OUR ASTRONOMICAL COLUMN.

PARALLAX OF BARNARD'S "RUNAWAY" STAR.—In the Journal of the British Astronomical Association for April, it is stated that Prof. Schlesinger, of Allegheny, has found a parallax of 0·52″, and a proper motion in R.A. of −0·73″ for the "runaway" star discovered by Prof. Barnard (NATURE, vol. xcviii., p. 196). Dr. S. A. Mitchell's value for the parallax is 0·47″, and that found at Yerkes Observatory by Dr. Lee is 0·55″. The true value is evidently very close to half a second. The star thus appears to come second to α Centauri in point of distance, but is the nearest known star which is visible in our latitudes.

DISTRIBUTION OF STARS OF TYPE O.—The important investigations of Prof. Charlier on the distribution and motions of stars of type B (NATURE, vol. xcviii., p. 116) have been extended to stars of type O by W. Gyllenberg (*Arkiv för Matematik*, vol. xi., No. 28). The general principle of the method is that if the temperature and radius be supposed constant for a given class of stars, the distance of each individual star is given by $r = R.10^{0·2m}$, where m is the apparent magnitude, and R is the distance corresponding to apparent magnitude zero. In general, R is determined from the proper motions and radial velocities, but alternative methods have been employed by Dr. Gyllenberg for stars of type O (Wolf-Rayet stars). The extension in space and the velocity distribution show a close relation to the B stars, as would be expected if the two classes are contiguous in the spectral sequence. The absolute magnitude of the O stars is −2·78, this being the magnitude at a distance of 1 siriometer (= 10^6 astronomical units). This result is in close agreement with Charlier's value −2·45 to −4·78 for the successive sub-classes of the B stars. The O stars, however, show a much larger extension than those of type B in the galactic plane. The density of O stars in the neighbourhood of the sun is 0·0000176 per cubic siriometer.

A similar investigation for A stars has been made by K. G. Malmquist and for F stars by C. F. Lundahl.

THE MINIMUM RADIATION VISUALLY PERCEPTIBLE.—The recent results of Ives with regard to the least quantity of radiant energy capable of producing the sensation of light (NATURE, vol. xcviii., p. 216) have been further investigated by Prof. H. N. Russell (*Astrophysical Journal*, vol. xlv., p. 60). As before, the metre-candle is taken to be of stellar magnitude −14·18, while a source emitting light of wave-length 0·55 μ, and appearing like a star of the 6th magnitude, is regarded as radiating energy at the rate of $1·35 \times 10^{-8}$ ergs per sec. per sq. cm. The modified factors are those referring to the diameter of the pupil of the eye, and to the stellar magnitude of the faintest visible object. Steavenson's estimate of 8·5 mm. is adopted for the former, and the limiting magnitude is now taken to be 8·5, from observations made by H. D. Curtis and the author. Since a star of magnitude 8·5 gives only one-tenth as much light as one of the 6th magnitude, it follows that the amount of energy which would enter the eye from a light source of maximum efficiency, and of magnitude 8·5, is $1·35 \times 10^{-8} \times 0·57 \times 0·10$, or $7·7 \times 10^{-10}$ ergs per sec. This is regarded as the best available approximation to the true *minimum visibile*. According to this estimate, the minimum perceptible radiation corresponds to the reception by the eye of about 200 elementary quanta of radiation per second, or of one erg in forty years.

WHALEBONE WHALES OF NEW ENGLAND.[1]

WITH a record of many previous American authors who had studied the whalebone whales of the eastern shores of the United States, it was no easy task for Mr. G. M. Allen to produce anything novel in this monograph. Yet the systematic manner in which he has handled the whole subject, from synonymy to enemies and parasites, renders the memoir both interesting and instructive, especially in connection with the habits, appearances in life, disposition, food, breeding, commercial value, parasites, and capture.[2] Some general questions are also dealt with, such as the notion of Ryder, the late able investigator of the fishes, that the tail-flukes of whales probably represent degenerate hind feet, not the whole limb, as Gray and some earlier authors held; whereas Owen, Huxley, Flower, Parker, and Claus were of opinion that the whole hind limb was (externally) suppressed or atrophied, and that flukes and dorsal fin had been secondarily added. The author's countryman, Gill, also thought that the flukes were derived from the greatly hypertrophied integument of the hind limbs, analogous to the hind limbs of the eared seal, whilst the osseous elements have been atrophied, basing this supposition on the fact that the dorsal and ventral vessels are distinct, and that the *crus*, when present, is in the line of the flukes.

