amined. It is, however, a permanent addition to the vast mining territory of the Rocky and trans-Rocky Mountain country, and when considered in connection with previous discoveries, it suggests the probability that the mineral deposits of the State of Washington exceed in quantity and value those of any other State.

W. H. RUFFNER.

Lexington, Va., Jan. 23.

THE EVOLUTION OF THE LOUP RIVERS IN NEBRASKA.

THE most casual inspection of a map of central Nebraska might suggest that the hydrography of the region has probably undergone radical changes. It looks as if the three Loup rivers, and the smaller creeks running parallel to them, had once been separate tributaries of the Platte, all independent of each other, as roughly indicated by the dotted lines on the map (Fig. 1). The Platte is the great central trunk of the drainage, and these streams all seem to be headed for it like branches, and would join it directly if they had not been somehow turned eastward and united to form the Loup River.

It is the fate of such impressions to fade out in the light of accurate knowledge, but there are some survivals, and this

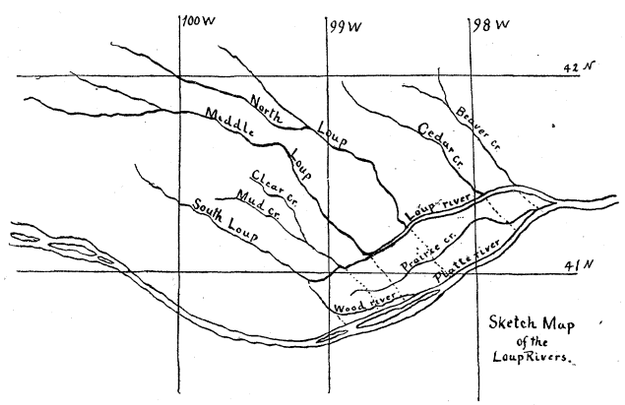

FIG. 1.

bids fair to be one of them. I have, I think, verified it by field work, and I will briefly recount some of the topographic and geological data which tend to confirm the first impression.

The Loup rivers flow in channels excavated from fifty to two hundred feet in soft tertiary marls. Taking them in succession from south-west to north-east each stream is lower than the preceding one. A profile on a line at right angles to the general south-east course of all the streams of the Loup system, would have the general character roughly represented in Fig. 2.

This general north-east slant of the country gives a great advantage in rapidity of erosion to all ravines on the south-west side of each stream. They become longer, deeper, carry more water, and are cut down more rapidly than those on the north-east side of the next higher stream, because they run with the slope of the country and have a lower outlet. Thus the space between the streams is captured by the more vigorous headwater erosion of the north-easterly tributary. Presently a branch more vigorous than the rest captures the headwaters of its neighbor lying to the south-west. This imparts still greater vigor of attack, and the succeeding captures in the same direction are hastened.

The latest robbery in the Loup system is that of the headwaters of Wood River. Journeying down from the headwaters of the South Loup one is impressed with the apparent continuity of its valley with that of Wood River, rather than with that of the South Loup itself below Callaway. It is obviously an instance of the lower, more easterly stream cutting through the divide and drawing to itself the headwaters of the higher one.

This series of captures by lower tributaries is exhibited on a grand scale and in a mature form in the Loup system. Another example on a smaller scale, and in its incipient stages, is shown in Fig. 3. The streams *a* and *b* have each captured the headwaters of some streams lying westward, and *a* threatens to capture the headwaters of *b*.

In this case, on the Republican River, the slant of the country is directly east, and is due to the Rocky Mountain upheaval, which gave an eastward tilt to the great plains.

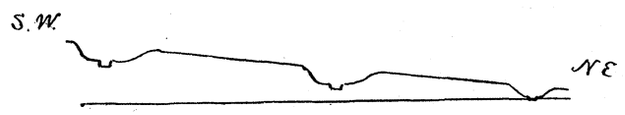

FIG. 2.

