VALUES OF M'S AND N'S, WITH LIMITING DECLINATIONS.

	Decl. at which Term can amount to $0''.005$					
	$x_1=30'$, $y_1=30'$			$x_1=1^\circ$, $y_1=1^\circ$		
	$da\cos\delta=10'$ $d\delta=10'$	$30'$ $30'$	1° 1°	$10'$ $10'$	$30'$ $30'$	1° 1°
$N_3=-1/2\, da^2\cos^2\delta\,(\tan^2\delta-1)\sin^2 1''$	0°.0	0°.0	0°.0	0°.0	0°.0	0°.0
$+d\delta^2\sin^2 1''$	0.0	0.0	0.0	0.0	0.0	0.0
$-3/4\, da^2\cos^2\delta\, d\delta^2\,(\tan^2\delta-1)\sin^4 1''$	75+	75+	75+	75+	75+	75+
$+1/24\, da^4\cos^4\delta\,(\tan^4\delta-12\tan^2\delta+5)\sin^4 1''$	75+	75+	75+	75+	75+	75+
$+2/3\, d\delta^4\sin^4 1''$	75+	75+	75+	75+	75+	75+
$N_4=da^2\cos^2\delta\tan\delta\sin^3 1''$	75+	75+	46.3	75+	46.3	14.6
$+1/2\, da^2\cos^2\delta\, d\delta\sec^2\delta\sin^4 1''$	75+	75+	75+	75+	75+	75+
$N_5=da\cos\delta\sin^2 1''$	0.0	0.0	0.0	0.0	0.0	0.0
$+3/2\, da\cos\delta\, d\delta\tan\delta\sin^3 1''$	75+	70.3	34.9	75+	34.9	9.9
$+15/8\, da\cos\delta\, d\delta^2\sin^4 1''$	75+	75+	75+	75+	75+	75+
$-1/6\, da^3\cos^3\delta\,(7\tan^2\delta-5)\sin^4 1''$	75+	75+	75+	75+	75+	74.8
$N_6=d\delta\sin^2 1''$	0.0	0.0	0.0	0.0	0.0	0.0
$-1/2\, da^2\cos^2\delta\tan\delta\sin^3 1''$	75+	75+	64.4	75+	64.4	27.6
$-3/4\, da^2\cos^2\delta\, d\delta\,(\tan^2\delta-1)\sin^4 1''$	75+	75+	75+	75+	75+	75+
$+4/3\, d\delta^3\sin^4 1''$	75+	75+	75+	75+	75+	75+
$N_7=1/8\, d\delta^2\,(3\tan^4\delta-2\tan^2\delta-1)\sin^4 1''$	75+	75+	75+	75+	74.4	68.8
$+da^2\cos^2\delta\sin^4 1''$	75+	75+	75+	75+	75+	75+
$N_8=2da\cos\delta\, d\delta\sin^4 1''$	75+	75+	75+	75+	75+	75+
$N_9=d\delta^2\sin^4 1''$	75+	75+	75+	75+	75+	75+

We find them to be:

Right ascension, $A_1=3^\circ\ 51'\ 26''.08$,
Declination, $D_1=74^\circ\ 58'\ 2''.52$.

From A, D, a_2, δ_2, we now compute x_2, y_2, also by our former series. These come out:

$$x_2=+1733''.92, \qquad y_2=-90''.28.$$

If we now apply equations (1) of the present paper to the data a_1, δ_1, a_2, δ_2, x_1, y_1, we should arrive at the same values of x_2, y_2. Actual calculation of the expressions appended below gives:

	$''$		$''$
x_1	$=+3600.000$	y_1	$=+3600.000$
M_1	$=-1984.573$	N_1	$=-3567.062$
M_2x_1	$=-\ 1.176$	N_2x_1	$=-\ 120.818$
M_3y_1	$=+\ 121.404$	N_3y_1	$=-\ 0.783$
$M_4x_1^2$	$=-\ 0.568$	$N_4x_1^2$	$=+\ 0.020$
$M_5x_1y_1$	$=-\ 1.126$	$N_5x_1y_1$	$=-\ 0.531$
$M_6y_1^2$	$=-\ 0.037$	$N_6y_1^2$	$=-\ 1.107$
$M_7x_1^3$	$=+\ 0.003$	$N_7x_1^2y_1$	$=+\ 0.020$
$M_8x_1^2y_1$	$=\ 0.000$	$N_8x_1y_1^2$	$=\ 0.000$
$M_9x_1y_1^2$	$=\ 0.000$	$N_9y_1^3$	$=\ 0.000$
	$x_2=+1733.927$		$y_2=-\ 90.261$

