made up until actually sold to passengers, which would oblige sleepy passengers either to sit up during transit through that intelligent commonwealth, or else sleep with entire indifference to the dusky porter and the possible new-comer, and sundry joint operations not, as most of us know, over-conducive to balmy and seductive repose.

What, then, we really require is not a new law, or a new custom, or a new statute, but an infallible foresight and judgment. Our newspaper leader-writers are not, unfortunately, the only gentlemen in the country who can prophesy things after they come to pass. There are plenty of gentlemen, equally competent in that regard, now employed upon the railway lines of this continent. If, however, a gentleman could be found with the much rarer gift of prophecy as to things to come before they actually transpire, I imagine that it would be difficult to name a salary he could not command from a railway company. Indeed, neglect by a railway company to secure the services of such advance prophet ought certainly to be such a negligence as would settle the company's liability entirely beyond all possible legal inference. There is nothing upon which newspaper comment is more familiar than the well-worn theme of the fallibility of human testimony: even four inspired Evangelists, they tell us, could not agree upon a given state of facts. They press this fallibility against railroad companies. Do they ever press it in their favor? That the average newspaper should experience a difficulty in conceiving that every railway accident was beyond the company's control does not amaze me; but I admit to some surprise at the following criticism upon my paper, in the *Railroad Gazette*, a most valuable and intelligent commentator, usually, upon railway affairs: viz., "At Republic, he [myself] says the man sent with a red light failed to carry it; no mention is made of the fact that two men failed in their duty to send him. Concerning Forest Hill, Mr. Morgan makes the original assertion that no appliance in the company's power to provide was lacking; which, perhaps, must be admitted as true, as a competent bridge-engineer (which the company neglected to provide) could not be called an 'appliance.'" So far from exploding, this appears to me a much stronger putting of my point than I was equal to on the facts as they reached me. According to the *Gazette*, the fault at Republic was not that the one red-light man did not go ahead, but that two officials did not send him. So, not one human brain, but two, failed to do their duty. If, as I argued, a corporation cannot control the deflections of even one human brain, how can it control the deflections, independent and coincident, of two? The fact that one man was absent-minded, I held to be beyond the power of a corporation to prevent. But the utterly unprecedented coincidence of two brains at the same moment, in the same spot, and under the same circumstances, forgetting their duty, — and that duty their identical duty to do identically the same thing, — does really seem to me to be about as nearly an absolute act of God as any case of which most experts could conceive. And, again, supposing that the inspector of bridges of the Boston and Providence Railroad was incompetent: here, again, a human brain was at fault. If it can be shown that the Boston and Providence Company knew him to be incompetent, or had discharged a competent bridge-inspector to deliberately install an incompetent one, that would have been another matter. But it does not so appear, neither does it appear that any bridge inspected by this particular bridge-engineer had previously fallen. Speaking of this unfortunate bridge-engineer of the Boston and Providence Railway Company, the Massachusetts Board of Railway Commissioners says, "This man had been in the employment of the corporation for a long series of years, his trade was that of a machinist, he had not been educated as a civil engineer, and the management had abundant reason to know that he was not qualified, and had had no opportunity to qualify himself, to do the work assigned to him with reference to this bridge." *Ergo*, had he been discharged prior to the accident, the accident would not have happened. Perhaps not. If a railway company could only foresee accidents, could know in advance just exactly when one of its bridges was going to collapse, doubtless it could avert the disaster by discharging the bridge-inspector, so that he could not report that bridge secure, so that no train would try to cross it (which would resemble, indeed, the intrepid mariner who warded off a cyclone by collaring the barometer and holding it upside down). But, seriously, should our railway companies every now and then discharge their old, tried, and faithful employees — men "who had been in the employment of the corporation for a long series of years" — lest they should at some time or other in the future become unfortunate, unfaithful, or careless? Perhaps a man not "educated as a civil engineer" could not possibly, after having been "in the employment of the corporation for a long series of years," come to know as much about railway-bridges as if in his youth he had spent a couple of years with a tutor, or in a polytechnic college. Does not the *Railroad Gazette's* statement of the causes of the Forest Hill accident exactly carry out my own criticism; namely, that a human brain, trusted and unusually accurate, for once failed to do its work?

APPLETON MORGAN.

New York, Jan. 12.

The Pronunciation of 'Arkansas.'

J. OWEN DORSEY'S article in *Science* for Jan. 13, re-opening the question of the pronunciation of 'Arkansas,' necessitates a few words in reply.

I fear that Mr. Dorsey fails to catch the spirit of my plea for the local and historically correct pronunciation, when he dwells upon the various vowel-sounds of *a*, and accuses me of pleading for 'consistency' in the pronunciation of this most inconsistent Anglo-American language of ours. Such an act upon my part would certainly be in opposition to my favorite hobby of observing and collecting data upon the differentiation in orthography, pronunciation, and vocabulary, under climatic and industrial conditions, of the English language in the United States.

