

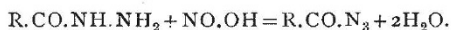
chlorides, or esters of the organic acids, primary acid hydrazines are produced, of the general structure R.CO.NH.NH₂, where R represents the hydrocarbon radical contained in the acid. Ammonia, hydrochloric acid, or alcohol is simultaneously formed, according as an amide, a chloride, or an ester is employed. The reactions proceed with facility and regularity, frequently in the cold, and afford theoretical yields of the substituted hydrazines. For many reasons, however, the esters are most convenient for the preparation of these acid hydrazines upon a large scale.

The primary acid hydrazines are colourless, non-volatile solids which usually crystallise well. The first member of the series, formyl hydrazine, H.CO.NH.NH₂, melts at 54°. They are usually soluble in water and alcohol, but insoluble in ether. Most of them form stable salts with one molecule of hydrochloric acid. The hydrogen of the imido group NH is replaceable by metallic sodium or by the radical acetyl. They possess reducing properties similar to those of phenyl-hydrazine, and they condense readily with aldehydes and ketones to form insoluble tertiary hydrazines. Upon heating, frequently by simply boiling their aqueous solutions, they become converted into secondary symmetrical hydrazines in accordance with the equation: 2R.CO.NH.NH₂ = R.CO.NH.NH.CO.R + N₂H₄. The liberated hydrazine decomposes into ammonia and free nitrogen.

The secondary symmetrical acid hydrazines are very stable substances, soluble only to a slight extent in water. They are usually colourless, possess high melting points, and behave as acids. By the action of powerful oxidising agents they are converted into substances endowed with brilliant colours, ranging from yellow to bright red, which appear to be of the nature of "azo" compounds.

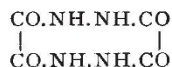
Of particular interest is the substituted hydrazine obtained by the action of hydrazine hydrate upon urea, the amide of carbonic acid. When urea is boiled with hydrazine hydrate a mono-hydrazide is first produced, NH₂.CO.NH.NH₂. This substance, however, is unstable and passes spontaneously into the secondary symmetrical compound NH₂.CO.NH.NH.CO.NH₂ with elimination of hydrazine, N₂H₄. This secondary hydrazide is identical with a compound of the same constitution previously obtained in an entirely different manner by Thiele.

An extremely interesting reaction occurs when the acidyl hydrazines of monobasic acids are treated with nitrous acid. They are directly converted into esters of azoimide, N₃H, in accordance with the following equation:—



During the course of work upon this latter reaction it was observed that the organic azoimides, both those containing acid and those containing hydrocarbon radicles, R.CO.N₃ and RN₃, behave in a peculiar manner with water. Thus diazobenzene-imide C₆H₅.N₃ resinifies with a copious evolution of gas; similarly benzoylazoimide, C₆H₅.CO.N₃, when boiled for some time in contact with water evolves large quantities of nitrogen and carbon dioxide, and becomes converted into a magnificently crystallising base of the composition of a symmetrical diamido-benzophenone, C₆H₄.NH₂.CO.NH₂.C₆H₄.

The hydrazines of dibasic acids do not yield derivatives of azoimide, but break up with a violent evolution of nitrogen and formation of secondary symmetrical hydrazines. For instance the hydrazine of oxalic acid yields the symmetrical compound



Several of the hydrazines of unsaturated acids behave in a manner peculiar to themselves. Thus the hydrazine derived from fumaric acid, C₄H₂(CO.NH.NH₂)₂, yields with nitrous acid an extremely explosive colourless compound, of the nature of a diazofumaramide, C₂H₂(CO.NH.N₂.OH)₂.

Prof. Curtius has succeeded in preparing a large number of double salts of metallic sulphates and chlorides with hydrazine sulphate and chloride. The double sulphates are constituted according to the general formula (N₂H₄)₂.H₂SO₄.R''SO₄, and are distinguished by their difficult solubility and by the absence of water of crystallisation. Salts of the series have been prepared containing as the metal R'' copper, nickel, cobalt, iron,

manganese, zinc, and cadmium; magnesium does not appear capable of forming a double sulphate. The blue copper salt is only soluble to the extent of one part in 1150 parts of water at 10°. It dissolves in ammonia with evolution of nitrogen.

The double chlorides are constituted according to the general formula N₂H₄.HCl.RCl. They are readily soluble in water, and certain of them may also be recrystallised from alcohol. Some contain water of crystallisation, while others are anhydrous and exhibit sharp melting points.

Hydrazine likewise forms a double phosphate with magnesium, which closely resembles ammonium magnesium phosphate.

Hydrazine appears to be remarkably stable towards nitric acid, but Prof. Curtius has eventually obtained the nitrate, N₂H₄.HNO₃, in splendid crystals which melt at 70°. If these crystals are heated suddenly they explode with great violence. The acid salt, N₂H₄.2HNO₃, loses nitric acid when its solution is evaporated. It may be remembered that Prof. Curtius observed a similar greater stability of the monacid salt in the case of the chlorides, for upon heating the dihydrochloride, N₂H₄.2HCl, to 140°, it was found to be completely converted into the monohydrochloride, N₂H₄.HCl.

