Research Items.

THE ORIGIN OF THE AMERICAN INDIAN.—In the Smithsonian Report for 1923 (dated 1925), Dr. Aleš Hrdlička, after setting forth the grounds for his view that the American Indian is a race, homogeneous on the whole, which penetrated the continent from Asia through the north-west in relatively modern times, goes on to discuss the chronology of this intrusion and the relative priority of the various types of the Indian race. He points out that the remains, archæological and skeletal, of north-eastern Asia are of no great antiquity, but correspond generally to those of the Old World Neolithic age. The palæolithic remains of the Yenisei and north-western China are thousands of miles away from the point where man crossed to America. This leads to the presumption that man did not cross over before late Palæolithic or early Neolithic times. This would give a date of about ten or at most fifteen thousand years ago. Even if the unlikely hypothesis were accepted that man of north-eastern Asia had an independent development from European late Palæolithic or Neolithic man, his advent from southern Asia could not have been earlier than if he had come from the west. Mass migration being impossible owing to the difficulties of climate and food supply, the people must have passed over in small groups. Of these, the first would be the dolichocephalic Indian represented by the Algonquian, Iroquois, Sioux, and Shoshonean stocks which spread to Tierra del Fuego, including the Lagoa Santa race. Next came the "Toltec" type marked by brachycephaly, settling along the north-west coast and reaching as far as Peru. Later came the Eskimo and Athapascan, the former spreading over the far north and becoming the most highly specialised of American types, while the Athapascan, a virile brachycephalic type which may have preceded the Eskimo, is the most closely allied of all to the prevailing Mongolian type of north-eastern Asia. The path of the Athapascan was blocked and they remained in Alaska, except for a few who passed along the west coast to Mexico, where they left the Hupa, and to New Mexico, Arizona, Texas, and tracts of northern Mexico, where they are known as the Apache.

PREHISTORIC AMBER ROUTES IN EUROPE.—The relative rarity of amber, and the peculiarity of Baltic or northern amber generally owing to its high content of succinic acid, has opened an important line of archæological research in tracing ancient trade routes, based on discoveries of amber, between northern and southern Europe. In the *Geographical Journal* for December, Mr. J. M. de Navarro gives some of his conclusions. Evidence is not sufficient to warrant the assumption that there was a transcontinental trade in amber prior to the Bronze Age. Before that time the appearance of amber in the south was sporadic, and it probably came by sea. In fact, it was not unlikely the opening of the amber trade that led to the introduction of bronze to the north. During the middle Bronze Age, southern and western Germany seem to have played a larger part in the trade than Italy, yet it was probably through Italy that Baltic amber reached the Ægean world. There is not sufficient evidence to say that it came by way of Russia. During the early Iron Ages, the commerce with Italy grew, and consequently Italian influence in northern Europe was more direct. Italian amber was exploited at that period, but analysis of specimens warrants the belief that more of the amber in Italy came from the north, while a certain amount of inferior Italian amber was traded in Switzerland. Mr. Navarro believes that the amber trade culminated about the middle of the seventh century B.C. After that the eastern superseded the western routes and the trade lost importance.

CLIMATIC CHANGES AND THE WEGENER THEORY.—The Wegener theory receives warm commendation in an interesting article by Dr. G. C. Simpson on "Climatic Changes" in the January issue of the *Nineteenth Century*, on the ground that it "solves so many meteorological problems that it is difficult for meteorologists not to accept it." The most serious of these problems is the uniform world-wide climate during the Jurassic claimed by Prof. A. C. Seward from the plant evidence. This view Dr. Simpson describes as "entirely inexplicable" to the meteorologist. It is also inexplicable to the geologist in face of the evidence by the Jurassic faunas of well-marked climatic zones parallel to those of the present day, and of the refrigeration of the Jurassic climate toward the polar regions. The reef-building corals, for example, were then prolific in tropical and subtropical seas, but gradually disappeared toward the north. Dr. Simpson discusses the evidence for recent changes of climate, and agrees with Prof. J. W. Gregory's conclusions that there has been no progressive desiccation or permanent change of climate of the earth during the past 3000 years, though there have been local variations greater than those of the Brückner cycle. Dr. Simpson states that all subsequent work has confirmed Brückner's 35-year climatic oscillation; but as the irregular local changes exceed the Brückner variation, it is only apparent in records over an extensive area. Dr. Simpson suggests that the oscillation should be called the Brückner groups of cold and warm years rather than a cycle.

