into dense balls, epiphyte ferns are in abundance, fallen trunks are covered with moss, and the path through the jungle chokes up so quickly that it has to be cut open often. The jungle is said to contain 1,500 species of trees. The Malays are very keen in perceiving distinctions, and recognize two species of oaks there which the botanists have not yet discriminated. On the heights the aspect becomes more European, *Viola*, *Ranunculus*, *Primula*, *Lonicera*, *Lobelia*, *Oxalis*, etc., appear, and Wallace explained this by supposing these northern forms were pushed south by a glacial climate and on the retreat of the ice they themselves retreated to the mountains.

EDWARD S. BURGESS,
Secretary.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

AT the meeting of the Academy of Science of St. Louis, on the evening of June 3, 22 persons present, the following subjects were presented:

A paper by Dr. Gellert Alleman, on 'The Action of Alcohol on Certain Isomeric Diazo Compounds,' and one by Dr. G. Hambach, entitled 'A Revision of the Blastoideæ,' were presented by title.

Mr. Wm. H. Roever, of Washington University, read a paper on 'The Effect of the Earth's Rotation upon Falling Bodies,' in which he showed that a body falling from a great height has a southward deviation in the northern hemisphere and a northward deviation in the southern hemisphere. The deviation is given by the formula—

$$\Delta = h\left[\frac{\left(1+\frac{h}{R}\right)^3 K \sin\phi\cos\phi}{1-\left(1+\frac{h}{R}\right)^3 K\cos^2\phi} - \frac{1}{\left(1+\frac{h}{R}\right)}\cdot\frac{K\sin\phi\cos\phi}{1-K\cos^2\phi}\right],$$

in which h is the height through which the body falls, R the radius of the earth (assumed spherical), ϕ the latitude of the place of observation, K the numerical fraction $\frac{1}{289}$ and Δ the deviation. If h and R are given in feet, Δ is in feet.

For $h = 578$ feet and $\phi = 45°$, $\Delta = .00133$ inch.

Mr. G. Pauls presented a number of specimens collected at Eureka, Mo. He exhibited a large number of galls on hickory, maple and oak leaves, commenting on the remarkable variety of the forms of galls made by the minute insects. He had bred a good many of these insects, and found that in successive years a good many different forms came from these galls.

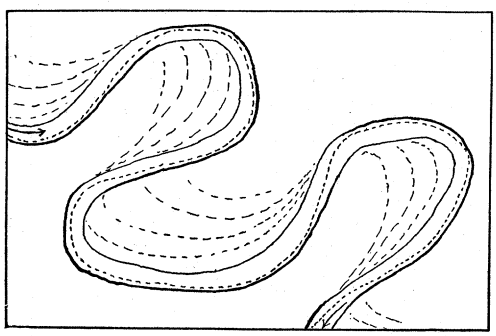
WILLIAM TRELEASE,
Recording Secretary.

CURRENT NOTES ON PHYSIOGRAPHY.

NEW MAP OF THE MISSISSIPPI.

THE 'Preliminary Map of the Mississippi River from the mouth of the Ohio River to the head of the Passes,' published by the Mississippi River Commission (1881–1885, 32 sheets, one inch to a mile), is now to be supplemented by a new edition, of which 13 sheets are issued, bearing in red overprint the changes wrought by the river in about fifteen years. These new sheets are without question the most instructive exhibition of river work, quantitatively determined, yet published in this country; for a river of the first magnitude they have no rival in the world. They deserve to be widely known not only among engineers for whom they were primarily constructed, but among geographers and teachers to whom they convey much information. The general behavior of the meandering river may be inferred from the maps of the earlier edition, from which it appears that the meander system slowly moves down the valley, because the thread of fastest current, thrown toward the outer side of every curve, is therefore delivered to the down-valley side of every tangent or 'crossing' (so called because river boats must there cross the river obliquely in following the channel of greatest depth); and that the meander belt included between tangents drawn outside of the curves slowly widens as the curves increase in radius and arc until it here and there suddenly collapses when a curve is cut off. It may be noted in passing that it is for this reason that the abandoned curves—the ox-bow lakes—are frequently of larger radius than the average of the existing curves. The

down-valley shifting and the broadening of the meander belt are well shown by the pattern of the toe-taps of alluvium that are added, right and left, to the flood plain lobes as the meanders grow and shift, as in the accompanying figure.



All these systematic changes are directly shown by a comparison of the river banks in black and red on the new edition of the map; the wasting banks being systematically located on the outer and down-valley side of the channel, as indicated by heavy lines in the above diagram. Sheet 14 includes the remarkable serpentine meanders near Greenville, where the increase of radius and arc and the down-valley shifting are beautifully shown. Sheets 17, 18 and 19 include a number of curves in the neighborhood of Vicksburg, where the river has destroyed the old levees, thus necessitating the construction of new ones further back from the bank. The bends below Baton Rouge (sheet 25) exhibit relatively small change of position.

THE RIVER SPEY.