A. E. TUTTON.

THE INTERNATIONAL CONGRESS OF PREHISTORIC ARCHÆOLOGY AND ANTHROPOLOGY.

IT is probably unique in the history of congresses that a report of the proceedings should be published within a period of three months from the time of the meeting. Such a feat was accomplished by the publication committee of the International Congress of Prehistoric Archæology and Anthropology, the eleventh session of which was held some time ago at Moscow. All the communications are printed in French. The first volume of the Report is divided into five sections; of these the first is devoted to geology and palæontology in their relations to primitive man. In his paper upon the constitution of the quaternary deposits in Russia and their relations to the finds resulting from the activity of prehistoric man, S. Nikitine draws the following conclusions:—The subdivision of the stone age into palæolithic and neolithic epochs should be retained for Russia in Europe, because it coincides with the geological subdivisions pleistocene and recent, which in their turn are based upon palæontological facts. The study of the glacial deposits of Finland and of the western region do not furnish any proof of the existence of two special glacial epochs and of an interglacial epoch; all the facts can be explained by phenomena of the oscillation of a glacier at the time of its gradual but irregular retreat. The time corresponding to the inter-glacial epoch and that of the second glaciation of the Swedes was probably for the greater part of Russia the period of the formation of ancient lacustrine deposits, of the loess and of the upper fluviatile terraces, containing the bones of the mammoth and other extinct mammals. Man lived simultaneously with the mammoth during the second half of the glacial epoch along the limit of glaciation, knowing amongst other things the use of fire, but only making splintered flint implements. As the glacier retreated man advanced towards the north and north-west; he arrived in Finland and in the Baltic region after the close of the glaciation, and after the disappearance of the mammoth; but man then possessed the more advanced culture of the neolithic period, and besides chipped flint implements he knew how to make implements of polished stone, pottery, &c. Russia in Europe does not present any traces of man in the first half of the pleistocene or of still more ancient man.—Prof. W. W. Dokoutchaïev contributes a valuable essay on the Russian steppes, past and present, in which he deals with the last page of Russian geology, and comes to the conclusion that before the glacial period the difference between the relative altitudes of the north-west and of the centre of Russia were much more considerable than at present. The author describes the carving of the steppes and their surface drainage; their soil, and that of the forests; the vegetation, fauna, and climate of the

steppes. As the soil of the forests differs in character from that of the tchernozième the author and M. Gheorgievsky were able to prove the greater extent formerly of the Poltava forests.—The second section deals with prehistoric archæology. In a paper entitled comparison of the primitive industries of France and Asia, G. Chauvet discusses the question "Can one establish general divisions, applicable to both Western Europe and Asia, for prehistoric times and especially for the palæolithic period?" The general progress of the industrial arts has been the same in Asia and in Europe during prehistoric times, but how far these epochs were synchronous is unknown. In order to have terms for comparison it is necessary to have a "fixed base"; such a base is afforded by the glacial phenomena. He concludes by urging that the great engineering works which are now progressing in Asia afford opportunities for obtaining information on these problems which should not be neglected.—Lubor Niederle (of Prague) calls attention to the latest results of prehistoric archæology in Bohemia, and its relations with Eastern Europe, and arrives at the conclusion that the Slavs arrived in Bohemia earlier than is admitted by historians. He believes that the Slavs, like the Germans and Gauls, were originally dolichocephalic, and of a blonde complexion.—The other papers in this section are short, two of them being on nephrite.—The third section is confined to tumuli and encampments (*Kourganes et goroditshchés*).—A. Spitzine reports on the bone-encampments in the north of Russia.—P. Krotov comes to the following conclusions in his paper on the layers of stone implements in the district of Jaransk, government of Viatka; the stone implements of the district of Jaransk do not belong to the true stone age, but to the epoch of the encampments and other ancient dwellings of the Finns, who made use of implements of stone and bone, along with utensils in iron and bronze. During this period of the life of the Finns, elements of a more advanced civilization penetrated into their country, coming from the centres of civilization of eastern Russia; flint and bone implements being replaced by iron tools.—B. Péredolsky has a paper on the "jalnik" (necropolis) of Iuriévo, in the district of Borowitchi, government of Novgorod.—The first paper in the Anthropological Section is by Topinard on race in anthropology, in which he asserts, (1) On no part of the surface of the globe can one discover a population entirely free from mixture, and presenting only a single type; (2) that the anthropological materials on which we work, and from which we extract the double notion of the type to begin with, and of its continuity in time, are only peoples; (3) that if the first factor, the type, is accessible with labour, the second, its permanence in time, is only a conjecture which it is impossible to demonstrate; (4) that in consequence the notion of race in the two factors, and especially in the latter, is only a subjective notion, a mental conception, peoples and their historic elements being the only objective realities. Later on he says: "In order to show how in Europe, for example, the question of nationalities is foreign to that of races, or even of the constituent elements of peoples, one need but remember that three or four races (using the word conditionally) only are fundamentally concerned in the formation of the numerous peoples which at the present time are distributed from north to south, and from east to west. The races are the whites, the brachycephals, and the browns. They are found everywhere, with only here and there some secondary additions. Their proportions alone vary. To the north there are more blondes; in the centre, from the Urals to Portugal, the brachycephals dominate; to the south, around the Mediterranean, the browns are in the majority. If two peoples agree in certain characters it does not follow that they have the same nationality. Kollmann, in an illustrated paper on the human races of Europe and the Aryan question, argues that it is necessary to distinguish at least four different types in Europe (the *Dolichocephalic leptoprosopes* and *chamæprosopes* and the *Brachycephalic leptoprosopes* and *chamæprosopes*) which have continued, without any doubt, since the neolithic period; that the intellectual European culture is a common product of these types.—In his paper on the weight of the brain among several peoples of the Caucasus, Dr. N. Giltchenko gives valuable data on fifty-seven subjects. Anoutchine has a paper entitled, "On Ancient, Artificially Deformed Skulls found in Russia."—The last section is devoted to Prehistoric Ethnography. In his contributions to the prehistoric ethnography of Central and North-East Russia, J. Smirnov concludes that the linguistic