FUNCTIONAL DISEASES OF APPLES IN COLD STORAGE.—The Food Investigation Board publishes as Special Report No. 23 ("Functional Diseases of Apples in Cold Storage." By Franklin Kidd and Cyril West. Pp. vi + 15 + 13 plates. London: H.M. Stationery Office, 1925. 1s. net), a very useful summary of the various diseases known to occur to apples in cold storage. This report is based upon a paper by Drs. Franklin Kidd and Cyril West which was published in the *International Review of the Science and Practice of Agriculture*, which is now brought up-to-date and reprinted as a special report accompanied by an extensive series of photographs greatly facilitating recognition of the various diseases. Basing their views in part upon causal conditions involved in orchard conditions or cold storage practice, and in part upon methods of control, the authors recognise the following main types of disease: (1) Apple scald, a browning of the skin of the apple, a disease of the green skin, to which red and yellow skins are very resistant, which can be controlled by very efficient aeration or, still better, by wrapping the apple in a tissue paper that has been soaked in mineral oil. American investigators suggest that this disease is due to the accumulation of esters at the apple surface which are volatilised with efficient aeration or absorbed by the mineral oil. (2) Internal breakdown, a browning of the flesh of the apple which can be controlled by storing at somewhat higher temperatures than 32° to 34° F. (3) Brown heart, caused by excessive accumulation of carbon dioxide during storage (see NATURE, April 18, 1925, p. 584), which is avoided by preventing accumulation of carbon dioxide so high as 8 per cent. in the storage atmosphere. (4) Frost injury, usually local unless freezing has been severe. An interesting point recorded here is the relatively

severe damage that is caused by bruising when the apples are in the frozen condition. The freezing point of the majority of apples appears to be between 28° F. and 30° F.

THE BRITISH FRESHWATER PEARL MUSSEL.—A short while ago (NATURE, July 25, 1925, p. 148) we directed attention to Part I. of Mr. J. Wilfrid Jackson's excellent address to the Conchological Society on "The Distribution of *Margaritana margaritifera* in the British Isles." Part II., now before us, which was announced to deal with the past history of the mollusc, does not, however, attain the same standard of excellence or add much to what little was known on the subject. The author points out that there is no definite proof of the occurrence of Margaritifera in pre-glacial times, and concludes that the species owes its presence to dispersal since glacial times, spreading gradually as the glacial conditions were passing away from areas untouched by the ice-sheets and gradually attaining its present distribution. Mr. Jackson summarises and discusses at some length the opinions of a limited number of writers on the glacial period and seems to conclude in favour of the post-glacial age of the greater part of the British fauna and flora. This to one with some fifty years' acquaintanceship with the subject has a distinct flavour of antiquity about it.

COLOUR VARIATIONS IN PARTRIDGES.—An exceedingly instructive series of colour variations in the red-legged partridges, *Alectoris rufa* and *A. saxatilis*, are described by Messrs. W. and G. Bateson (*Journ. Genetics*, vol. 16, No. 1). The "bright" variety of *A. rufa*, known as *melanocephala*, is represented by four specimens in the British Museum, all from the west of England, where four others have been seen. This form is also known from two records in different localities in Spain; and three specimens of the same variation in *A. saxatilis* were examined in Swiss museums, having all been taken within a radius of thirty miles. A "dull" variety of *A. rufa* is described under the name *obliterata*. It has a more nearly uniform coloration and is represented by three male specimens, all from the east of England. A black-headed species exists in Arabia under the name *A. melanocephala*, and this may be factorially significant. The dull, normal and bright forms are regarded as forming a series showing the progressive spread of barring. They are compared with the varieties of North American flickers, Colaptes, and with the barred patterns of the quagga and its relatives. As with Colaptes, a consistent factorial analysis of the differences is impossible without breeding experiments, because the colour-changes in different pterylæ appear to be, at least in part, independent of each other. The same problem is involved here as in the origin of many species which differ in several features of their colour patterns. Many South American parrots and parrokeets show similar differences, and it is to be hoped that some one will undertake breeding experiments with them, which might throw much light on the nature of all such variations.

THE ANATOMY OF PILA.—Vol. 8, No. 3 (1925), of the *Memoirs of the Indian Museum* is devoted to a description, by Dr. B. Prashad, of the anatomy of the common Indian apple-snail, *Pila globosa*, one of the Ampullariidæ which inhabits tanks, ponds, lakes, streams, and ricefields in the Gangetic plain, being particularly abundant where there is a large quantity of succulent aquatic vegetation. The various systems of organs are carefully described and references made to the histology. The functions of most of the organs are briefly noticed, *e.g.* the methods of respiration, aquatic and aerial, and short biological notes are added. The memoir will be found useful for comparative purposes.