The broadening of *a* into *aw*, the Indian origin, and the euphony of the word to foreign ears, are questions of the least import in the pronunciation of the word 'Arkansas;' for the first of these is probably French-Indian or a secondary climatic change visible in hundreds of other words, such as 'W*a*bash,' 'Ouachit*a*,' 'Waukesh*a*,' etc., and which neither Mr. Dorsey nor I, nor any one else, can stop, more than we could put a brake upon any other evolutionary biologic or linguistic process. The evil effect that would follow the use of individual choice in the euphonious pronunciation of geographic terms is self-evident; and, since these Indians had no phonetic method of recording their tribal names, we must seek the approximately correct pronunciation of the word 'Arkansas' in the French language, in which it was first phonetically recorded. Surely, Mr. Dorsey cannot find there any authority for the pronunciation of the final syllable 'saas,' or omission of the final *s*. Certainly none of the examples given by him would authorize this, nor any of the following historical methods of spelling the word, which Mr. Dorsey seems to have overlooked: Joliet (1672), 'Kansa;' Hennepin's map (Utrecht, 1697), 'A Kansa;' Dumont de Montigny's map (1753), 'Arcanças;' Le Page du Pratz (1758), 'Arcancas;' and many other later French writers, 'Arkansas;' all of which, in good French, can only be pronounced 'Arkânsâ.' I think no further examples are necessary to show that the original French pronunciation was much nearer '-sa' or '-saw' than 'saas.'

But this is only one, and the least, of the many reasons why the local pronunciation should be preserved. The present territory of the State of Arkansas was first settled by a colony of Frenchmen, sent out by the celebrated financier, John Law, about the year 1720. They settled in the country of the 'Arkansas' Indians at Arcansas Post, around which their descendants have lived until the present day, and which was the nucleus of all the early Anglo-American migrations into Arkansas, and from whom they got their pronunciation of the French geographic nomenclature. These people still pronounce the word 'Arkâns*â*' and 'Arkan*saw*.' They can see neither logic nor reason in 'Arkan*saas*.' Nor are they to be blamed that they memorialized the Legislature of the State through the Historical Society of Arkansas a few years since, when exasperated by the attempts of foreign euphonists to force the 'saas' pronunciation upon them, and to ridicule the only historical and phonetically correct pronunciation of the word, to set the matter at rest by legalizing the old pronunciation of the word, which was done by an almost unanimous resolution of the State Senate.

Have the customs and rights of the millions of Anglo-American and French-American pioneers and descendants in this region no

voice in the matter of the local nomenclature? Suppose that they, for the sake of euphony, should say that 'Worcester' (Mass.) should be pronounced 'Wor-ces-ter,' or 'Tehuacana' (Tex.) 'Tee-hu-a-can-a,' or 'San José' (Cal.) 'Saint Jo,' etc.: they would be termed ridiculous. If Anglo-Americans should agree to abandon the original pronunciation of all the French and Spanish spelled geographic terms of the South-west, I would agree with Mr. Dorsey, "that, when the regular Indian pronunciation cannot be maintained, let us use one that is euphonic English;" but as long as we pronounce the final syllable of the following partial list of French-American denominatives 'a' or 'aw,' all of which had the same origin and belong to the same category as 'Arkansas,' I shall oppose the singling-out of the latter word for euphonic experimentation: Attakapas, Tensas, Arkansas, Opelousas, Quapaw[1] (Kapas), Chickasaw[1] (Chickachas, Tchicachas).

Now, let us drop the word 'Arkansas' for the present, and take a look into the pronunciation of the geographic nomenclature of the western United States, which had its origin in the romance-speaking people, and its modifications by the Anglo-Saxon migrants, and lexicographers. Mr. Swinburne has given some fine illustrations of this in his able article 'The Bucolic Dialect of the Plains,' in a recent number of *Scribner's Magazine;* but there some general laws can be drawn from my observations in the Upper and Lower Mississippi valley, which I think are worthy of consideration. They are as follows: —

(1) In the north-west, the Latin-American geographic names, or Indian names spelled in the Latin languages, are generally spelled correctly by Anglo-Americans, but often mispronounced. Examples: 'Terre Haute,' 'Detroit,' 'Versailles,' 'Kansas,' 'Vincennes,' etc.

(2) Latin-American names of the south-west, or Indian names spelled in Latin languages, are often wrongly spelled by Anglo-Americans, but usually pronounced with approximate correctness. Examples: 'Bosque' ('Basque'), 'Turn Wall' (rare) ('Terre Noir'), 'Low Freight' ('L'Eau Frais'), 'Boggy' ('Bogie,' proper name), 'Tensaw' ('Tensas'), 'Prairie Dan' ('Prairie d'Ane'), 'Arkansaw,' 'Waco' ('Hueco'), etc.

It seems indeed paradoxical that the best educated and most literate population should have been least correct in the pronunciation; but when it is remembered that the Southern migrants procured their pronunciation by direct contact with the French and Spanish speaking people, and that the Websterian pronunciation was invented far from the scene, and in a day when modern languages received little attention, and the monopolizing classics pronounced even the mother Latin in the euphonious *veni, vidi, vici,* method, it was nothing but natural, that, "while Noah Webster in Connecticut was proposing single-handed to work over the English tongue so as to render it suitable to the wants of a self-complacent young nation," he should have fallen into the error of writing in the former editions of his valuable dictionary, "Arkansas, formerly pronounced and sometimes written 'Arkansaw.'"

