case of the Roaring Run and Apollo wells, it may be possible that no porous stratum, which could serve as a gas reservoir, was pierced by the drill: this, as already stated (*Science*, July 17), is the first necessary condition of the existence of gas.

The Ridgway gas-well is located in a syncline, and not on a subordinate anticline, as has been suggested, but at a point where there is a certain regular dip of about 1° toward the west, on the side of the syncline. The Kane gas-wells — including the large one at Kane, which is now supplying the residents of the town with light and fuel, and the famous Kane geyser (gas) well — are both in a syncline, the south-east dip, in the one case, and the north-west dip, in the other case, toward the centre of the basin, being less than fifty feet per mile; and the south-west dip along the axis of the basin being from fifteen to twenty-five feet per mile. The great McMullen & Hallet gas-well, commonly known as the 'Mullen snorter,' is not in the vicinity of any anticline. The gas-sand at this well is nearly horizontal, having a dip of about eleven feet only in a direction S. 15° W.

The gas-wells found in the vicinity of the city of Erie are located in a region where no anticlines or synclines have been discovered. The dip of the rocks here is toward the south-west, at the rate of about twenty feet per mile, from recent surveys: or from the surveys made nearly fifty years ago, by the First geological survey, as pointed out by Professor Lesley, the average dip was estimated to be fourteen feet per mile. Gas-wells have been drilled in the vicinity of Fredonia, New York, one as early as 1821. Gas is still obtained here; and, as far as the structure has been made out, no anticlines exist in the vicinity of the Fredonia wells.

While these few facts would seem to be enough to show that all gas-wells, either in the vicinity of productive oil territory, or at considerable distances removed therefrom, are not necessarily in the vicinity of anticlines, many instances might be cited, particularly in the gas regions recently developed in Pennsylvania, to show that some of the largest and most productive wells are either on or in the vicinity of anticlinal crests. I am free to admit, as I have already done, that the position of anticlines and synclines have an important bearing upon the location of profitable gas-wells; but I cannot believe that, in view of our present knowledge, the 'anticlinal theory' is sufficient to account for all occurrences of natural gas. As to whether it will be possible for facts still to be recorded to give any geologist an adequate basis for the formulation of an ultimate theory, we must await the results of Mr. Carll's present investigation.

CHAS. A. ASHBURNER,
Geologist in charge Penn. surv.

907 Walnut Street, Philadelphia,
Aug. 24.

Annuaire géologique universel.

The undersigned being mentioned, under the name of Dr. *Svedonius*, amongst the collaborators in the above-named work recently published by Dr. Dagincourt in Paris, and two articles on Sweden and Norway appearing in the same, signed in my name, of which I had no knowledge *until after* their publication, I do hereby declare that the said articles are not composed by me, but are uncritically compiled from two pamphlets printed in the years 1874 and 1878, and are, consequently, now substantially antiquated pamphlets, with the authorship of which I had nothing whatever to do. These pamphlets, together with several others on the same subject, I have, at the request of a Swedish man of science, forwarded to Dr. Dagincourt, emphatically pointing out the time of their publication; and to this my collaboratorship in the annual is restricted.

DR. F. SVENONIUS,
State geologist.

Stockholm, July 31.

Probable period of gestation in the 'horned toad.'

On the 15th of May last I captured a very fine specimen of an adult female Phrynosoma Douglassii. The fact having long been known to me that these reptiles are capable of sustaining prolonged fasts without any apparent inconvenience, I determined to test the question for my own satisfaction and information. Accordingly, this specimen was placed where it was impossible for it to secure any food. One month after its incarceration it was taken out to be examined. No particular change was noticeable; the barest traces of emaciation could be seen in the limbs; but the creature upon being teased puffed itself up, as they do, and made short leaps with open mouth at my finger. It also ran nimbly about my study.

It was replaced in its limited quarters, and another month passed by without its having taken a particle of nutriment. Its eyes now had a slight sunken appearance, and some shrinkage of the limbs could be detected. I dipped it in water for a moment, and once more introduced it to its narrow prison. At this stage of the proceedings my chief surprise arose from the fact that the body of the animal still retained its rotund contour, and was, if any thing, plumper than at the time of the inauguration of the experiment.

Upon this date it had passed no excrementitious matter for nearly three weeks.

My surprise was great, when, in looking into the box on the afternoon of the 10th of the present month, to find strewed about the bottom of it no less than seven newly-born young. These were all dead, and enveloped in their membranes, which latter also enclosed a bright yellow yelk about as large as a small pea. At the time, circumstances prevented me from making any further examination; but, two hours later, my astonishment was at its pitch, when I found *fourteen* more young had come to light. Two of these were without the membranes and yelk, but every one of the twenty-one was dead.