These numbers are in satisfactory accord with the values obtained in the previous calculation with the old series.

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CURRENT NOTES ON LAND FORMS

UPWARPED MOUNTAINS IN ALASKA

THE descriptions of certain ranges given by A. H. Brooks in 'The Geography and Geology of Alaska' (prof. paper no. 45, U. S. Geol. Survey, 1906) furnish additional examples of upwarped plateaus, carved into mountainous form by normal and glacial erosion, as already indicated in Gilbert's volume on 'Glaciers' in the reports of the Harriman Alaskan Expedition. The coast range, or southeastern part of the Pacific mountain system in Alaska, is said to be an irregular aggregate of mountain masses with little symmetry of arrangement except a rough alignment along a northwest-southeast axis. The whole aspect of the range is rugged and precipitous, from the needle peaks and knife-edge crests down to the sharply incised channels. This young topography appears to have been carved out of an ancient highland, as is indicated by the striking uniformity of the summit altitudes, which range from about 7,500 feet in British Columbia to about 5,000 feet in Alaska. Here and there pyramidal peaks rise above the general sky line, as if representing the fast-disappearing remnants of eminences not reduced to the general regional level in an earlier cycle of erosion. The Endicott range, the most important member of the Rocky mountain province in Alaska, appears to have had a similar history. When viewed from altitudes of 6,000 feet, the summits 'show a remarkably even sky-line and strongly suggest that they have been carved from a former plateau.' Here, while the transverse valleys are sharply cut, the longitudinal valleys are broad with gentle slopes. The Central plateau, between the Endicott and the Pacific ranges, is described as a gently rolling upland in which the rivers have trenched broad valleys; occasional mountains or mountain groups break the continuity of the plateau. All these provinces appear to have been eroded to moderate relief during a lower stand of the land; the contrasts that they now present seem to be due in part to difference in the amount of uplift, and in part to difference in the depth and stage of revived erosion. Although the ranges here considered do not possess even-topped summits, such as occur in certain other mountain ranges lately referred to in these notes, they appear with many others to confirm the law to which Powell gave so much emphasis: that plateaus of uplift are fashioned into mountains by rivers and glaciers.

I. B.

THE WOLDS AND VALES OF BELTED COASTAL PLAINS

THE development of longitudinal belts of higher and lower ground in a coastal plain (or other similar structure) that initially possessed a single continuous transverse slope toward the sea, is a question to which systematic attention has been given but recently in books on physical geography. A terminology appropriate for the description of longitudinal relief of this kind has lately been suggested by A. C. Veatch in connection with the examples that occur in New Jersey and Long Island ('Underground Water Resources of Long Island, N. Y.,' prof. paper 44, U. S. Geol. Survey, 1906, 28–32). He introduces the English terms, *wold* and *vale;* wold, for the upland which is sustained on a belt of more resistant strata; and vale, for the longitudinal depression that is excavated, chiefly by subsequent streams, on a belt of weaker strata. Thus he calls the inner lowland in New Jersey the Hightstown vale; and the enclosing upland the Perrineville wold; the former having its northeastward extension submerged in Long Island Sound; and the latter forming the body of Long Island itself, now ornamented with glacial additions. In this connection, an ingenious explanation is offered for the deflection of the Delaware, Susquehanna and Potomac rivers for short distances southwestward along the vale, before they transect the wold: Direct consequent courses are assumed to have prevailed in the first cycle of coastal-plain erosion (in which the small relief of old age was presumably attained); then during a time of depression, the transverse passages through the wold were obstructed by Lafayette deposits; and on reelevation—probably with a slight tilt to the southwest—the three rivers deserted their former transverse notches and sought new ones. The problem is necessarily an obscure one, because of the large amount of erosion since the deflected courses were taken. Darton (and later, Newsom) had previously explained these cases of river deflection as caused by coastal sand reefs during a time of submergence; but Veatch points out that this would not account for the occurrence of deflection only in those rivers where a vale had been eroded on weak Cretaceous beds.

