(Bull. II., Geol. and Nat. Hist. Survey, Chicago Acad. Sciences, May, 1897), including the Valparaiso moraine, the channel cut by the former outlet of Lake Michigan through the moraine and down the Illinois river valley, and the beaches of the former lake. The moraine is concentric with the present lake shore; it is a hilly belt, about ten miles wide and a hundred or more feet higher at the 'crest' than at the borders; its mounds frequently enclose hollows and lakelets. The channel cut by the former lake outlet follows a drift-clogged valley of preglacial origin below Hennepin (where the Illinois river turns from west to south), but is of glacial or post-glacial origin above that point. It is from one to five miles wide, and from 20 to 70 feet deep; its marginal bluffs are steep, like a river bank, throughout the entire length of 300 miles, as if the lake outflow had great volume, filling the channel from bluff to bluff. Three beaches are described, marking the lake shore at the time of the westward outflow. It should here be remembered that the slight difference between the level of the old outlet and of the present lake is not due simply to a slight withdrawal of the waters, but is due to a strong rise of the waters after a strong fall, as has been well shown by several students of the glacial history of the Great Lakes; the fall resulting from the adoption of eastern outlets, and the rise resulting from an elevation of the land in the northeast. So close a return to the Illinois outlet is portentous of the future.

STUDIES IN INDIANA GEOGRAPHY.

SEVERAL papers on the geography of Indiana by various authors have been published in the *Inland Educator* during the past year, and some of them have been referred to in these notes. The whole series is now edited by C. R. Dryer, professor of geography in the Indiana State Normal School, and published in book form (Inland Publishing Co., Terre Haute, Ind., 1897). 'First series' appears on the title page, as if more essays are to follow; and it is to be hoped that such is the case, for much educational good must result from the careful use of such material by teachers. The book is notable in being the first of a kind that should have great extension over the country, as an encouragement and assistance in the study of home geography. There is to-day no similar series of essays even for States as prosperous and as important as Ohio and Pennsylvania. Indeed, it is a difficult matter for the inquiring teacher to find available geographical literature for her work. Professors of geography in other normal schools might well follow the example set by Dryer.

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CURRENT NOTES ON ANTHROPOLOGY.

ANTIQUITY OF MAN IN SWITZERLAND.

THE thirty-fifth volume of the Memoirs of the *Société Helvétique des Sciences Naturelles* is taken up with a thorough analysis of cave exploration near the Rhine, by Dr. Jacob Nuesch and his collaborators. The conclusions he reaches are the more noteworthy because they were obtained after the most exhaustive investigations and comparisons of the fauna, flora and human remains exhumed from the cave-floors. They may be briefly summed up as follows:

The oldest faunas found were sub-arctic and post-glacial. Man was contemporaneous with these, and at that time his industries were distinctly palæolithic. This period lasted about 8,000 years. A long period then elapsed, 8,000 to 12,000 years, during which the fauna changed to modern types, but man seems to have been absent. The neolithic and lake-dwelling period then

began and continued about 4,000 years, closing with the introduction of bronze about 4,000 years ago.

This makes about 28,000 years since man first appeared on Swiss soil; but it must be borne in mind that he may have flourished in milder parts of the continent for indefinite ages before that. The vast Alpine glaciers rendered the climate of Switzerland uninviting long after the continental glacial period had ceased.

MOKI CEREMONIALS.

An instructive article for the student of primitive religions is that by Dr. J. Walter Fewkes on 'The Group of Tusayan Ceremonials called *Katcinas*.' (15th Rep. Bureau of Ethnology.) It is a faithful narration of the strange religious performances, amply illustrated, and the native terms preserved wherever possible.

The word *Katcina* is a vague term for spiritual beings of an inferior class to the highest deities of the tribe, but who are credited with much power over the welfare of the community. They may include the ancestral souls, but are not exclusively these. The ceremonies in their honor are frequent, and distributed throughout the year in a ritual calendar devised by the priestly class. Both men and women participate in them, and they have the character of a sacred drama, as have most primitive rituals. Masks, costumes and traditional songs and chants are prominent features.

Dr. Fewkes finds noticeable resemblances between these ceremonials and those of other Pueblos, but also marked differences. He is impressed with their analogies to those of the ancient Aztecs, and it is likely that throughout America numerous counterparts could be discovered.

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NOTES ON INORGANIC CHEMISTRY.

Léon Franck details in the Bulletin of the French Chemical Society some interesting experiments on the formation of metallic sulfids by mechanical action. When a mixture of fine aluminum powder and flowers of sulfur is rubbed between two sheets of paper, hydrogen sulfid is evolved, owing to the formation of aluminum sulfid and its subsequent decomposition. The same reaction takes place between magnesium powder and flowers of sulfur. If an aluminum plate be rubbed with flowers of sulfur, or even with vulcanized rubber, the odor of hydrogen sulfid is distinctly perceptible. With those metals whose sulfids are not decomposed in the air the reaction is different. When a plate of silver is rubbed with flowers of sulfur it gradually darkens, owing to the formation of silver sulfid, and if the action is continued, little prominences of silver sulfid are formed, which can be removed by a knife. Copper and lead give the same reaction as silver.

This reaction corresponds to the well known darkening of silver coins when carried in the pocket with sulfur matches. In the case of blackening of silver spoons by eggs the reaction is somewhat different, as the sulfur is in combination and in solution. The layer of sulfid must in this case be exceedingly thin, for silver spoons which have been used sometimes for more than a generation have been cleaned again and again, perhaps weekly, each time the layer of sulfid being rubbed off, and yet the spoons show apparently little diminution of weight.

In the *Comptes Rendus*, Léon Lémal describes the coloring of glass by the direct penetration of metals or metallic salts, analogous to the cementation process of steel making. If glass is covered with a silver salt, even in small quantity and heated to 500°–550°, on cooling it shows a