facts permit the supposition that only a part of the remains of the neolithic period of Central Russia can belong to the Finns. The antiquity of sepultures can be determined, besides other ways, by the animal bones deposited with the dead. The N.-S. position of the skeleton may be regarded in Central Russia as one of the indices of ancient Finnish sepultures. To the category of the monuments of prehistoric epochs belong geographical names. The place-names of northern and central Russia prove that its pre- or proto-historic population has been more homogeneous to the east, in the region of the Permiens and Ougriens, and more mixed to the west.—N. Troitzky has a very interesting paper on vestiges of paganism in the region situated between the upper courses of the Oka and of the Don. Fire, tree, and stone cults persist, but modified by Christianity.—E. Chantre has a project for reform in the nomenclature of the peoples of Asia"; and A. Ivanovsky, some information upon the questions: (1) of the simultaneous employment of sepulture and incineration; and (2) of the stone statues called "Kamennya baby."—The last is the most important communication, "Which is the most ancient race in Russia?" by Prof. A. Bogdanov, of Moscow. He finds that the most ancient skulls are dolichocephalic. In passing to the more modern tombs since the fifteenth century, we see a diminution of the quantity of dolichocephals and the preponderance of brachycephals. In the ancient tombs of the government of St. Petersburg, as well as in some districts of Novgorod, we meet from the stone age onwards skulls of a type quite distinct from those characteristic of the tumuli (*kourganes*) of Central Russia. From Moscow eastward, and as far as the Urals and Siberia (Tobolsk), we find the tumuli of the brachycephals. In the governments of Moscow, Smolensk, Riasan, and Don, we have only in some localities the series of the dolichocephals, and in others a kind of mixture of characters; in these localities, more than in the others, mixture was possible, since they are found either on the great routes of migrations, or at the limit of the distribution of different races. In the tombs called "Scythian" the majority of the skulls quite resemble the dolichocephalic tumuli-population of Central Russia. One finds only occasionally Mongoloid skulls in the tumuli of Central Russia, and in the tombs of Southern Russia; whilst in the tumuli of Tobolsk, and of the Uralian countries they abound and often predominate. The territory of this dolichocephalic leptoprosopic primitive people is very distinctly limited to the north, east, and south by the tumuli, with a population quite brachycephalic, or presenting this type in preponderance. There is no south-west limit. In Galicia, north and south Germany, and Sweden we meet with the same type in the ancient tombs as in those of Central and Southern Russia. There are true primitive dolichocephalic chamæprosops in Asia among the Mongolians, but not in Europe. Kollmann's European types appear to be the result of mixture with brachycephals, or of what Virchow calls "pathological races." Dolichocephalism is more and more diminishing in Europe. The larger and broader heads of the civilized classes should be attributed to other causes than merely to mixture.

A. C. H.

SCIENTIFIC SERIALS.

The Quarterly Journal of Microscopical Science for January, 1893, contains:—On the relationships and rôle of the Archoplasm during mitosis in the larval salamander, by John E. S. Moore (plate xxi.).—On the occurrence of embryonic fission in cyclostomatous polyzoa, by Sidney F. Harmer (plates xxii.–xxiv.). The extraordinary phenomena described in detail in this paper were announced in brief to the Cambridge Philosophical Society a couple of years ago. The completed investigations of the author indicate in the clearest way that the young larvæ of *Crisia ramosa* are produced as buds from an embryonic mass of cells found in the young ovicell. "At the end of segmentation the embryo consists of a small mass of undifferentiated cells, lying near the distal end of the follicle, which has increased largely in size, and now forms a spherical knob projecting freely into the interior of a spacious tentacle sheath;" after a time "the embryo, although remaining a solid mass