On the shores of New England (that is, from the Bay of Fundy to Rhode Island, or thereabout) six well-known forms occur, viz. the Atlantic right whale (*Eubalaena glacialis*, Bonnaterre), the common rorqual (*Balaenoptera physalus*, L.), the "sei," pollack, or Rudolphi's whale (*B. borealis*, Lesson), the great blue whale, or Sibbald's rorqual (*B. musculus*, L.), the little rorqual, or piked whale (*B. acutorostrata*, Lacépède), and, lastly, the humpback whale (*Megaptera nodosa*, Bonnaterre).

The author takes each species in succession, and deals with it systematically, structurally, and under the other heads already noted. Thus, under the Atlantic right whale, which probably sweeps from pole to pole, the vestigial femur, with its ligamentous rod (tibia?), and the occasional double-headed first rib are noted. It is lively when harpooned, rolling over and over so as to wind the line round its body, and, it may be, upsetting the boat and injuring its crew, or in its active movements striking the boat with its "bonnet" (a process at the tip of the snout). Its numbers have diminished since the early settlers peopled these shores (1620), though they were numerous in 1700, when twenty-nine were killed in one day. Now they are scarce. Its migrations northward and southward, its food (chiefly Thysanoëssa and Calanus), and its breeding are described. In clearing up the synonyms of the next species, the cosmopolitan common rorqual, the author has done good service; and he appears to agree with Kükenthal that it is the third finger which is absent in the *manus*, and not the thumb, since two branches of the median nerve go to the space between the second and third digits. The only trace of a hind limb is a papilla on each side of the anus in the fœtus. In addition to the movements recorded, this finner, in a calm and glassy sea, when reconnoitring, will quietly push its head nearly horizontally out of the water and examine, for instance, a boat with its occupants, and then slip underneath

[1] "The Whalebone Whales of New England." By G. M. Allen. Memoirs of the Boston Society of Natural History, vol. viii., No. 2, pp. 107–332, 16 plates and various text-figures. (Boston, September, 1916.)

[2] The American records of stranded as well as captured whales are creditable so far as they go; but the recently instituted system of notification by the British Government, acting through the staff of the British Museum, is more trustworthy.

almost without a ripple. A fishery for these whales began in 1810, and in 1887 a single ship captured about fifty in a year. The fishery continues still, the whole carcass being utilised, the flesh for feeding cattle, and part of it and the bones forming manure.

Rudolphi's rorqual, again, is rare, and its oil contains less stearine than in other whales. The baleen, however, is the finest of the series, and many of the blades are pure white. Sibbald's rorqual is likewise rare, and goes under the name of the "sulphur-bottom whale," though there is no ground for such a term from its actual coloration. Its fingers are indicated externally in the flipper, even in the fœtus, and the skull has a broader rostrum, agreeing in this respect with the small finner. Little is known of the age of such huge whales, yet the occurrence in the Antarctic seas of giant forms, approaching 90 ft. in length, of a species apparently identical with this would appear to support the view of long life. The small finner or little piked whale is not uncommon, but the author, in mentioning the plicæ of the throat, does not allude to their forking. He found this whale occasionally "breaching"—that is, leaping clear of the water—and that no "spout" was visible, thus in both features differing from the British representatives. Its food on the shores of the United States is chiefly capelin and herrings. Scammon described another closely allied species, viz. *Balaenoptera Davidsoni*, which the author rightly ignores. It refers only to the foregoing. In his account of the last species, the humpback whale, he gives a careful description of the coloration of the flippers (called "fins" throughout the memoir), the upper surface being chiefly white, but that the extent may vary with age, that of the Scotch example harpooned in the Tay in 1884, and described by Struthers, being entirely white. These huge organs (about 12 ft. long and 9 in. thick in a 40-ft. whale) are supposed by the author to be used for swimming, but in the example from the Tay they were used for sounding, especially when efforts were made to drive it on the beach. This form has a rudimentary femur. The vigour and tenacity of this whale and its frequent leaps during its gambols are remarkable. On the whole, the external characters, and even the internal and external parasites of these American Cetaceans, conform to the conditions found in our own waters, a result to be anticipated in forms possessing a range so extensive.

