ceding, and separated from it by a long and well marked interval of time, in which were deposited by what is termed shore action, those thick and extensive beds of reddish grit, commonly known as the oldest sandstone; and whose remarkable organic developement was in the abundance of fishes. This rock, of which many of our city churches were built, constituted the great mass of the Catskill Mountains, and was abundant on the Pennsylvania and New York borders. Overlying these, were found masses of limestone rock of great thickness, very fossiliferous, and impregnated with vegetable matter. The depth of this bed did not average more than 800 yards, including beds of sandstone and shale accompanying the limestone. Above these laid other beds of standstone and shale, with immense deposits of coal, and layers of ironstone, irregularly stratified. to which might be added deposits of fresh water limestone. The depth of those approached 1000 yards, the latter series had received the name of coal measures, and the former that of mountain limestone; and both formations had received the title of carboniferous from their containing so much vegetable matter, the remains of the flora of that epoch. In fact. during the period under consideration, two new features were presented, as predominant, one being the production of terrestrial vegetation; the other, the formation of extensive beds of limestone under the sea. By the agency of the coral animal, Dr. Antisell here described the formation of beds of rock by the coral insect, and illustrated this position of the subject by elaborate drawings, and alluded to the different conditions of the globe as to temperature which existed at the former and present periods, are evidenced by the presence of coralline limestone, even in frigid latitudes, while the present growth of coral was confined to the tropics. Coal was generally found in beds having a slight curve, and those were, on that account, generally termed coal basins. Many beds or basins now distinct, might have been deposited contemporaneously over a large area, and since their deposition had been isolated and altered, by upheaval and volcanic action. The extent of the Ohio, Illinois, Michigan, Virginia, and Pennsylvania coal basins, were pointed out in the diagrams, with the different characteristics which peculiarize the coal fields of this country, and those of Europe The position which the seams of coal occupied, and the muddy and sandy beds which immediately surrounded the coal, and which contained leaves of ferns and other like plants, with the crusted trunks of forest trees, were then described. The great depth of some coal beds was pointed out—that near Bettingen being 22,000 feet below the sea level. The traces of vegetation found were those of plants belonging to the fern tribe; also, grasses, yuccalike, liliaceous plants and palms, with pines and zamias, in all, over four hundred species. The varied appearance of those plants was illustrated by drawings and specimens, to which the lectuter referred. The similarity of this flora to that of Australia, and of the plateau of Mexico was clearly demonstrated, and the climate of that epoch to have an insular and intertropical one. Vegetation was excessively profuse over the whole globe then, resembling in the excessive luxuriance of its forests, tropical South America, as described by Humboldt. Dr. Antisell then passed on to different views, with regard to the manner in which the extensive deposition of coal plants was produced. In very many cases they were the result of accumulated drift wood, similar to what occurred in our southern rivers, where the timber floating down became impacted and water logged. It would only require to be covered over with mud and sand, and subjected to pressure for a long period of time, to be converted into coal. In other instances, it was probable that the trees grew on a spot where the coal bed now existed, and that the land becoming submerged, drift wood was imparted among the standing trees, and both combined to form the future seam. The great height to which many of these coal plants attained was remarkable, there being seams of the lepidodendrum—a plant allied in form to the modern club moss—found, which were fifty, sixty, and even seventy feet high. None of these mosses, even in the warmest region, ever attained more than the size of a shrub. So it was with the equisotim, or mare's tail, at present an humble plant but in the fossil species a gigantic tree. All the plants which were represented by similar species existing now, attained at that period a more ample developement, bespeaking a warmer and more equable climate. The asterophyllite plants were rather abundant in the Nova Scotian and Apallachian coal, belonged to a family of which there were now no living representatives. The varieties of coal were next alluded to. It was shown how it was possible for anthracite and bituminous coal to exist in the one bed, the difference being in the loss of bituminous matter sustained by the former, this loss being produced by the close proximity of heated mineral matter. Thus, an upheaval of green stone, or any volcanic rock, or the close proximity to the scene of volcanic action, would result in the coal beds being altered from their original position, bent, and even fractured in many places, producing faults or dislocations. The advantages of these to the miner was exemplified. By the proximity of volcanic action, the coal beds themselves became heated to that point that their bitumen was driven out, leaving behind a hard, carbonaceous residue, or coke, which was termed anthracite. In Pennsylvania, those portions of the coal fields lying close to the Alleghanies, had their bitumen driven out by this cause, and were anthracite, while, as the bed travelled westward, the amount of bitumen gradually increased, until, in the neighborhood of Pittsburg, it retained its full quantity of bitumen, and resembled the unaltered basin of any European coal field. Dr. Antisell here went into some particulars of the extent and supply of American coal fields, and the enormous time it would take to consume their contents. It might be asked what was the use of this abundant vegetation, seeing that neither the land nor the air, during the larger period of its growth, seemed to be in a suitable condition for sustaining animal life. The chief office of vegetation at the present day was was to purify the air, and render it suitable for the support of animal life. This was its office. Then, also, and from its greater diffusion, it was evident that the necessity for purification was greater then; there was more carbonic acid gas in the air at that time—a gas eminently fatal to existence when breathed—and to purify the air and render the earth a suitable habitation, was the allotted duty of this remarkable flora. This duty was accomplished by the fiscation of the carbon of the gas into the wood of the tree. Every forest which grew drew more of this noxious gas out of the atmosphere, until, in process of time, it was reduced to its present amount—a quantity which in no way interfered with animal life. The properties of this gas were then shown by a few experiments—its incapacity to sustain a light burning, or to support life, was proved—and its greater abundance in the atmosphere of a more ancient period accounted for the fact of the non-existence of any tenants of either the forest or the air. The animal life of this period was then alluded to—the abundance of molluses, conchifers and brachiopoda, and the peculiarity of the fishes which tenanted the seas. The cotemporaneous working of the coral insect, aiding the terrestrial vegetation to withdraw carbonic acid from the air, showed a wonderful unity of design in preparing the globe for land inhabitants, and laying up, by that means, a magazine of fuel and limestone to subserve the future wants of