It is gratifying to note, that, with the increased facilities for travel of late years, these erroneous arbitrary pronunciations are wearing away, and that Webster's latest edition gives the pronunciation 'Ar-kân-sa.'

ROB'T T. HILL.

U.S. Geol. Surv., Jan. 17.

The Iroquois Beach.—A Chapter in the History of Lake Ontario.

I SEND you the following abstract of a paper read by me before the Washington Philosophical Society, Jan. 7, 1888.

Of the high-level beaches about Lake Ontario, the most important is that to which the writer has given the name 'Iroquois,' after the Indian confederation who used portions of it as a trail. Fragments of this beach have long been known, but these were first correlated in New York by Mr. G. K. Gilbert, who discovered that the variations in its height were due to the differential elevation of the earth's crust. These investigations have been carried around the Canadian side of the lake by the writer, whose studies upon the origin of the Great Lakes date back for a decade. He has also followed the beach beyond the observations of Mr. Gilbert, in north-eastern New York, across the axis of maximum northern uplift, among the Laurentian ridges. In the old sea-cliffs in the region of Black River the author has found evidence of still older and greater differential elevation. At the head of the lake the height of the beach is 363 feet, south-east of the lake 441 (Gilbert), north-east, near Watertown, about 700, and at Trenton, Ont., 657 (barometric) feet, above the sea, in place of 247 feet, — the elevation of the modern lake. It is usually located within a few miles of the modern shore. At the south-eastern margin this beach sweeps around and includes Oneida Lake. North and east of Belleville, the lake, at this epoch, covered a large region, stretching to the Ottawa and down the St. Lawrence River. The maximum depth of the lake was 1,000 feet, in place of 738 feet, as at present; and of the outlet, 800, in place of a maximum of 240. The characters of the beach are described. Upon the northern side it rests upon drift-hills, but these are often replaced by more or less rocky shores upon the southern side. From Hamilton to Rochester, the eastward equivalent of the upward warping is three-fourths of a foot per mile, thence to Oneida Lake only one-fifth of a foot, and beyond a downward movement is indicated. At the eastern end of the lake the uplift increases from three feet to about five feet per mile, in proceeding northward. About the western end of the lake the northern equivalent of differential elevation ranges from 1.4 feet to three or four feet about Georgian Bay. The foci of elevation are south-east of James (Hudson) Bay. During the Iroquois epoch the lake was less than 140 feet above tide, and may have been at sea-level. In either case the outlet of the lake would have been 800 feet deep in places. There was no rock nor dirt barrier. Until further investigation shows the necessity, no other barrier will be assumed. In the Iroquois beach, remains of mammoths, elk, and beaver have been found, but no shells are known. There are lower beaches which are less perfectly developed, yet these show a decline of the warping forces. The Iroquois beach is coincident with the level of the Mohawk valley. Ontario was united with the other Great Lakes at a common level (the altitude being much lower than at the present day). This common lake (until the separation of Ontario) is here named Lake Warren, in honor of Gen. G. K. Warren, whom the writer regards as the father of lacustrine geology in America. Lake Warren is posterior to the last great ice epoch, and Ontario somewhat younger. Although the Ontario basin was somewhat warped before the Iroquois epoch, yet, so far, there is no evidence that the smaller basin formed an earlier separate lake.

In the study of the lakes the two great questions are, the origin of the valleys, and the cause of their closing into water-basins. As the valleys were shown long ago by the author to be preglacial, the second question is now being solved by the labors of Mr. Gilbert and the writer. Much unpublished information has been collected, and very much more is needed. There is now a dawn of light upon the theory and origin of the Great Lakes of North America.

J. W. SPENCER.

[1] The old French methods of spelling these words are given in parentheses. They are instances of words wherein the orthography has been sacrificed, and the pronunciation approximately maintained.

Weather-Predictions.

IN addition to Mr. Clayton's letter on this subject in *Science* for Jan. 13, I would state that I have never objected to a fair interpretation of 'my rules' so called, which, however, were an amplification of his own. Long before the predictions closed, I wrote him, suggesting that when one predicted 'rain,' the other 'threatening,' and the weather was actually 'fair,' the prediction nearer the truth should have the more weight. It is easy to see that the intent of any rules could only be a fair comparison between predictions. As I have already stated (*Science*, Dec. 30, p. 323), in two cases Mr. Clayton came nearer the actual weather, and in eight mine were the nearer. It was only after Mr. Clayton refused this proposition and any reference to a third person that I referred the matter to an impartial judge.

I am very glad indeed to find Mr. Clayton insisting, that, when predictions are made according to a certain rule, they should be verified thereby. In the case before us I have gone over all of Mr. Clayton's predictions in the *Boston Transcript*, and find, that, if he had modified them otherwise, they would have received the same verification by Upton's scheme as by mine, or, under the most lib-