THE physiography of the Spey, a river flowing eastward from the Highlands of central Scotland to the North sea, is considered by Hinxman ('The River Spey,' *Scot. Geogr. Mag.*, XVII., 1901, 185–193). A number of the items presented are of interest, but the plan of the article does not imply a comprehensive view of the natural history of rivers. "The Spey valley for the greater part of its extent may * * * be regarded as the result of the slow erosion of the river, continued since early Paleozoic times"; this suggests altogether too great an antiquity; the incision of the Spey valley, and of all the existing valleys, glens and straths of Scotland, beneath the general level of the Highland summits, is probably not older than Tertiary, and certainly not older than middle Mesozoic time. The valleys of "the river and its principal tributaries * * * belong to a very early period in the history of the earth. That they existed before the Old Red sandstone age" is known, because patches of that formation still remain in them here and there; a safer statement would be that an uneven land surface, presumably a region of hills and valleys, was buried by the Old Red, and that some of these ancient valleys have been re-excavated; but it is very improbable that the main and branch valleys of the Spey system are in any close degree coincident with any single ancient valley system. Indeed, much may be said in favor of the initiation of these and certain other Highland valleys on a land surface that was deformed by the tilting and faulting which disturbed the Old Red itself. No special consideration is given to the stage of development of the Spey in pre-glacial time, or to the amount of change produced by glacial action, destructive or constructive; but certain features of the existing river are presented. One is the diversion of a small upper part of river Feshie from the Dee system to the Spey; the diversion is ascribed to normal retrogressive erosion, but it is not shown that the capturing stream had any special advantage over the captured, and no account is taken of glacial action.* Reference is made to the temporary enlargement of the Spey by waters from Glen Spean, on the west, when the lower course of the Spean was obstructed by ice in the Glen Roy district; but that the Pattack and several other barbed headwaters of the present Spean were preglacial members of the Spey system is not considered. Special emphasis is given to the abnormal slope of the Spey; the upper course falls 327 feet in 14 miles, the middle course falls 215 feet in 40 miles; and the lower

* According to the Ordnance map, a gorge on the Feshie two miles southeast of Ruigh-fionntaigh would seem to mark the site of the divide between Spey and Dee before the diversion; and the diversion appears to have been associated with some glacial control. The gorge is not situated where it should be if the upper Feshie had been diverted by retrogressive erosion.

course falls 600 feet in 43 miles. The Feshie makes a fan across the flat middle section of the Spey valley. It is assumed that the Spey once had a normal slope, and it is suggested that a relatively recent uplift in its lower third flattened the middle course and steepened the lower course. Explanation is thus found for the action of the stream in aggrading its middle portion with drift and in cutting down its lower portion in bed rock; but no confirmation for the suggestion of recent uplift is looked for in the neighboring valleys; the success of the suggestion in explaining what it was invented to explain is taken as its verification, without looking for unexpected consequences.

THE RIES.

THE divide between the headwaters of the Main and Neckar on the northwest and the Danube on the southeast is in general determined by the crest of a rather pronounced cuesta of Jurassic limestone, part of which is known as the Swabian Alp. The escarpment of the cuesta, facing northwest, is usually well defined; the back slope, towards the Danube, is on the whole remarkably simple and systematic; but near the middle of its curved length there is a curious, roughly hexagonal depression, called the Ries, about 18 k. in diameter, rather flat floored and well enclosed by the hilly borders of the uplands, with Nördlingen as its chief town. This highly abnormal feature has been likened to a gigantic *maare*, or pit-crater; but although volcanic rocks are confusedly mixed with many others—decomposed granite, schists, mesozoic, tertiary and quaternary—in the floor of the depression, a detailed study by Gruber ('Das Ries, eine geographisch-volkswirthschaftliche Studie,' *Forsch deut. Landes u. Volkskunde*, XII., 1899, 193–291, map, 12 figs.), ascribe the basins to dislocations, similar to those by which various other depressions have been produced in central Germany. It is not clearly explained, however, in just what shares dislocation and denudation are responsible for the basin; no definite statement is made as to the form that the surface had when dislocation took place, as to the form that dislocation produced, or as to the work of denudation on the dislocated form. It is, therefore, difficult to form a clear mental picture of the theoretical forms by which the observed forms are to be explained. In the second part of the essay, the people, settlements, occupations and products of the Ries are described.

W. M. DAVIS.

BOTANICAL NOTES.

'SAVE YOUR PUFF-BALLS.'

UNDER this title Mr. C. G. Lloyd, the well-known student of the higher fungi, has issued a circular asking botanists and others to save puff-balls of all kinds (excepting the large ones) for him. He intends to publish 'in the near future a detailed description of all the Gasteromycetes' and solicits specimens from every one who can help him. Due credit is promised for all specimens sent to him for this purpose. The monograph is to be profusely illustrated with photo reproductions of typical specimens of the species and also with micro-photographic enlargements of the spores and capillitium by Dr. Edward Thompson, an expert in this line of work.

In his directions to collectors Mr. Lloyd says: "For the purpose of study puff-balls must be ripe, that is, they must be full of dry dust. When young most kinds are white and when you cut them they appear like 'cottage cheese.' They are mostly good to eat in this condition, but not to study. The best time to gather them is just when they are getting ripe, just when the white has become moist and discolored and the spines are just drying up and beginning to flake off." * * * "Simply pick them up, handle them carefully so as not to mash them, and if they are just ripening and are moist, spread them out on the floor in a garret or where they will be out of the way and let them dry. Then pack them loosely in a little wooden box; don't squeeze or bruise them." "If your boxes are not full, pack in loosely a little cotton or tissue paper (cotton is better) to fill out. Do not wrap in paper or put in paper bags." Send the boxes, securely wrapped, by mail or express, to Mr. Lloyd at Court and Plum streets, Cincinnati, Ohio.

A NEW WORK ON TREES AND SHRUBS.

THE announcement is made by Messrs. Houghton, Mifflin & Co., of Boston, Mass., that