PLATE XIX.

Fig. 1. Section of nucleus of nodule from Station 276 ; 2350 fathoms, South Pacific. This represents a portion of a lapilli, principally formed of an aggregation of extremely thin crystals of plagioclase in the form of rhombic tables. From the optical properties this plagioclase appears to be bytownite. The fundamental mass of the rock, now transformed into palagonite, was originally a blackish glass. The dark colour at some points of the figure is due to the presence of manganese. This rock is profoundly altered, the felspars alone having resisted decomposition. In some parts there are sections of augite and of olivine entirely transformed into a red substance, with a fibrous appearance. The rock is a felspathic basalt with a vitreous base (magnified 50 diameters).

Fig. 2. Section of nucleus of manganese nodule from Station 276 ; 2350 fathoms, South Pacific. This especially represents the decomposition of olivine. The fragment belongs to a basaltic rock in which porphyritic crystals of olivine are imbedded. The fundamental mass, which is highly altered and penetrated by manganese, is filled with little crystals of plagioclase, as seen in the upper and lower parts of the figure. In the crystal of olivine occupying the centre of the figure the optical properties are almost effaced ; it presents a more or less pronounced fibrous structure. The mineral is in part transformed into hematite, and manganese penetrates into all the fissures traversing the crystal in an irregular manner (magnified 37 diameters).

Fig. 3. Section of nucleus of manganese nodule from Station 293 ; 2025 fathoms, South Pacific. This figure represents the nucleus as seen by reflected light. The centre is composed of a black and homogeneous volcanic glass (sideromelan or tachylite), which is still unaltered. All around this are successive zones, like those of an agate, which correspond to different phases of decomposition. Those nearest the centre are colourless or tinged with yellow, succeeded by others in which the tints are brown or green, the fractures being irregular. Beyond these altered zones are successive layers of peroxide of manganese (magnified 20 diameters).

Fig. 4. Section of nucleus of manganese nodule from Station 276 ; 2350 fathoms, South Pacific. The fundamental mass of this fragment, which was formerly vitreous, is transformed into yellowish palagonite. In this altered mass are embedded large and small crystals of plagioclase, the larger ones having undergone but little alteration, and sections of olivine transformed into a reddish material with a fibrous structure, like the crystal represented in fig. 2. These crystals of olivine have inclusions of the vitreous base of the rock at the centre. Augite is rare in this preparation ; there are some crystals of magnetite. The rock is a felspathic basalt with a vitreous base (magnified 50 diameters).