first annual migrations of the young of numerous species of birds which undertake their initial fall journey without knowledge of landmarks or the chaperonage of adults. The young of our cowbirds, for instance, or European cuckoos, reach their predestined wintering grounds without either parental or foster-parental guidance, while certain species of the flightless penguins migrate annually by swimming from the antarctic to South America and back with infallible precision, through a murky ocean from which they are presumably incapable of getting bearings and on which there exist no landmarks.

On November 9, 1940, approximately a month after the last resident crow had gone south, I liberated 54 young crows of the year near Edmonton, Alberta, from the area on which they had been hatched and subsequently trapped as juveniles in July and August. They were merely held in a spacious flying cage during the intervening period; no adults were with them. By November 20 over 50 per cent. had been retaken, the furthest 250 miles southeast of the point of liberation on a line directly joining Edmonton and central Oklahoma, the wintering ground of 95 per cent. of Alberta crows. None of the birds recovered had deviated materially from this line and some of them were traveling at 50 miles per day, a remarkable rate for crows. The temperature was below zero F. and the ground blanketed with snow.

[1] *E.g.*, B. B. Riviere, Verhandlungen des VI. Internat. Ornithologen-Kongresses, Kopenhagen, 1926.

On this, their first southward migration, these birds were doing the opposite to homing: they were deserting their birthplace for a destination that could have been known to none of them and over territory on which not a single landmark could have raised familiar memories or been previously observed.

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SCIENTIFIC BOOKS

ELECTRICITY AND RADIO

Basic Electricity. By WILBUR L. BEAUCHAMP and JOHN C. MAYFIELD. viii + 312 pp. Illustrated. Chicago: Scott, Foresman and Company. 1943. $1.60.

Fundamentals of Electricity. By WILLIAM H. JOHNSON and LOUIS V. NEWKIRK. x + 212 pp. Illustrated. New York: The Macmillan Company. 1943. $2.00.

Fundamentals of Electricity. By CHARLES E. DULL and MICHAEL N. IDELSON. xx + 456 pp. Illustrated. New York: Henry Holt and Company. 1943. $2.00.

Fundamentals of Electricity. By MORTON MOTT-SMITH. 64 pp. Illustrated. Pittsburgh: Westinghouse Electric and Manufacturing Company and Science Service, Inc. 1943.

Electricity and Its Application to Civilian and Military Life. By CHARLES A. RINDE. xii + 466 pp. Illustrated. New York: Harcourt, Brace and Company. 1943. $2.50.

Prepare Yourself. By LAWRENCE F. TULEEN, GEORGE S. PORTER and ARTHUR HOUSTON. vi + 298 pp. Illustrated. Chicago: Scott, Foresman and Company. 1943. $.96.

Shop Job Sheets in Radio. By ROBERT NEIL AUBLE. Book I—*Fundamentals,* vi + 134 pp. Book II—*Service Problems,* x + 128 pp. Illustrated. New York: The Macmillan Company. 1944. $1.50 each.

Practical Radio and Electronics Course. By M. N. BEITMAN. (3 volumes) 368 pp. Illustrated. Chicago: Supreme Publications. 1943. $3.95.

AT the beginning of the present war, it was obvious that the armed forces would make wide application of the amazing developments of the past two decades in the field of electronics. It was also obvious very early in the conflict that there was a great lack of individuals trained to operate the new highly specialized and rather complicated equipment. This lack was partly caused by the failure of most educational institutions to afford proper emphasis to electronic devices and instruments in their laboratory courses. While courses in applied electronics had been introduced in many schools, the general attitude was that the work was not too important and consequently did not enjoy the wholehearted support of many of the educators.

Fortunately, once the new electronic equipment has been designed, engineered and built, its operation is relatively simple and can be entrusted to relatively unskilled personnel. The armed forces were then faced with the necessity of giving a training program to a large group from whom this operating personnel could be selected. For such training programs, most of the available texts were utterly unsuitable in that either the treatment followed the conventional lines of logical presentation common to most college-grade text-books or the treatment in the usual high-school text was too elementary. To fulfil the need, a number of texts were prepared all according to a definite specification as to the subject-matter, method of treatment, etc. The above listed texts were some of the books written for this purpose.

As would be expected from the fact that these books were designed to definite specifications, the treatment is similar in arrangement, scope, etc. In all these books, the subject of magnetism and electricity is treated before the subject of mechanics, with the result that the conventional treatment based on mechanics is not possible. Another result of this is that the scope of the numerical problems which can be assigned is definitely limited, particularly in not making it possible to stress the energy relations which exist in electrical circuits. Here again, since the books are designed to "train rather than educate," the loss is not too serious. In all the books, considerable emphasis is placed on the subject of electro-chemistry, as applied to primary and storage cells. The main difference between the various books lies in the selection of examples, photographs and diagrams, and in this respect all of the books are very good.

"Basic Electricity," by Beauchamp and Mayfield, and "Fundamentals of Electricity," by Johnson and Newkirk, are very similar in many respects and are definitely elementary in their treatment. The first of these books actually describes many experiments with detailed instructions on the making of the apparatus for the experiments. "Fundamentals of Electricity," by Dull and Idelson, is just slightly more advanced and more emphasis is placed on numerical problems and formulae. "Fundamentals of Electricity," by Morton Mott-Smith, was prepared by the Westinghouse engineers and looks rather more like a collection of reprints from popular magazine articles than a text-book. It is, however, especially good in containing a large number of excellent sketches and photographs. "Electricity and Its Ap-