In my own practise, the forms here designated by wold and vale have been called cuesta and (inner) lowland. Objection has been frequently urged against the Spanish word, cuesta, because it does not mean only a lop-sided ridge, but a hill or slope of any kind. To this my answer has been that, as soon as any other fitting term comes to be generally adopted, the Spanish name may be given up; but that in the meantime cuesta is much better than no name at all. It will now be interesting to note what acceptance is gained, especially in England, by wold and vale in the restricted sense proposed by Veatch; and to know how many American physiographers will say 'Chunnenugga wold' and 'Winnebago vale' for the cuesta of southern Alabama and the inner lowland of eastern Wisconsin. 'Wold,' like 'forest,' originally meaning wild-land, but not necessarily wood-land, is taken from eastern England, where it names the lop-sided ridge of chalk which ends at Flamboro head; but the chalk cuesta elsewhere in England has other names, such as Chiltern 'Hills,' near Oxford, and the North and South 'downs,' on either side of the eroded lowland of the Weald (another form of wold): and 'vale' is used in England not only for lowlands of the kind here considered, but also for the Vale of Eden, eroded on a faulted mass next west of the Pennine escarpment; and for the Vale of Pewsey, an anticlinal valley. It is perhaps as doubtful whether English physiographers will be content to use these semi-poetic terms in the limited systematic sense proposed by Veatch, as whether Spanish physiographers (if such there be) will be satisfied with the foreign use of cuesta for a low lop-sided ridge.

W. M. D.

SOUTHERN ARKANSAS AND NORTHERN LOUISIANA

THE inner part of the coastal plain in the Gulf States is well known to be a hilly district, but it is not often that one meets specific and systematic accounts of its topographic features. A few pages of welcome information on this matter are found in a recent report by A. C. Veatch ('Geology and Underground Water Resources of Northern Louisiana and Southern Arkansas,' prof. paper 46, U. S. Geol. Survey, 1906, 14–16), where the hill lands between the broad flood plains of the Mississippi, Ouachita, Red and Sabine rivers are described as traversed (ENE–WSW) by several 'ranges of hills, which are more or less persistent for many miles and which follow the general strike of the formations producing them.' The ranges and the strike valleys between them are called wolds and vales, according to the terminology referred to in the preceding note. The Kisatchie wold, formed on the Catahoula (Grand Gulf) formation in northwestern Louisiana, is perhaps the most important. According to McGee it is continued southeastward through the state of Mississippi as the 'Grand Gulf hill land'; and it is due to this wold-making formation that the Mississippi flood plain is narrowed and its enclosing bluffs are increased in height near Natchez ('Lafayette Formation,' 12th Ann. Rep. U. S. Geol. Survey, 1891, 366–370). Sulphur wold, formed on the sandy beds of the lower Eocene, extends from southwestern Arkansas into Texas: between its inner face and the next (Saratoga) wold, farther inland, is a vale along which a main railway line runs from Little Rock. Sulphur wold would appear to be the trans-Mississippi representative of what is known in Alabama as the Chunnenugga ridge (best described by E. A. Smith, Geol. Surv., Alabama, Rep. for 1881–2, p. 273), and in Mississippi as the 'Lignitic hill lands' (see McGee, as above). The wolds, cuestas or hill lands of Arkansas and Louisiana are not continuous upland belts, but are maturely dissected into gentle hills and open valleys by consequent and insequent streams (subsequent streams are poorly developed), with a relief of 100 or 200 feet.

