that the cosmic component and the orbital component are both reduced in the same proportion in the interferometer. The mean factor of reduction is $k=0{\cdot}0514$. The azimuth of the observed effect is subject to a diurnal variation, produced by the rotation of the earth on its axis. The observed oscillations of the azimuth are in accordance with theory as to magnitude and time of occurrence, but for some unexplained reason, the axis of the oscillations is displaced from the meridian. In order to account for the results here presented, it seems necessary to accept the reality of a modified Lorentz-FitzGerald contraction, or to postulate a viscous or dragged ether as proposed by Stokes.

The results here reported are, notwithstanding a common belief to the contrary, fully in accordance with the original observations of Michelson and Morley of 1887, and with those of Morley and Miller of 1904–5. The history of the ether-drift experiment and a description of the method of using the interferometer, together with a full account of the observations and their reduction, has been published elsewhere[3].

[1] *Science*, **63**, 433; 1926. NATURE, **116**, 49; 1925.
[2] *Astrophys. J.*, March, 1927.
[3] *Rev. Mod. Phys.*, **5**, 203, July, 1933.

Treasures of Carniola*

By CHRISTOPHER HAWKES, British Museum

THE work which has given this brief essay its inspiration and its title stands for three things of outstanding importance to all interested in the application of science to human history. First, the unique value of the prehistoric treasures of Carniola and the surrounding provinces themselves, both in the narrower world of archæology and the broader one of man's history at large. Second, the devotion by the late Duchess of Mecklenburg of her great resources to their methodical excavation from 1905 to 1914, after the district had for many decades been pillaged by indiscriminate fossickers, and so amassing a collection not only of enormous wealth, but also of unspotted scientific purity. Third, the unparalleled feat of co-operation by which an American sale-room, acting for the late Duchess's daughter, has commissioned an international committee of prehistorians to work over the entire collection and perpetuate its authentic archæological groupings as lots in a free public sale in New York, at which it has been laid down that each lot is accompanied by its original inventory, excavation-records, plans, and other documents, the publication rights in each being reserved solely to its purchasers. The volume now before us is the catalogue which embodies the archæological committee's work, and in enabling its publication the American Art Association Anderson Galleries have caused an outstanding contribution to be made to prehistoric science.

The sale took place on January 26, and its results are still unknown to us. It is evident that much of the collection will never re-cross the Atlantic, and it is known that of the European countries whose national museums may be enriched by shares, Great Britain has decided not to be one. But it is to be hoped that the purchasers, whatever their nationalities, will faithfully discharge their manifest obligation to publish their lots, with their documentation behind them, in detail and without delay. The Mecklenburg sale may thus become an international precedent of the first importance in many scientific spheres.

The Duchess of Mecklenburg was born Princess of Windischgrätz, and came of a family long distinguished for services to archæology no less than to the Austro-Hungarian crown. By the greatest good fortune, their oldest estates in Carniola and Styria coincided with one of the richest and most important archæological centres in Europe. She deserved well of her heritage. For it is safe to say that her excavations form one of the greatest single contributions ever made to the early history of man in this Continent. How this is so is ably expounded in the long introduction to the catalogue by Dr. Adolf Mahr, who, it is needless to say, went to his present post in Dublin from Vienna.

The Early Bronze Age saw the birth of a round half-dozen of great cultural groupings in Europe, growing up in the earlier centuries of the second millennium B.C. Of these, Minoan civilisation dominated the Ægean from Crete. Italy received a Bronze Age culture linked through the Alpine lakes with the barrow-builders of west-central Europe; and north and east of these three a civilisation of many provinces but a single broadly-conceived character stretched from the Balkan and Dinaric mountains to Saxony and Silesia. Equilibrium at last grew into tension, and rather before 1000 B.C. the tension snapped. The aspect of Europe was in a short time transformed. The Minoan-Mycenæan civilisation crumbled to its downfall, accompanying upheaval in the Near East and all over south-eastern Europe. The Etruscans thereafter left Asia Minor for Italy, to lay the foundations of its future; while from the great East European culture-area beyond the mountains migrating tribes had come pouring out, pressing into the Balkan highlands, and down to the Ægean, debouching on to the head of the Adriatic, penetrating the Swiss and south German plains and valleys, and absorbing their peoples in a varied but essential continuum reaching to

* Treasures of Carniola: Prehistoric Grave Material from Carniola Excavated in 1905–14 by H.H. the late Duchess Paul Friedrich of Mecklenburg (*née* Princess Marie of Windischgrätz). Sold by Order of her Daughter, H.H. the Duchess Marie Antoinette of Mecklenburg. Catalogue compiled under the direction of Dr. Adolf Mahr (Dublin), assisted by Prof. Raymond Lantier (St. Germain), Dr. Gero von Merhart (Marburg a.d.L.), Mr. J. M. de Navarro (Cambridge), Prof. Balduin Saria (Ljubljana), Prof. Ferenc de Tompa (Budapest), Dr. Emil Vogt (Zurich) and others. Pp. x+131+33 plates. (New York: American Art Association, 1934.)