The memoir is illustrated by sixteen excellent lithographic plates and several text-figures, efforts being made even to show the fimbriæ on the edge of the powerful flukes of the humpback whale, but the small outline in this and other cases falls much short of the condition in Nature. Various tables of measurements and records of captures are also interpolated in the text. The Boston Society of Natural History and the painstaking author are to be congratulated on this monograph, which places in the hands of the public a succinct yet comprehensive account of each form occurring in the waters of New England.

W. C. M.

COMMERCIAL AERONAUTICS.

THE lecture delivered on May 30 at the Central Hall, Westminster, by Mr. Holt Thomas, on "Commercial Aviation," should awaken a considerable amount of interest in the commercial possibilities of aircraft after the war. The lecture was in effect a prelude to the meeting of the Civil Aerial Transport Committee, of which Lord Northcliffe is chairman, which has recently been mentioned in these columns. The serious consideration of commercial aeronautics will involve a great deal of scientific work, since the machines which will be necessary for commercial transport will differ in many ways from the types which have been developed to meet the demands of war. Speed will still be an important factor, though not of such paramount importance as in the military aeroplane. Mr. Holt Thomas pointed out that an aerial mail to Paris could be worked profitably at a charge of one halfpenny per ounce, the time of transit being about three hours, and this one instance is sufficient to show the great advantages which aerial transport could confer upon modern commerce. The influence of winds would necessarily render such a mail service more erratic than those now in operation, but the greatly increased speed would more than compensate for this, especially in the case of journeys which now involve both land and sea transport. The question of passenger conveyance is much more complicated than the establishment of aerial mails, as it will be necessary to design machines to give a reasonable amount of comfort to the passengers, especially on the longer journeys. Such difficulties of design are by no means insuperable, and it is practically certain that passenger services will be established in the near future, especially to places not easily served by railway. As Mr. Holt Thomas remarked, the aeroplane could be used to develop outlying places until they grew sufficiently large to warrant the construction of a railway line. The aerial mail will probably come first, owing to the obvious benefits such a rapid service would bring, and to the fact that it would not involve any radical changes in the design of the necessary machines.

Mr. Louis Coatalen, the well-known designer of the Sunbeam Company, delivered an interesting lecture on "Aircraft and Motor-car Engine Design" on May 16 before the Aeronautical Society. He commenced by pointing out the wide differences between the aeroplane engine and the type of engine previously developed for motor-cars. The chief desiderata in the aeroplane engine are lightness and the ability to work continuously at maximum power, and these considerations scarcely affect the design of the car engine at all. The engines designed for racing cars are much more nearly analogous to the aircraft type, and the lecturer remarked that the experience gained on such racing engines was of great value in the early days of aeronautics. The extent to which design had progressed was illustrated by the fact that in two years the weight of aeroplane engines had been reduced from 4·3 to 2·6 lb. per horse-power, and that without sacrificing trustworthiness. The question of valve design received a good deal of attention, the lecturer stating that in his opinion the best arrangement was to use two inlet and two exhaust valves, and to place the sparking-plug in the centre of the cylinder head. Coming from such an experienced and successful designer as Mr. Coatalen, the paper is full of valuable information, and should be read by all who are interested in light petrol motors, whether for aviation or for other purposes.

THE PAST WINTER.

WITH the publication of the Monthly Weather Report of the Meteorological Office for April observations are now complete for the five months December, 1916, to April, 1917, which embrace the abnormally cold and wintry period experienced generally over the British Islands. Temperature results are given in great detail in the reports and the data afford a most thorough examination of the exceptional character of the weather.

Cold conditions set in towards the close of November and continued until nearly the close of April. The report for December shows a deficiency of temperature everywhere in the British Islands, except at