CARBOHYDRATE/NITROGEN RELATION IN HORTICULTURE.—The *Journal of Pomology and Horticultural Science* for December contains an interesting review of recent American investigations on the importance of the carbohydrate/nitrogen balance in the plant, upon processes of growth and reproduction, which is written by Henry W. Hooker of the University of Missouri, who is himself an active worker in this field. This ratio is somewhat vague in connotation; carbohydrate is commonly used to include both insoluble polysaccharides such as starch, and reducing sugars, but not substances entering into the skeleton of the plant; there is some discussion as to whether soluble, insoluble or total nitrogen figures are more relevant. By various practical methods, as manuring, girdling, pruning, root pruning, and so on, this ratio can be definitely disturbed and in terms of the disturbance the effects upon growth and reproduction interpreted, though it is evident that the metabolic changes may be associated with, and yet not causal in relation to, growth and developmental changes. In fruit trees it has now been clearly demonstrated that in different parts of the tree this ratio may have a very different value and that the initiation of flower buds is associated with relatively high carbohydrate, whilst, on the other hand, fruit development seems associated with a rise in nitrogen in the fruit-bearing spurs.

THE ORIGIN OF THE ALPS.—In a paper recently read before the Royal Geographical Society, Prof. L. W. Collet gave a summary of recent ideas with regard to the evolution of the Alps. In a series of diagrams, to be published later in the *Geographical Journal*, he showed that in the embryonic Alps the foreland and hinterland of the chain constitute the boundaries of the great Alpine geosyncline diversified by included geanticlines. Through Carboniferous and Jurassic times these boundaries closed on and compressed the geosyncline like the jaws of a vice. The two geanticlines have developed into the two dominant nappes of the Alps, Great St. Bernard and Dent Blanche. Prof. Collet accepts as proved the forward drive of the hinterland towards the foreland. These conclusions, he points out, are in support of the Wegener hypothesis and indicate a northward drive of Europe, producing a distension to which the Mediterranean basin is due.

THE SPECIFIC HEAT OF ROCKS.—The effects of heat upon rocks are important not only geologically but also from the point of view of their fire-resisting properties. A valuable investigation which should not be overlooked has been carried out by T. Okaya, and the results are published in the *Japanese Journal of Astronomy and Geophysics*, vol. 3, No. 1, 1925. The specific heats of seventy-one different rocks are given, with a careful petrological description of each of the specimens tested. It is shown that the specific heat depends mainly on the chemical composition, but also in part on the structure. For practically all rocks the value lies between limits of 0·1 and 0·3. Among igneous rocks those rich in soda have higher values than those rich in potash. Sodic andesites, for example, range from 0·24 to 0·28, whereas potassic andesites range from 0·14 to 0·20. Crystalline limestones vary widely: from 0·19 for those poor in calcite to 0·26 and higher in the case of saccharoidal calcite marbles. Results are also recorded for tuffs and granites, and the paper is illustrated by eighteen excellent photo-micrographs.

AN AIR-PRESSURE SOUNDING MACHINE.—In the November number of the *Hydrographic Review*, there

is a description of a self-recording sounding machine which depends on balancing the pressure of water on the sea-bottom by an equal pressure of air. The portion on the sea-bottom is an armoured sounding cable containing a flexible rubber tube. The lower end of the cable is provided with a jointed armoured covering which permits ready bending and promotes durability. The inboard end is secured by an air-tight joint to the hollow axle of the winding drum. An air-pressure pipe connects the axle, and therefore the tube of the sounding cable, with a pressure gauge on the bridge and with the compressed air reservoir. The recording devices consist of three dials and a bathygraph. The depth, at any moment, can be read on one of the dials. The other dials show the amount of cable out and the pressure in the air reservoir, while the time is recorded on a bathygraph. In practice the pressure in the reservoir is kept slightly higher than any water pressure expected, and the excess pressure is reduced by the escape of air from the bottom end of the sounding cable until the water pressure is balanced.

STOKES'S THEORY OF THE ABERRATION OF LIGHT.—The issue containing parts 11-14 of Vol. 58 (1925) of the *Rendiconti of the Royal Lombardy Institute of Science and Letters* includes a paper by Prof. G. A. Maggi replying to the objections raised to Stokes's theory of the aberration of light by Prof. Eddington in his communication on "Ether Drift and the Relativity Theory" published in NATURE of June 6 last. As regards the first objection—that the ether, with a velocity which is zero at sea-level and 10 kilometres per second at the height of Mount Wilson, would possess a rapid rotational motion, whereas Stokes showed that the movement of the ether should be irrotational—Prof. Maggi points out that actually Stokes postulated the irrotational movement to deduce his formula and that hence arose a difficulty indicated at the time by Lorentz in his paper on "Stokes's Theory of the Aberration in the Supposition of a Variable Density of the Ether" (*Proceedings of the Royal Academy of Sciences*, Amsterdam, 1898–1899, p. 443). The second and more serious objection advanced by Eddington is to the effect that, in contradiction to the more elementary notions of astronomy, the formula of Stokes indicates a variation of the aberration with the altitude. In this connexion Prof. Maggi observes that Stokes's formula furnishes the effective deviation, with respect to the terrestrial globe, of the light emitted from a star, from which, allowing for the degree of drag of the ether at any altitude, the aberration at that altitude is deduced.