France and the British Isles. Meanwhile, from the south-east or east, there came into Europe the knowledge of iron.

The Early Iron Age that followed is the dawn of European history. The culture with which these great movements led it to open is round the Ægean called the Geometric, in Italy the Villanovan and Etruscan, and northwards of these the Hallstatt culture, from the great cemetery site in Upper Austria where it was first recognised, and where the Duchess of Mecklenburg in her turn came to excavate. East of the central Alps, the peoples of the Hallstatt culture were predominantly Illyrians. These Illyrians lay open to the east whence were coming the Scyths, they stretched down the Balkan Peninsula to the confines of Greece, they marched beyond the head of the Adriatic with Villanovan and Etruscan Italy, and to the north-west they mingled with the future Celts.

Carniola, where the routes from Greece and Italy meet, with the ways east and north and west lying open behind, is the key to the whole great nexus. Here, in cemetery after cemetery of surpassing richness, we can trace the development and appraise the character of the Hallstatt civilisation as never before, in the Duchess's great collection. It would be impossible to go into details here: the total number of excavated graves is estimated at more than 1,300, and a reckoning of 20,000 individual objects may be short of the truth. But if this mass of material, scientifically interpreted, helps us to understand the Hallstatt civilisation at its focal point, it opens our eyes to the unity of a great stretch of human history. For, linked as it was to Etruscan Italy and Geometric Greece, with the shadow of the old Mycenæan Empire behind them, the Hallstatt civilisation was spread out over barbarian Europe, to give birth to that of the Celts whose conquests in east and west made way for the Roman Empire, and to last on meanwhile in Carniola, and more strongly still in the lands to south-eastward, until it passed under that Empire itself. Standing here now, we can at once salute the spirit of Augustus and invoke the ghost of Agamemnon.

Obituary

Prof. J. Cossar Ewart, F.R.S.

THE death of Prof. James Cossar Ewart removes one who worked with distinction for more than half a century in the field of zoology and was a pioneer in the study of hybridisation and other problems of animal breeding.

Prof. Ewart was born at Penycuik, Midlothian, in 1851 and in 1871 entered the University of Edinburgh as a medical student. After graduating in 1874 he acted for six months as demonstrator of anatomy under Turner and was then appointed curator of the Zoological Museum in University College, London. Besides adding numerous preparations both of vertebrates and invertebrates to the collection, he assisted Lankester, who had been appointed professor in University College in 1874, to organise the first course of practical zoology in the College, and in the absence of his chief in the summer of 1878 he was in charge of this class. During this period Ewart published papers on the structure of the lens and retina, on points in the anatomy of the lamprey and on the life-history of lower organisms, including *Bacillus anthracis*, and for this last work, presented as a thesis for the degree of M.D. (Edin.), he was awarded a gold medal.

At the end of the summer term of 1878 Ewart returned to Edinburgh and became a lecturer in anatomy in the extra-mural School of Medicine, but after about two months in this office he was appointed professor of natural history in the University of Aberdeen and began his work there in January 1879. In the same year he established a small marine zoological station near Aberdeen—the first marine laboratory in Britain—in which he and others conducted investigations during the next three years. The most notable product of the station was the material for the Croonian lecture of 1881, by Ewart and Romanes, on the locomotor system of echinoderms.

After three active years in Aberdeen, Ewart was appointed, in succession to Wyville Thomson, to the chair of natural history in Edinburgh, which he held for forty-five years—1882–1927. He reorganised the class of practical zoology, hitherto optional and attended by only a small proportion of the students, and established a more advanced practical course for students who were specially interested in zoology. He further developed the teaching and research in his Department by the institution of lectureships in embryology (in 1885, held first by George Brook and afterwards for twenty-six years by John Beard), in invertebrate zoology (1901) and in heredity and genetics (1910, to which Arthur Darbishire was appointed).

In 1882 Ewart became scientific member of the Fishery Board for Scotland, and during the next seven years was the author or joint author of about a dozen papers and reports on fisheries subjects including the natural history of the herring. Then followed the series of well-known papers, from 1888 until 1895, on the electric organ of the skate (*Raia*) and on the cranial nerves and lateral sense organs of this fish and *Læmargus*. He showed that the electric organ of the skate, discovered by Dr. James Stark of Edinburgh in 1844, was a developing and not a degenerating structure, and that in its most primitive condition, as seen in *Raia radiata*, the muscle fibres from which the electric elements are formed are less modified than in other species, and that in *Raia batis* the modification has proceeded so far that the adult electric organ presents little trace of its relation to muscular tissue.

Ewart's investigations on the cranial nerves were undertaken at a time of considerable activity in