In the Loup region there is also, in addition to the eastward slope, a pitch to the north-east, which has a more local origin, but is, none the less, an important factor in the evolution of the Loup system. The last great tertiary lake (Cheyenne) submerged the Loup and the Republican completely, but left the upper Platte a vigorous mountain stream, bringing down silt at a rapid rate. This silt, quickly subsiding in the still lake waters, formed a succession of bars off the mouth of the river, as the shore line shifted east and west in the vicissitudes of climate, and of upheaval and subsidence. There was no permanent point of discharge, and consequently no permanent single bar, but a general distribution of silt in and along the channel of the Platte, which accumulated to such an extent as to raise the level of this river above that of the Loup on the north and the Republican

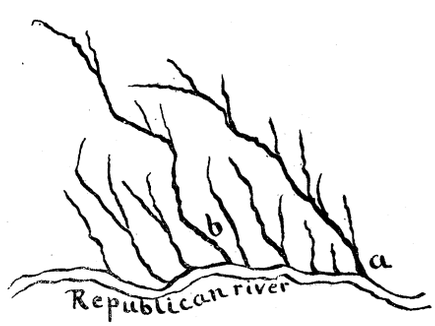

FIG. 3.

on the south. This is true in the case of the Loup, notwithstanding it is a tributary of the Platte, and the anomally is explained by the lower gradient of the Loup. The tributary is at the same level as the parent stream at the point of confluence, but the Platte falls 7.1 feet per mile and the Loup only 5.6 feet per mile. This brings the Platte rapidly above the Loup in following them upwards from the point of confluence. It is true that this lower gradient of the Loup is itself anomalous, so that I have only explained one anomaly by another. The full explanation of the second would require another article.

The natural result of excessive deposition along the Platte would be to crowd the mouths of its tributaries eastward and obliterate their old channels. Not only would they be turned to the east by the mass of silt in their former path, but

they would be crowded upon each other and unite in a main trunk almost parallel to the Platte, like the lower Loup. The two causes, headwater erosion and Pliocene channel-filling, have worked together harmoniously. The former has swept the upper courses westward by a series of captures; the latter has crowded the mouths of the tributaries eastward and made them coalesce into a single large tributary. Thus a number of separate tributaries entering the Platte nearly at right angles have been wheeled into an oblique position, and evolved into one great tributary system, whose volume rivals that of the parent stream. L. E. HICKS.

NOTES AND NEWS.

A TELEGRAM has been received announcing the illness of the Right Rev. John J. Keane, D.D., president of the Catholic University of America, and requesting that the date on which his address, before the Brooklyn Institute, on "Leo XIII. and the Social Problems of the Day" is to be given be postponed until Bishop Keane is able to come to Brooklyn to deliver it.

— Those who interest themselves in the aboriginal languages of Australia, will hear with much satisfaction that the vernacular of the natives of the MacDonnell range, South Australia, has been studied and committed to writing by their missionary, Rev. H. Kempe, who resides on the Finke River mission. His grammar and vocabulary occupy the first fifty-four pages of the Transactions of the Royal Society of South Australia (Vol. XIV., Part I., July, 1891, 12mo), a periodical edited by Professor Ralph Tate, Adelaide, W. C. Rugby, publisher.

— On the 9th of January representative scientists from the different parts of the State met in Austin, at the University of Texas, and organized a Texas Academy of Science. The officers are: president, Dr. Everhart, professor of chemistry, Austin; vice-president, Mr. Dumble, state geologist, Austin; treasurer, Professor Nagle, Agricultural and Mechanical college, Bryan; honorary secretary, Dr. Macfarlane, professor of physics, Austin; members of council, Dr. Halsted, professor of mathematics, Austin; Mr. von Streeruwitz, State Geological Survey; and Dr. Simonds, professor of geology, Austin.

— At the late annual meeting of the Iowa Academy of Science Mr. R. Ellsworth Call exhibited a remarkable specimen of the human hyoid bone, taken from a male subject. The basi-hyal was excessively irregular on the anterior surface with complete obliteration of the median vertical ridge; the anterior aspect was also somewhat concave. The right cerato-hyal was entirely wanting; the left was nearly as long as the thyro-hyal on its side, and was styliform in shape. It was completely ankylosed to the basi-hyal. On the side on which the cerato-hyal was wanting there was no evidence of any structure corresponding to the cerato-hyal and no indication of a synovial bursa or structure which would show that it had ever existed. In addition, the muscles of that side were attached to the basi-hyal, and this was believed to be the cause of the disappearance of the vertical median ridge and the cause of the roughened characters presented by the anterior surface.