The peculiar shallow lakes which once occupied the valleys lateral to that of the Red river of Louisiana are described with care (pp. 59–64). The explanation which attributes them to obstruction by normal though rapid aggradation of the main-river flood-plain is shown to be in error. They are due to the obstruction of the main river by its 'raft,' or jam of fallen trees. The raft grew by gradual addition to its upper end, while its downstream end slowly decayed and drifted away. As one tributary stream after another was thus obstructed, a shallow lake rose in the lateral valleys. The raft has been artificially removed (1873) by cutting away the tree trunks; and since then the river has lowered its bed and the lakes have shrunk or disappeared. They are given too great number and size on most maps. The deflection of the Red river by the raft to the northeast side of its flood plain, and the resulting development of rapids, not yet graded, where it turns by a new course into the Mississippi flood-plain are items worth mention.

The lakes on the tributaries of the Danube near its mouth have, like those lateral to the Red river of Louisiana, been explained as due to aggradation of the main-river flood-plain. In view of the above restatement of the problem of the Red river lakes, that of the Danube lakes also may require a new interpretation.

W. M. D.

THE BICENTENARY OF LINNÆUS

THE trustees of the British Museum have deputed one of their officers, Dr. F. A. Bather, assistant keeper of the geological department, to represent the museum at the celebrations in Sweden of the bicentenary of the birth of Linnæus. Dr. Bather has been instructed to present two addresses to the University of Upsala and the Swedish Academy of Sciences, the former of which reads as follows:

The British Museum (Natural History), London.

To the Royal University of Upsala.

It is with feelings of peculiar indebtedness that the Board of Trustees of the British Museum desires on this occasion to greet and congratulate the University of Linnæus.

In January, 1758, was published the tenth edition of the 'Systema Naturæ,' the edition from which the zoologists of the world now date the technical nomenclature of animals. In January, 1759, the British Museum was first opened to the public, and its Natural History Departments began the systematic study of the living and extinct animals and plants, taking for their guidance the works of Linnæus, and for their teacher his favorite pupil, Daniel Charles Solander.

By the acquisition of the Banksian Herbarium and Library, already brought to such perfection of arrangement by Solander and Jonas Dryander, the British Museum became the repository of many plants described by Linnæus, notably the originals of the celebrated 'Hortus Cliffortianus,' as well as of valuable manuscripts and books connected with the great Swede.

Desiring, therefore, to share in your celebration of one to whom the British Museum owes so much, the Trustees beg to join with this letter 'A Catalogue of the Works of Linnæus Preserved in the Libraries of the British Museum,' which they have had specially printed in honor of this occasion, and they have appointed as their delegate to present the same one of their officers, Dr. Francis Arthur Bather, M.A.Oxon, Assistant Keeper of the Geological Department.

May the world-wide fame of Linnæus and the fortune of the ancient University of Upsala ever endure and increase to the advancement of learning and the benefit of mankind!

EDWIN RAY LANKESTER,
Director

BRITISH MUSEUM (NATURAL HISTORY),
May 11

SCIENTIFIC NOTES AND NEWS

M. DE LAPPARENT, professor of mineralogy and geology at Paris, has been elected permanent secretary of the Paris Academy of Sciences in succession to the late M. Berthelot.

THE senate of the University of Toronto has conferred the degree of LL.D., on Dr. S. Weir Mitchell, of Philadelphia.

AT the recent commencement of the Jefferson Medical College, of Philadelphia, the honorary degree of doctor of laws was conferred upon George Sumner Huntington, M.D., ScD., professor of anatomy, College of Physicians and Surgeons, Columbia University. Professor Huntington delivered an address on 'Modern advances in the teaching of anatomy and other medical sciences.'

PROFESSOR ROLLA C. CARPENTER, who holds the chair of experimental engineering at Cornell University, has been given the degree of doctor of laws by the University of Michigan.

NEW YORK UNIVERSITY has conferred the doctorate of laws on Dr. Joseph D. Bryant, of New York City, retiring president of the American Medical Association; on Charles W. Hunt, New York City, secretary of the American Society of Civil Engineers, and on Professor George F. Swain, professor of civil engineering of the Massachusetts Institute of Technology.

SIR WILLIAM RAMSAY, K.C.B., has received the Order of Commendatore della Corona d'Italia from the King of Italy.