Upon examining the mother, it was at once evident that her labor had not terminated; and, indeed, within the next ten minutes she was delivered of three more young ones. These were all born tail first: two of them were living, and had to be simply freed from their envelopes, the yelks having been absorbed. The remaining one was like the majority of the others, and lived but a moment or two.

As I write these lines I have before me twenty-two of the young in alcohol, two live and active little fellows of the same brood, and the mother-lizard, who, though she has lost much of her original activity and flesh during her *three months*' test, looks for all the world as fully capable of enduring many more days of it.

Taking all the circumstances I have related into consideration, I believe it will be found that about one hundred days is the period of gestation of this viviparous reptile.

It will be of interest to state, in the present connection, that other lizards endure these fasts as well as Phrynosoma; for I have a large Sceloporus, un-

dergoing the test, that has suffered but very little, not having partaken of any food whatever for over a month.

I had a live Sceloporus consobrinus about my room here nearly two months, but one day it was missed, and ten days afterwards it was found in a dark corner. Nothing remained of it but the skin, enclosing a perfect skeleton and seven eggs. These latter had firm white shells, and were each of an elliptical form.

R. W. Shufeldt.

Fort Wingate, N. Mex., Aug. 12.

Color and other associations.

In the matter of color association with months, I have a relative who associates June and green, October and light crimson, December and blue.

I have strong color association with certain names; for example, —

Henry, Henrietta	= grass-green.
Sophia,	= dark green.
Louise,	= violet.
Charlotte,	= deep purple.
Alice,	= black and gold.
Francis,	= white and gold.
Emily,	= primrose-yellow.
Susan,	= pale blue.
Lucy,	= clear blue.
Anna,	= gold color.
Caroline,	= Naples-yellow.
Agnes,	= pearl gray.
Frances,	= pale fawn.
Lydia,	= a gay plaid, pink and green predominant.

Some of these, I suspect, are caused by the vowel in the name of the color and the proper name being the same. Lydia, perhaps, may wear the dress of the first owner of the name I ever saw. The others I cannot account for.

The months stand in a circle: December, January, and February grouped close together on the upper, or right hand; March and April curve around; May has a little more room; June, July, August, and September are wider apart; October and November correspond to March and April on the other side. The winter months are in the shade; the summer ones in a strong light.

F. M. Slack.

THE LICK OBSERVATORY.

To German parents in Lebanon county, Penn., in the year 1796, was born a son, who received the name James Lick. As a boy, he learned the piano-maker's trade in Philadelphia, where, in youth and early manhood, he led a varied life, engaging in divers occupations, from the making and selling of furniture and pianos, to the managing of a theatre. When about thirty-five years old, he went to South America, where he resided chiefly at Buenos Aires, acquiring property to the extent of about forty-five thousand dollars, with which sum, in 1847, he emigrated to the site of the present San Francisco, and invested it in real estate. In a quarter of a century he found himself worth a fortune nearly one hundred times as great, which, by the execution of a deed of trust, he placed under the control of a board of trustees, of which Mr. Richard S. Floyd is now the president.

Mr. Lick died at the age of eighty years. His chief scientific bequest was the sum of seven hundred thousand dollars, for the erection of a great observatory at a mountain elevation. He was anxious to secure the highest elevation consistent with ready accessibility; and Lake Tahoe, nearly eight thousand feet above sea-level, was about the first site which came prominently to his notice. The proposed locality was visited, investigated, and rejected; and the site of Mount Saint Helena, an eminence much nearer San Francisco, was visited by Mr. Lick in person. Early in 1875 Mr. Thomas E. Fraser suggested Mount Hamilton, in the county of Santa Clara, as a desirable site; and, on his recommendation, Mr. Lick decided upon this eminence for the permanent location of the great observatory. Mount Hamilton is situate in the Pacific coast-range, about fifty miles south-east of San Francisco, and thirteen miles in a direct line from San José, the nearest city. A telephone-line, and an excellent mountain road, now connect the two.

Mount Hamilton has a treble-pointed summit, about forty-five hundred feet high; and no mountain within a radius of one hundred miles approaches this elevation. The two extreme peaks of the general summit are nearly a mile distant from each other, in a north-east, south-west direction. The southernmost peak is bare of all woody growth, and its lines converge to form an angle slightly acute. Although about a hundred and twenty-five feet lower than the northern summit, this peak was chosen by the trustees for the location of the observatory, on the advice of Professor Newcomb and Mr. Burnham; as it presented the greater advantage in point of accessibility, configuration, and a minimum of obstruction to the view south, east, and west. The first work was to cut down this apex; and about forty-five thousand tons of rocks were removed, leaving an irregularly oval plateau, about four hundred and fifty feet in length, and with an extreme breadth of about two hundred and twenty-five feet. The lands about the mountain, which are set aside for observatory purposes, comprise a government reservation of about fifteen hundred acres, to which the trustees have added a hundred and sixty acres by purchase.

The first astronomer who visited the site of the projected observatory was Mr. Sherburne