Tartary, which was discovered a few years later by a Japanese, Mamia Rinso, whose discovery is embodied in Siebold’s *Nippon.* The Russian navigator Nevelskoi, in 1849, definitively established the existence and navigability of this strait; since that time the Russian expeditious of Boshnyak (1851) and Rimskiy-Korsakoff (1853) continued the explorations, and in the latter year a Russian post was temporarily established at Aniva Bay. L. Schrenck in 1855-56, and MM. Schmidt, Glehn, Brvlkin, and Shebunin in 1860, explored the geology, fauna, flora, and ethnology of the island ; M. Lopatin in 1867 explored, on foot, the cast coast ; MM. Dobrotvorsky published (1869 and onwards) interesting data as to the inhabitants, and M. Polyakoff was entrusted in 1881-82 with a detailed exploration, and returned with rich ethnological and zoo­logical collections, with regard to which only preliminary reports have as yet been published. (P. A. K.)

SAGINAW, a city of the United States, capital of Saginaw county, Michigan, lies on an elevated plateau about 30 feet above the water on the left bank of the Saginaw river, which falls into Saginaw Bay on Lake Huron, about 18 miles lower down. It is a railway junc­tion of some importance, 100 miles north-west of Detroit, is connected with East Saginaw by a street railway, and can be reached by the largest vessels that ply on the lake. The upper branches of the river are also available for boat traffic throughout a considerable district. Saw-mills, planing-mills, and salt-works are the principal industrial establishments. The population was 7460 in 1870 and 10,525 in 1880. The city charter dates from 1859, the first settlement from 1822.

SAGITTA. The name “ Sagitta ” was given by Martin Slabber in 1775 to a small marine worm which is now known as the type of a distinct group, the *Chaetognatha* (Leuckart). The group comprises two genera *(Sagitta* and *Spodella)* and a considerable number of species; they are small transparent pelagic animals, varying in length from a few lines up to two inches, and are universally dis­tributed. The body (see fig.) is elongated and furnished with a tail and lateral fins, which are prolongations of the chitinous cuticle; the head is provided with a great number of variously shaped chitinous setae. The body is divided by transverse septa into three distinct segments : the first septum is placed just behind the head *(st),* the second (*st)* about the middle of the body, separating the ovaries and testes. The body-cavity is likewise separated into right and left halves by a continuous vertical mesentery, 'which suspends the gut. The alimentary canal is a simple straight tube of uniform structure passing from the mouth to the anus, which is placed ventrally and at the second transverse septum ; the alimentary tube is ciliated and is unprovided with glands of any kind. The body-wall is composed of (1) an outer layer of epidermis, which secretes the chitinous cuticle already referred to,—the thickness of the epidermis varying from five or six cells in the region of the head to a single layer of cells in the “ fins ”; (2) a deli­cate structureless supporting lamella; (3) a layer of longi­tudinal muscles. These last have a peculiar arrangement and structure : they are disposed in four bands, two dorsal and two ventral, the action of which is evidently favour­able to producing the onward movements of the creature. The muscular fibres, which are transversely striated, are arranged in a series of lamellae whose direction is per­pendicular to the longitudinal axis of the body. Projec­tions inward of the supporting lamella bear on either side a single row of muscular fibres; a similar muscular struc­ture occurs in the *Nematoidea* and in many *Oligoehaeta.* In the anterior region of the body the muscular layer is differentiated into special muscles for the movement of the setae. (4) The body-cavity is lined by a delicate peritoneal epithelium closely applied to the muscular layer of the body-wall and to the gut. The nervous system consists of a cerebral ganglion and a large ventral ganglion—the two united by commissures which pass round the gut; both ganglia are embedded in the epidermis. This primi­

tive condition of the nervous system is retained in other lowly organized worms (*e.g., Polygordius).* The ventral ganglion is connected with an intra-epidermic nervous plexus which surrounds the whole body. Eyes are present, be­sides a number of tactile cells upon the outer surface of the body; an­teriorly is a ring-shaped structure (*r*) which is supposed to be olfac­tory in function. The generative organs consist of ovaries and testes, which are united in the same indi­vidual; the ovaries (*e*), placed an­terior to the testes, are furnished with oviducts, which appear to ter­minate in a cæcal extremity. The testes (*ho)* are placed behind the second septum; they are each fur­nished with a vas deferens opening on to the exterior and into the body-cavity by a ciliated funnel.

For embryology, see Balfour, *Com­parative Embryology,* vol. i. p. 303.

In spite of the detailed knowledge which we now possess of the structure and development of the *Chætognatha,* the systematic position of the group remains a matter of the greatest uncertainty. That they are an archaic group is shown by their hermaphroditism, by the primitive condition of the nervous system, and by the persistence of the vertical mesentery among other characters; in all these points and in others they agree with such primitive *Annelida* as *Protodrilus* and *Polygordius.* On the other hand, their similarity to the *Ncmatoidea* has been dwelt upon; the disposition of the muscles is the same in both groups, and the *Gordiacese* have the gut suspended by a dorsal and ventral mesentery in the same fashion as has been described above in *Sagitta ;* the *Chætognatha* differ, however, from the *Nematoidea* in the important fact of their segmentation. On the whole, it appears that the *Chætognatha* are best regarded as a special phylum equivalent to such groups as *Annelida, Platyhelminthcs, Ncmatoidea,* but having no special relation to any one of them.

SAGO is a food-starch prepared from a deposit in the trunk of several palms, the principal source being the sago palm, *Metroxylon Rumphii* (Mart.), and *M. læve* (Mart.). These palms are natives of the East Indian Archipelago, the sago forests being especially extensive in the island of Ceram. The trees flourish only in low marshy situations, seldom attaining a height of thirty feet, with a thick-set trunk. They attain maturity as starch-yielding plants at the age of about fifteen years, when the stem is gorged with an enormous mass of spongy medullary matter, around which is an outer rind consisting of a hard dense woody wall about two inches thick. When the fruit is allowed to form and ripen, the whole of this starchy core disappears, leaving the stem a mere hollow shell; and the tree immediately after ripening its fruit dies. When ripe the palms are cut down, the stems divided into sections and split up, and the starchy pith extracted and grated to a powder. The powder is then kneaded with water over a strainer, through which the starch passes, leaving the woody fibre behind. The starch settles in the bottom of a trough, in which it is floated, and after one or two washings is fit for use by the natives for their cakes and