

III. MISCELLANEA.

I. *Origin of SALIFEROUS DEPOSITS. SALT-LAKES of PATAGONIA and LA PLATA.*

SALINAS or natural salt-lakes occur in various formations on the eastern side of the continent of South America, in the argillaceous-calcareous deposits of the Pampas, in the sandstone of the Rio Negro, where they are very numerous, in the pumiceous and other beds of the Patagonian tertiary formation, and in small primary districts in the midst of this latter formation. Port St. Julian is the most southerly point (lat. 49° to 50°) at which salinas are known to occur*. The depressions in which these salt-lakes lie are from a few feet to sixty metres (as asserted by M. d'Orbigny, *Voy. Géol.*, p. 63) below the surface of the surrounding plains; and according to this same author, near the Rio Negro they all trend either in N.E. and S.W. or in E. and W. lines coincident with the general slope of the plain. These depressions in the plain generally have one side lower than the others, but there are no outlets for drainage. Under a less dry climate an outlet would soon have been formed, and the salt washed away. The salinas occur at different elevations above the sea; they are often several leagues in diameter; they are generally very shallow, but there is a deep one in a quartz rock formation near Cape Blanco. In the wet season the whole or a part of the salt is dissolved, being re-deposited during the succeeding dry season. In a large salina northward of the Rio Negro, the salt at the bottom during the whole year is between two and three feet in thickness.

This salt rests almost always on a thick bed of black muddy sand, which is fetid, probably from the decay of the burrowing worms inhabiting it. [This mud in some places rests on gravel, and in one case the salina is in an alluvial plain within the valley of the Rio Negro.] When I visited the salina about fifteen miles above the town of El Carmen on the Rio Negro and three or four miles from the banks of that river, the salt was beginning to crystallize; and on the muddy bottom there were lying many crystals of sulphate of soda, generally placed crossways, and, imbedded in the mud, were nume-

* According to Azara (*Travels*, vol. i. p. 56) there are salt-lakes as far north as Chaco (lat. 25°) on the banks of the Vermejo. The salt-lakes of Siberia appear to occur in depressions very similar to those of Patagonia.—*Pallas's Travels*, Engl. Tr., vol. i. p. 284.

rous crystals of sulphate of lime from one to three inches in length. M. d'Orbigny states that some of these crystals are acicular, and more than even nine inches in length, others are macled and of great purity; those I found all contained some sand in the centre. As the black and fetid sand overlies the gravel, and that overlies the regular tertiary strata, I think there can be no doubt that these remarkable crystals of sulphate of lime have been deposited from the waters of the lake. The inhabitants call the crystals of selenite *padre del sal*, and those of the sulphate of soda *madre del sal*; they assured me that both are found under the same circumstances in several of the neighbouring salinas, and that the sulphate of soda is annually dissolved and is always crystallized before the common salt on the muddy bottom. The association of gypsum and salt in this case appears to me interesting, considering how generally these substances are associated in the older stratified formations.

Mr. Reeks has analysed for me some of the salt from the salina near the Rio Negro: he finds it composed entirely of chloride of sodium, with the exception of 0.26 of sulphate of lime and 0.22 of earthy matter; there are no traces of iodic salts. Some salt from the salina Chiquitos in the Pampean formation is equally pure.

With respect to the origin of salt in the salinas, the foregoing analysis seems opposed to the view entertained by M. d'Orbigny and others, and which seems so probable, considering the recent elevation of this line of coast, namely, that it is due to the evaporation of sea-water and to the drainage from the surrounding strata impregnated with sea-salt. I was informed (I know not whether accurately) that on the northern side of the salina, on the Rio Negro, there is a small brine-spring which flows at all times of the year; if this be so, the salt in this case at least is probably of subterranean origin. It appears at first very singular that fresh water can often be procured in wells, and is sometimes found in small lakes, quite close to these salinas. I am not aware that this fact bears particularly on the origin of the salt, but perhaps it is rather opposed to the view of the salt having been washed out of the surrounding superficial strata, but not to its having been the residue of sea-water left in depressions as the land was slowly elevated.—*Darwin's South America*, 1846, pp. 73-75.

II. On the CHEMICAL COMPOSITION of CALCAREOUS CORALS.

To the Editor of the Quarterly Journal of the Geological Society.

Yale College Laboratory, September 26, 1846.

SIR,—In No. 7 of the Geological Journal (Part ii. p. 94) there is a short anonymous paragraph quoted "from Silliman's Journal," "On the Chemical Constitution of Calcareous Corals," in which certain analyses by the writer are cited, as supporting the remarkable statement "that the Zoophytes which form these stony skeletons