RELEASE OF PRESSURE IN COAL-DUST EXPLOSIONS.—"The Effect of Release of Pressure on the Development of Coal-dust Explosions" is the subject of the second joint publication by the Safety in Mines Research Board and the United States Bureau of Mines (London, H.M.S.O., 3*d*. net). It describes a series of trials carried out at Eskmeals under Dr. R. V. Wheeler, the Director of the Station, and Mr. H. P. Greenwald of the Bureau of Mines staff. The experiments were made in the large steel gallery 750 feet long, open at one end and (normally) closed at the other. A cannon fixed 200 feet from the closed end was fired into a pile of fine coal-dust placed in front of it. Between the cannon and the open end, 550 feet away, fine dust was strewn partly on side-shelves and partly on the floor; no dust was laid behind the cannon. Along the gallery timing-screens and pressure gauges were fixed. The release of pressure was effected by substituting plates with circular holes cut in them for the solid plates which normally closed the gallery at three different places. (1) In the first place the release was made in the end plate 200 feet behind the cannon. When this was closed the maximum velocity of flame recorded near the mouth of the gallery was 2660 feet per sec. with a maximum pressure of 73 lb. per sq. inch. When this plate was a quarter open, little difference was observed; but with the end half open the pressure recorded was much less, although the flame came out at both ends of the gallery. With the rear end quite open the flame travelled slowly and only 2 lb. pressure was recorded. (2) When the openings for release were made just in front of the cannon, two small openings of one-sixteenth the area of the gallery had little effect on the velocity and pressure; but two one-eighth openings reduced the velocity to nearly one-quarter and the pressure to 3 lb. On moving the cannon just in front of the two one-eighth openings the velocity was high and the pressure rose to 23 lb. (3) When the openings were 200 feet in front of the cannon, the effect was to accelerate the initial flame, though the pressure recorded near the open end was not so high as when there was no release—and appeared to diminish as the flame proceeded. The nearer to the firing-point the release of pressure can be made, the greater is its effect in preventing a serious dust explosion.

ALCHEMICAL SECRET NAMES.—E. Wiedemann and J. Ruska have accomplished a very useful piece of work in giving a list of some Arabic alchemical "Decknamen" in a recent number of the *Beiträge zur Geschichte der Naturwissenschaften* (Sitzungsber. d. Physikalisch-Med. Sozietät in Erlangen, Band 56, 1924). It is well known that the Greeks, Syrians, Persians, Arabs, and others who, during 2000 years, busied themselves with alchemy, used "technical" or secret names for the substances they used in their operations. These names sometimes refer to noticeable properties of the bodies concerned (*e.g.* mercury, "the volatile slave"; copper, "the green one"; and so on), and sometimes are derived from mystical or religious associations, as when the metals are called by the names of the planets. Very often, however, they are purely arbitrary, so far as can be judged at the present day. The existence of this peculiar and variable system of nomenclature renders the translation of early chemical texts a matter of great difficulty, and the appearance of any list of synonyms—especially from the pen of Wiedemann and Ruska—is a matter for congratulation. The present paper is based mainly upon a manuscript work (Berlin, Ahlwardt's catalogue, No. 10361) of the celebrated poet, statesman, and alchemist Al-Tughrā'ī, entitled "The Book of the Precious Stone, upon the Art of the Elixir," but other sources have been drawn upon as well. First of all, the various names of the seven metals are given—no less than 23 for gold and about 60 for mercury!—then come the names of the seven "spirits" (mercury—also classed with the metals,—sal-ammoniac, realgar, orpiment, "yellow sulphur," "red sulphur," and "white sulphur"). Among the most interesting are the following: *Al-Kātib* (the scribe) and *Hayatu'l-Aṣsād* (life of the metals), for mercury; *Al-Milḥ al-Ṭayyār* (the flying salt) and *Al-Filfil al-Armanī* (Armenian pepper) for sal-ammoniac; and *Ṭair Suqrâṭ* (the Bird of Socrates) for sulphur. A similar vocabulary, but with a larger proportion of Greek names, is given by the thirteenth-century author Abu'l-Qāsim al-'Irāqī in his book "Al-Kanz al-Afkhar," a MS. of which is preserved in the Royal Library at Cairo. Such lists are not only interesting in themselves; they also afford useful evidence concerning the transmission of chemical knowledge from one nation to another. Very noteworthy is the large number of Persian words used by Muslim chemists.