— The second annual meeting of the Nebraska Academy of Sciences was held at the University of Nebraska, commencing Thursday, Dec. 31, 1891. The programme was as follows: the president's address, Specialization in Science (Dr. Kingsley being absent, the address was read by Dr. C. E. Bessey); The Slime Moulds of Crete, by A. T. Bell; The Evolution of Oxygen by Plants, by A. F. Woods; Additions to the Flora of Nebraska, by by Professor G. D. Swezey; The Flora of the Black Hills, by Dr. C. E. Bessey; Metabolism, by Dr. H. B. Lowry; A Bacterial Disease of Corn, by H. B. Duncanson; Notes on the Flora of the Artesian Well at Lincoln, by J. R. Schofield. The officers for 1892 are: president, Dr. Charles E. Bessey, University of Nebraska, Lincoln; vice-president, Professor G. D. Swezey, Doane College, Crete; secretary, W. Edgar Taylor, State Normal School, Peru; custodian, Lawrence Bruner, University of Nebraska, Lincoln; trustees. Ex-Superintendent E. T. Hartley, Lincoln, and Dr. H. B. Lowry, Lincoln.

— In a paper presented to the Iowa Academy of Sciences, recently, Miss Minnie Howe, assistant in biology in the West Des Moines High School, described a series of experiments made by her at the Iowa State University during the winter and spring of 1891, together with their results. The problem which Miss Howe attempted to solve was the separation of the *Bacterium, Bacillus subtillis,* from the yeast plant *Saccharomyces cerevisiæ* found together in ordinary soft yeast. She sought, also, to obtain pure cultures of each and to determine the part that each played in bread-making. It was found that bread made of sterilized flour and raised with the pure bacillus culture was light, but not as spongy as ordinary bread, sweet, close-grained, rather dark-colored, smelling and tasting much like "salt-raised" bread. Bread raised with the pure yeast culture under exactly the same conditions as the first was somewhat light, sweet, not so fine-grained nor as light as either ordinary bread or that made with bacteria. It had a peculiar insipid taste, with an odor unlike that of either of the other kinds. The result of these experiments seems to show that neither the yeast plant nor the bacillus alone will make as good bread as both together; that either without the other will produce alcoholic fermentation and cause bread to rise; that the bacillus is rather more efficient alone than the yeast. Further experimentation is projected along the same line, since no one set of experiments can be regarded as conclusive.

— "The influenza is once more in the air," says the *British Medical Journal,* "wafted hither and thither throughout the habitable world, a formidable, disabling, and fatal pandemic. Once more we are urgently asked on all sides, 'Have we a specific? Can we offer a cure?' It is the old delusion and the everlasting and unreasoning, but excusable, impatience for the miraculous and the impossible.. 'Disease comes by Providence and goes by medicine;' that is a durable and popular formula. Of specifics for sale there are, of course, a legion. To sell them is the business of the quacks; the Matteis, the Holloways, the Morrisons abound in specifics. There are a dozen available for cholera, for typhoid, for small-pox, for hydrophobia, for carcinoma — all equally plausible and equally useless except for commerce — and why not for influenza? But is there a specific for any disease? It is more than doubtful. The more we know of the nature and cause of disease, of its origin and life-history, the less we are inclined even to expect the discovery of specifics. Disease we know not as an entity, an enemy to be struck down with a club, or to be expelled by a drug, but as a process, the change of tissues and of fluids, the growth of a microbe, the proliferation of a cell, the secretion of a virus. We can modify the processes, we can lessen their virulent products, we can fortify against their worst effects; we can aid the evolution and perhaps guide it to health; sometimes we can arrest it; and often we can anticipate it. Thus we know how to ward off many diseases. Cholera, typhoid, small-pox, hydrophobia are enemies whom we can meet at the gate and forbid their approach. Deaths from either of these preventable diseases are, for the most part, violent deaths, inflicted by the ignorance of the people, the neglect of the sanitary authorities. *Populus vult mori.* In their search for specifics they parley with the enemy and lose their lives. Of influenza we know less than of most other infections; it is aerial, communicable from person to person, and along the lines of travel. For it, as for scarlet fever, we have only isolation as a preventive and palliatives as a treatment. Perhaps one day we shall know more; but there does not seem any likelihood of the discovery of a specific, and judging from numerous analogies it is far from certain that there is in this any ground for reproach. At any rate, it comes badly from a public and from a generation which is content to leave Great Britain without even one Institute of Preventive Medicine, and which is left to an appeal for funds from a Lister and a Roscoe to found such an institute — in which lies a chief hope for further life-saving and the advance of preventive and curative knowledge — while millions are lavished on weapons of destruction, or the more obvious means of charitable relief to physical suffering; and finally on the purchase of fraudulent 'specifics.'"